TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AGENDA ITEM REQUEST

for Rulemaking Adoption

AGENDA REQUESTED: October 17, 2012

DATE OF REQUEST: September 28, 2012

INDIVIDUAL TO CONTACT REGARDING CHANGES TO THIS REQUEST, IF NEEDED: Michael Parrish, (512) 239-2548

CAPTION: Docket No. 2011-1226-RUL. Consideration of the adoption of amendments to 30 TAC Chapter 290, Public Drinking Water, Sections 290.38, 290.39, 290.46, 290.103, 290.109 - 290.112, 290.116, 290.119, 290.122, and 290.275; and 30 TAC Chapter 291, Utility Regulations, Sections 291.161 and 291.162.

The adoption would bring Chapters 290 and 291 into conformity with House Bill (HB) 805, 82nd Legislature, 2011, Regular Session; the federal Ground Water Rule (GWR) including a change to the definition of groundwater under the direct influence of surface water to make it consistent with 40 Code of Federal Regulations Section 141.2; Total Organic Carbon (TOC) Rule; and United States Environmental Protection Agency (EPA) Method 334.0. The federal regulations implement the federal Safe Drinking Water Act. The amendments made for HB 805 expand the counties to which the Emergency Preparedness Plan requirement applies and provides a timeline for newly affected water systems to comply. The amendments made for the GWR establish rule language consistent with that used in the federal regulations. The amendments to the TOC Rule correct an inaccuracy in the applicability statement that extended the state requirements of Section 290.112 to treatment plants that are not subject to the corresponding federal requirements. The amendments also include EPA Method 334.0 as an approved alternative for measuring chlorine residual in drinking water. The proposed rules were published in the June 15, 2012, issue of the *Texas Register* (37 TexReg 4353) for Chapter 290 and (37 TexReg 4398) for Chapter 291. (Matt Court, Christiaan Siano) (Rule Project No. 2011-056-290-OW)

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Copy to CCC Secretary? NO X YES

Texas Commission on Environmental Quality
Interoffice Memorandum

To: Commissioners **Date:** September 28, 2012

Thru: Bridget C. Bohac, Chief Clerk
Zak Covar, Executive Director

From: L'Oreal W. Stepney, P.E., Deputy Director
Office of Water

Docket No.: 2011-1226-RUL

Subject: Commission Approval for Rulemaking Adoption
Chapter 290, Public Drinking Water
Chapter 291, Utility Regulations
HB 805 (EPP) and Federal Ground Water Rule (GWR), Total Organic Carbon (TOC) Rule, and EPA Method 334.0
Rule Project No. 2011-056-290-OW

Background and reason(s) for the rulemaking:
This rulemaking will make changes to Chapters 290 and 291 to incorporate the requirements of House Bill (HB) 805, 82nd Legislature, 2011, relating to emergency preparedness plans (EPP). Adopted changes will make Chapter 290 consistent with the federal Ground Water Rule (GWR) and the federal Total Organic Carbon (TOC) Rule. This rulemaking will also address an inconsistency with federal rules that resulted when the United States Environmental Protection Agency (EPA) adopted Method 334.0 for continuous chlorine residual analyzers. Additionally, staff recommends a change to the definition of groundwater under the direct influence of surface water (GUI), to make it consistent with agency practice and the federal GWR.

HB 805 - Senate Bill (SB) 361, 81st Legislature, 2009, was incorporated into TCEQ rules in 2009. SB 361 required a retail public utility, exempt utility, or provider or conveyor of potable or raw water in a county with a population of 3.3 million or in an adjacent county with a population of 400,000 or more that furnishes water service to more than one customer: to ensure the emergency operation of its water system during an extended power outage, as soon as safe and practicable following the occurrence of a natural disaster; to adopt an EPP that demonstrates the affected utility's ability to provide emergency operations; and, to submit the plan to the commission for approval. SB 361 required TCEQ to adopt rules to implement Texas Water Code (TWC), §13.1395, and to meet the specific requirements to ensure emergency operation at 35 pounds per square inch (psi) through the adoption of the EPP as well as develop an EPP template that lists and explains the necessary preparations and all the commission rules and standards pertaining to EPPs. In 2010, affected utilities with customers in Harris County were required to submit and implement an EPP. Based on HB 805, affected utilities in Harris and Fort Bend Counties were required to prepare and submit an EPP for TCEQ review and approval by February 1, 2012, and to begin implementing the plan by June 1, 2012. The bill allows a one-time extension to each of these deadlines (to March 1, 2012 for submittal and to September 1, 2012 for implementation).

GWR - Federal rules for microbiological monitoring have been in place since 1989. On October 12, 2006, the EPA adopted the GWR, which primarily focuses on groundwater sources, to provide additional protection from fecal contamination. The commission adopted the GWR on December 19, 2008 (Rule Project 2006-045-290-PR). Under Title 40, Code of Federal Regulations (CFR) §142.10, the commission must adopt rules at least as stringent as the federal rules to maintain primacy over public water systems (PWS) in Texas. TCEQ is adopting revisions to the existing Chapter 290 rules to provide language that is consistent with the federal rule.

Scope of the rulemaking:

A.) Summary of what the rulemaking will do:

The adopted rulemaking would bring Chapters 290 and 291 into conformity with HB 805, the federal GWR, TOC Rule, and EPA Method 334.0. The adopted amendments made by HB 805 expand the counties to which the EPP requirement applies and provide a timeline for newly affected water systems to comply. The federal regulations implement the federal Safe Drinking Water Act as detailed below.

B.) Scope required by federal regulations or state statutes:

HB 805 - The adopted amendments would incorporate HB 805, expanding the counties to which the EPP requirement applies and provide a timeline for newly affected water systems to comply.

GWR - The purpose of the GWR is to provide increased protection against microbial pathogens in PWSs that use groundwater sources. The EPA is particularly concerned about groundwater systems that are susceptible to fecal contamination since disease-causing pathogens may be found in fecal contamination. The GWR requires additional microbial sampling from the groundwater source in the event of a coliform-positive sample in the distribution system. The GWR also requires that "significant deficiencies" identified by the TCEQ be corrected by the system within an established timeframe.

In reviewing the state rule, the executive director's staff and the EPA determined that state revisions are needed to conform to the federal GWR. The majority of the changes are minor such as adding the terms "raw groundwater source monitoring," "significant deficiencies," and "situations," as well as revising the definition of GUI to make it consistent with 40 CFR §141.2 as it relates to mixed systems referred to in the GWR. The GWR provides a definition of GUI that includes the use of documentation of well construction characteristics and geology with field evaluation to determine if groundwater source of drinking water is a GUI. The TCEQ's existing definition of a GUI only reflects the use of water quality data to make the determination of a GUI. The added terms are prominent in the federal language and are adopted in several areas to provide consistency with the federal rule and to clarify the state rule.

TOC - The adopted amendments are made to correct an inaccuracy in the applicability statement of the TOC Rule that made the state requirements broader than the federal requirements.

EPA Method 334.0 - The adopted amendments include EPA Method 334.0 as an approved method for measuring chlorine residual in drinking water.

C.) Additional staff recommendations that are not required by federal rule or state statute:

§290.46 - Update the microbiological submission subsection to specify that samples must be submitted in a manner prescribed by the executive director to give the commission more flexibility with how data should be reported.

§290.116 - Rephrase the "in lieu of" statements in all applicable citations because they are confusing in the existing language and have generated several questions and complaints from the regulated community.

§290.122 - Delete the term "violation" in §290.122(a)(2)(D) where it says "notice violation" because the regulated community must post a notice, not a notice violation. Add additional electronic posting methods in all applicable subdivisions to give the regulated community more flexibility with posting options.

Statutory authority:

TWC, §§5.013, 5.102, 5.103, 5.105, 13.041, and 13.1395; and Texas Health and Safety Code (THSC), §341.031(a) and §341.0315

Effect on the:

A.) Regulated community:

HB 805 - HB 805 expands the EPP requirement, previously limited to Harris County, into Fort Bend County. All PWSs with customers in Fort Bend County and connections with overnight accommodations were affected by this regulation. Fewer than 175 systems were affected. Cost of compliance varies because the affected utilities have eight options to achieve compliance. Thus, the cost can vary depending on the option chosen and with the size and complexity of the system. Additionally, a financial waiver is available for systems for which the cost of compliance would result in a significant financial burden to its customers.

GWR - PWSs will be affected by this rulemaking but the effect will be minimal because the Water Supply Division has been providing guidance using a combination of the existing state rule language and the federal rule language contained in the CFR. Although the adopted rule changes for the GWR are significant, the additional federal requirements are not anticipated to significantly increase costs to the regulated community. Also, there will not be any compliance impacts to the regulated community because the Water Supply

Division has been implementing the requirements of the GWR consistent with the federal requirements.

TOC - The adopted amendments correct an inaccuracy in the applicability statement that extended the state requirements of §290.112 to treatment plants that are not subject to the corresponding federal requirements; it is not anticipated that the effect of complying with the adopted amendments will be significant.

EPA Method 334.0 - The adopted amendments make EPA Method 334.0 an approved method for measuring chlorine residual in drinking water; it is not anticipated that the effect of complying with the adopted amendments will be significant.

B.) Public:

HB 805 - The cost of compliance will be passed along to the customers of the affected utilities; the customers will receive the benefit of having emergency operations following a natural disaster.

GWR - Customers of PWSs would be minimally affected by this rulemaking due to a slight increase in public notices from groundwater systems as a result of violations or situations associated with the GWR.

TOC - There is no anticipated impact as a result of this rulemaking.

EPA Method 334.0 - There is no anticipated effect to the public as a result of this rulemaking because the adopted amendments only provide an additional method for analyzing chlorine residual.

C.) Agency programs:

HB 805 - HB 805 is an expansion of an existing project. The Water Supply Division will outsource most of the project and estimates a two-year implementation period with a cost of $250,000 for the first year.

GWR - The program areas affected by this rulemaking would be the Water Supply Division, Regional Offices, and Enforcement Division. The Water Supply Division would make changes to the text of public education materials and correspondence provided to systems that commit violations or have situations associated with the GWR. The Regional Offices will be affected as a result of the requirements for investigations and correspondence to the regulated community. The Enforcement Division may receive requests for information about the changed rules as well as a potential increase in enforcement cases. The changes and effects discussed will be minimal due to the Water Supply Division's implementation activities already in place since the GWR became effective in December 2009.

TOC - There is no anticipated impact as a result of this rulemaking.

EPA Method 334.0 - Allowing PWSs more flexibility in measuring chlorine residuals will result in minimal effect to agency programs.

Stakeholder meetings:
A stakeholder meeting was held on September 13, 2011; there were no specific comments received. The stakeholder meeting resulted in no changes to this rulemaking.

Public comment:
The comment period began on June 15, 2012. The commission held a public hearing on July 10, 2012, in Austin, Texas. The comment period closed on July 16, 2012. No comments were received during this rule's public comment period.

Significant changes from proposal:
None.

Potential controversial concerns and legislative interest:
HB 805 expands an existing program. The expansion has been anticipated since the passage of the first EPP requirement, and will affect a relatively small number of water systems. The GWR has historically been a controversial rule because it requires additional microbiological sampling, corrective actions, public notifications, and reporting for PWSs; however, no significant changes are contained in the adopted rule language so prolonged public dispute or debate is not anticipated. The revisions are adopted to conform to the federal rule language.

Does this rulemaking affect any current policies or require development of new policies?
HB 805 expands the EPP program into Fort Bend County. All of the water systems that serve overnight accommodations will be affected by this regulation, whereas they were not affected in the past. TCEQ will apply existing EPP policies to newly affected water systems. There will be no effect on existing policies or the development of new policies as a result of the adopted rulemaking associated with the GWR, TOC Rule, and EPA Method 334.0.

What are the consequences if this rulemaking does not go forward? Are there alternatives to rulemaking?
If HB 805 is not included within the TCEQ's rules, TCEQ's rules and the state statute would be in conflict. The alternative would be to repeal the TCEQ's current rules and implement HB 805 directly from the statute. For the federal regulations, direct implementation of the federal Safe Drinking Water Act and its amendments by the EPA would be the alternative. The state of Texas must adopt, implement, and enforce regulations at least as stringent as the EPA's Safe Drinking Water Act to maintain primary enforcement authority for drinking water. Where states do not meet that requirement, the EPA performs direct implementation of the Safe Drinking Water Act and its amendments through its regional offices.

Re: Docket No. 2011-1226-RUL

Key points in the adoption rulemaking schedule:

***Texas Register* proposal publication date:**	June 15, 2012
Anticipated *Texas Register* publication date:	November 2, 2012
Anticipated effective date:	November 8, 2012
Six-month Texas Register filing deadline:	December 15, 2012

Agency contacts:
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Attachments
HB 805; GWR; TOC Rule; and EPA Method 334.0

cc: Chief Clerk, 2 copies
Executive Director's Office
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Office of General Counsel
Matt Court
Michael Parrish

The Texas Commission on Environmental Quality (TCEQ, agency, or commission) adopts amendments to §§290.38, 290.39, 290.46, 290.103, 290.109 - 290.112, 290.116, 290.119, 290.122, and 290.275.

Sections 290.38, 290.39, 290.46, 290.103, 290.109 - 290.112, 290.116, 290.119, 290.122, and 290.275 are adopted *without changes* to the proposed text as published in the June 15, 2012, issue of the *Texas Register* (37 TexReg 4353) and will not be republished.

Background and Summary of the Factual Basis for the Adopted Rules

The commission adopts this rulemaking for several reasons. First, the commission amends Chapter 290 for consistency with the federal Ground Water Rule (GWR) and the federal Total Organic Carbon (TOC) Rule. The rulemaking also addresses an inconsistency with federal rules that resulted when the United States Environmental Protection Agency (EPA) adopted Method 334.0 for continuous chlorine residual analyzers. In addition, this rulemaking adopts an expanded definition of groundwater under the direct influence of surface water (GUI) to bring it into conformity with agency practice and federal rules. Finally, the commission changes Chapter 290 to incorporate the requirements of House Bill (HB) 805 from the 82nd Legislature, 2011.

The purpose of the GWR is to provide increased protection against microbial pathogens in public water systems (PWSs) that use groundwater sources. The EPA is particularly concerned about groundwater systems that are susceptible to fecal contamination since disease-causing pathogens may be found in fecal contamination. The GWR requires additional microbial sampling from the groundwater source in the event of a coliform-positive sample in the distribution system. The GWR also requires that "significant deficiencies" identified by the TCEQ be corrected by the water system within an established time frame. In reviewing the state rule, the EPA and the executive director determined that state revisions are needed to conform to the federal GWR. The majority of the changes are minor, such as adding the terms "raw groundwater source monitoring," "significant deficiencies," and "situations." These terms are prominent in the federal language and are adopted in several areas to provide consistency with the federal rule and add clarity to the state rule.

GWR

Federal rules for microbiological monitoring have been in place since 1989. The GWR, which focuses primarily on groundwater sources, was adopted by the EPA on October 12, 2006, to provide additional protection from fecal contamination. The commission adopted the GWR on December 19, 2008 (Rule Project No. 2006-045-290-PR). The EPA granted the TCEQ a two-year extension until October 12, 2010, to complete the TCEQ's version of the rule. Under 40 Code of Federal Regulations (CFR) §142.10, the

commission must adopt rules at least as stringent as the federal rules to maintain primacy over PWSs in Texas. The TCEQ is revising Chapter 290 to provide language that is consistent with the federal rule.

HB 805

Senate Bill (SB) 361, 81st Legislature, 2009, was incorporated into TCEQ rules in 2009. SB 361 required a retail public utility, exempt utility, or provider or conveyor of potable or raw water in a county with a population of 3.3 million or in an adjacent county with a population of 400,000 or more that furnishes water service to more than one customer to: ensure the emergency operation of its water system during an extended power outage, as soon as safe and practicable following the occurrence of a natural disaster; adopt an emergency preparedness plan (EPP) that demonstrates the affected utility's ability to provide emergency operations; and submit the plan to the commission for approval. SB 361 required TCEQ to adopt rules implementing Texas Water Code (TWC), §13.1395, that required affected utilities ensure emergency operation at 35 pounds per square inch (psi) through the adoption of an EPP. In 2010, affected utilities with customers in Harris County were required to submit and implement an EPP. Based on HB 805, affected utilities in Harris and Fort Bend Counties were required to prepare and submit an EPP for TCEQ review and approval by February 1, 2012, and to begin implementing the plan by June 1, 2012.

In a corresponding rulemaking published in this issue of the *Texas Register*, the commission also adopts revisions to 30 TAC Chapter 291, Utility Regulations.

Section by Section Discussion

In addition to implementation of the state and federal laws discussed previously, the commission adopts administrative changes throughout the adopted rules to reflect the agency's existing practices and to conform with *Texas Register* and agency guidelines. These changes include updating cross-references and correcting typographical, spelling, and grammatical errors.

Subchapter D: Rules and Regulations for Public Water Systems

§290.38, Definitions

HB 805

The commission adopts §290.38(1), the definition of "affected utility," changing the population threshold to 550,000 as required by HB 805.

GWR

The commission adopts §290.38(30) updating the definition of "groundwater under the direct influence of surface water" to better reflect the criteria the commission uses to identify these types of water sources and also provide consistency with the federal definition outlined in 40 CFR §141.2. "Groundwater under the direct influence of

surface water" is mentioned in the federal GWR citation, 40 CFR §141.403(a)(3), and the commission is also adopting §290.116(a) which is the corresponding state citation for 40 CFR §141.403(a)(3) to harmonize the state definition with the federal definition. In reviewing the state definition for a GUI, the executive director determined that the definition in §290.38(30) needed to be consistent with the federal definition for a GUI. The federal definition allows for "site-specific" criteria which is not included in the state definition. Furthermore, the federal definition states that "direct influence must be determined for individual sources in accordance with criteria established by the state." The commission also adopts §290.38(71), the definition for "sanitary survey," to include all eight elements of the investigation process. The existing state definition does not include a list of the eight elements that are in the federal definition. The commission adds §290.38(75), defining "significant deficiency," because the state rules did not have such a definition, whereas the federal rules did. These amendments are necessary to provide consistency with the CFR. The commission also renumbers the existing definitions to maintain alphanumeric order.

§290.39, General Provisions

HB 805

The commission amends §290.39(o)(1) updating the due dates for submitting the EPP. The existing rule required systems that existed as of December 1, 2009 to submit the EPP by March 1, 2010. The adopted changes require a system that exists as of

November 1, 2011 to submit the EPP by February 1, 2012. These dates derive from HB 805. The commission adopts §290.39(o)(4) updating the due date for implementing the EPP from July 1, 2010, to June 1, 2012, as required by HB 805.

§290.46, Minimum Acceptable Operating Practices for Public Drinking Water Systems

GWR

The commission adopts §290.46(a) to include a reference to the definition of routine sanitary surveys. EPA staff recommended this clarification as sanitary surveys are one of the primary components of the GWR. The commission adopts §290.46(b) to add the statement that samples shall be submitted in a manner prescribed by the executive director to give the commission more flexibility with how data should be reported. The commission adopts §290.46(f)(2), which requires records to be available during investigation to also require the PWS to make records available to the executive director upon request. This requirement is in the CFR but not in all the appropriate state citations. The commission adopts §290.46(f)(3)(D)(v) to add the federal requirement to retain documentation of coliform-positive samples that could have been caused by distribution deficiencies rather than source issues. The commission adopts §290.46(f)(3)(D)(vi) to delete "and" from the end of the clause because it is no longer necessary with the addition of §290.46(f)(3)(D)(viii) and (ix). The commission adopts §290.46(f)(3)(D)(vii) to delete the period at the end of the rule citation and add a semicolon because of adopted §290.46(f)(3)(D)(viii) and (ix). The commission adopts

§290.46(f)(3)(D)(viii) to include the federal requirement to retain records of the lowest daily residual and of any failure to maintain 4-log treatment. The commission adopts §290.46(f)(3)(D)(ix) to include the federal requirement to retain compliance requirements and records for any executive director-approved alternative treatment techniques, including membrane filtration. These requirements were not in the state language but they are in the CFR. The commission adopts §290.46(f)(3)(E)(viii) to delete "and" from the end of the clause because it is no longer be necessary with the addition of §290.46(f)(3)(E)(x). The commission adopts §290.46(f)(3)(E)(ix) to delete the period and add a semicolon and the word "and" to the end of the clause because of adopted §290.46(f)(3)(E)(x). The commission adopts §290.46(f)(3)(E)(x) to include the federal requirement to retain records of executive director-approved minimum specified disinfectant residual for systems providing 4-log treatment.

Method 334.0

The commission adopts §290.46(s)(2)(C)(i) reducing the frequency that the manual disinfectant residual analyzer accuracy must be evaluated from at least once every 30 days to at least once every 90 days to be consistent with the provisions of federally-approved EPA Method 334.0. The commission deletes existing §290.46(s)(2)(C)(ii) because Method 334.0 does not require on-line disinfectant residual analyzers to be recalibrated every 90 days. The commission renumbers §290.46(s)(2)(C)(iii) as §290.46(s)(2)(C)(ii). Further, in order to achieve consistency with federally-approved

procedures, the commission adopts §290.46(s)(2)(C)(ii) by replacing the term "calibration" with the term "accuracy," increasing the frequency that the accuracy of on-line instruments must be checked from at least once every 30 days to at least once every seven days, and adding a reference to the federally-approved analytical methods identified in §290.119. The commission adopts §290.46(s)(2)(C)(iii), which requires a system to determine and correct the cause of a performance inaccuracy and, if necessary, to adjust, repair, or recalibrate the analyzer to be consistent with the provisions of federally-approved EPA Method 334.0.

Subchapter F: Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems

§290.103, Definitions

GWR

The commission amends §290.103(20) to insert the word "days" after "30" to insert a word which was inadvertently omitted from the rule. The commission amends §290.103(31) replacing the word "sampling" with "monitoring" to provide consistency with the GWR language and prevent additional confusion among the regulated community. The commission adopts §290.103(32) defining "significant deficiency" because this term is used throughout the rule and is defined in the GWR. The commission adopts §290.103(39) defining "4-log treatment." Existing TCEQ rules did not have a definition for "4-log treatment" and it is necessary to conform to the federal

rule because this term is discussed throughout the GWR. The commission further renumbers the existing definitions to maintain alphanumeric order.

§290.109, Microbial Contaminants

GWR

The commission adopts §290.109(c)(4) to include a reference to the updated analytical procedures to more accurately reflect the federal groundwater analytical methods because the state's existing methods did not include the *Escherichia coliform* (*E. coli*) methods. The commission amends §290.109(c)(4)(A)(i) to add a reference to the 4-log treatment definition and also remove the words "or at" to more accurately reflect the federal rule language as recommended by the EPA. The commission amends §290.109(c)(4)(A)(ii) to add a reference to the invalidation criteria specified in §290.109(d)(1). The existing reference in §290.109(c)(4)(A)(ii) and (D)(ii) says "as specified in paragraph (5)," which is incorrect. The commission amends §290.109(c)(4)(B) to specify that only "routine" coliform-positive samples trigger the raw sampling requirement because currently it can be interpreted that coliform-positive "repeat" samples trigger the GWR. The commission also amends §290.109(c)(4)(B) to specify that samples must be analyzed for *E. coli* or "other approved fecal indicator" because currently the language only includes *E. coli* and the federal rule allows for the analysis of additional fecal indicators. The commission further amends §290.109(c)(4)(B) to correct a typographical error. The commission adopts

§290.109(c)(4)(C)(ii) to include a statement that wholesale systems and all consecutive systems served by that groundwater source must notify all customers in accordance with §290.109(g)(2), which is consistent with federal language. The existing language placed the requirement only on the initial wholesale system and not the consecutive systems. The commission adopts §290.109(c)(4)(D)(ii) to clarify that this exception to the triggered source monitoring is contingent on a system meeting the distribution coliform sample invalidation criteria outlined in §290.109(d)(1) and to specify that the replacement sample must be negative for coliforms to meet the criteria. These revisions are necessary to provide consistency with the federal rule language while also deleting an incorrect reference in the existing language to "paragraph (5)." The commission adopts §290.109(c)(4)(E) to add language that describes a hydrogeological sensitivity assessment to be consistent with the federal rule. The commission adopts §290.109(c)(4)(E)(i) and (ii), under the assessment source monitoring subsection that better describes the assessment source monitoring requirements because the existing language does not have all of the requirements outlined in the federal language. The commission amends §290.109(f)(4) to specify that an *E. coli*-positive is not a treatment technique violation but a situation that requires public notice and that it is a violation if corrective action is not addressed within 120 days. The existing language was incorrect in stating that collecting an *E. coli*-positive sample is a violation. The commission adopts §290.109(f)(6) to be more specific with the violation criteria and add that a violation requires public notice. Existing language was not consistent with federal

language. The commission adopts §290.109(g)(2) to better reflect the intent of the federal rule, specify consecutive system requirements, and include instructions on posting the notice annually. The existing language did not include requirements for annual posting and consecutive systems.

§290.110, Disinfectant Residuals

Method 334.0

The changes incorporate in this section a federally-approved analytical method for on-line analyzers that continuously monitor chlorine residuals and to restore consistency with the analytical methods in §290.119 which are referenced in §290.110(d). The commission adopts §290.110(d)(1) and its subdivisions to incorporate the federally-approved analytical method for on-line chlorine residual analyzers by deleting specific analytical methods. The adopted language for chloramines requires approval to use color comparator analytical methods. The commission deletes §290.110(d)(2) and its subdivisions and inserts a reference to chloramines into §290.110(d)(1). Section 290.110(d)(2) is no longer necessary because the adopted language for free chlorine and chloramines is the same; therefore, the commission renumbers §290.110(d)(3) to subsection (d)(2).

§290.111, Surface Water Treatment

Method 334.0

The changes in this section incorporate the federally-approved analytical method for on-line analyzers that continuously monitor chlorine residuals and to restore consistency with the analytical methods in §290.119 which are referenced in §290.111(d)(4). The commission adopts §290.111(d)(4)(C) and its subdivisions to incorporate the federally-approved analytical method for on-line chlorine residual analyzers by deleting specific analytical methods listed as §290.111(d)(4)(C)(i) - (iv). The adopted language references chloramines and requires approval to use color comparator analytical methods. The commission deletes §290.111(d)(4)(D) and its subdivisions and inserts a reference to chloramines into §290.111(d)(4)(C). The remaining paragraphs are renumbered accordingly. Section 290.111(d)(4)(D) is no longer necessary because the adopted language for free chlorine and chloramines is the same; therefore, the commission deletes §290.111(d)(4)(D) and its subdivisions. As a result of these adopted amendments to §290.111(d)(4), the commission reletters the remaining subdivisions.

§290.112, Total Organic Carbon (TOC)

TOC Rule

The commission adopts §290.112(a) to correct an inaccuracy in the applicability statement that extended the state requirements of this section to treatment plants that are not subject to the corresponding federal requirements.

§290.116, Groundwater Corrective Actions and Treatment Techniques

GWR

The commission adopts §290.116(a) to include a description of mixed systems, state that significant deficiencies require corrective action, and specify that 4-log treatment is for each source. The existing language did not specify mixed systems, did not mention significant deficiencies, and implies that 4-log treatment is per PWS, not sources within a PWS. The existing language was not consistent with the federal language. The commission adopts §290.116(a)(1) to specify that 4-log treatment is on a source basis, not a system basis; remove the December 1, 2009, deadline and state that a system must notify the TCEQ in writing if it plans to discontinue the 4-log treatment to be consistent with federal rule language. The commission amends §290.116(a)(1) and (2) to replace the term "customer" with "connection" because this is more consistent with commission terminology. The commission also adopts §290.116(a)(2) to state that a system must conduct triggered source monitoring until the system is approved by TCEQ to do 4-log treatment, and that a system must conduct triggered source sampling if 4-log treatment is discontinued. The commission adopts §290.116(b) to include significant deficiencies as a reason that a corrective action may be necessary, which is included in the federal language. The commission adopts §290.116(b)(1) and (2) to include significant deficiencies as a reason that a corrective action may be necessary, which is included in the federal language. The commission adopts §290.116(b)(5)(B) to specify that by "source" the rule refers to groundwater sources as opposed to potential contaminant sources. The commission amends §290.116(b)(5)(D) to replace the term "customer"

with "connection" because this is more accurate with commission terminology. The commission adopts §290.116(b)(5)(E) to include the federal corrective action option to correct all significant deficiencies. The commission adopts §290.116(b)(5)(F) to include the federal corrective action option of assessment source monitoring. The existing state language did not contain two of the federal corrective action options. To make the language consistent with the federal GWR, the commission adopts §290.116(c) to add "significant deficiency" and specify that 4-log is achieved at or before the first connection for the specified groundwater source. To add clarity and consistency with the federal rule, the commission adopts §290.116(c)(1) to specify that disinfectant levels must be maintained "every day the specified source serves the public" and to add a reference to the monitoring plans required by §290.121. The commission adopts §290.116(c)(1)(A) to reference 40 CFR §141.74(a)(2), the requirement of continuous monitoring of chlorine residuals. The commission adopts §290.116(c)(1)(A)(i) to specify that a system must conduct grab sampling every four hours if the continuous monitoring equipment fails. The commission adopts §290.116(c)(1)(A)(ii) to require the PWS to resume continuous monitoring within 14 days. These requirements are included in the federal language and need to be included within the state rule. The commission amends §290.116(c)(1)(B) to state that the system population threshold is "3,300 or fewer" not "less than 3,300" and to include the federal requirements if such systems fall below the specified disinfectant residual. This amendment to §290.116(c)(1)(B) is necessary so as not to exclude any system with a population of exactly 3,300, provide consistency with

the corresponding federal citation, and give instructions for the situation described in §290.116(c)(1)(B). The commission adopts §290.116(c)(2) to reflect the federal alternative treatment requirements. The commission adopts §290.116(c)(4) to include the federal recordkeeping requirements for systems that provide 4-log treatment or other alternative treatment techniques. The amended §290.116(c)(4) will provide consistency with the corresponding federal citation, provides a reference to the recordkeeping requirements of §290.46, and also provides clarity for the regulated community. The commission amends §290.116(d) by adding the phrases "a significant deficiency" and "conducts 4-log treatment" to add clarity and consistency with the federal rule. The commission adopts §290.116(d)(1) to specify that documents must be made available upon request of the executive director because this is included in the federal rule. The commission adopts §290.116(d)(2) to remove the December 1, 2009, deadline and to add the phrase "for a specified groundwater source" to clarify that 4-log treatment is per source and not per PWS. The commission adopts §290.116(d)(4) to clarify that 4-log treatment is "for the specified groundwater source" and not the system and that when a system "met the state criteria" it is exempt from triggered source monitoring. The commission adopts §290.116(d)(5) to include the federal requirement that systems must notify the executive director if they fall below the minimum specified residual for more than four hours. The commission adopts §290.116(e) to add the 120-day time frame and remove the duplicative language which is already listed in §290.116(a). This amendment is necessary for consistency with the federal rule. The

commission adopts §290.116(e)(3) to specify that systems are in violation if they do not notify the executive director that their 4-log treatment was non-operational for more than four hours, to be consistent with the federal rule. The commission adopts §290.116(f) to add the phrase "or situation" to be more specific and consistent with the federal requirements. The commission adopts §290.116(f)(1) and (2) and its subdivisions to include the special notice requirements for community and noncommunity systems, which would be consistent with the federal rule.

Method 334.0

The changes in this section incorporate the federally-approved analytical method for on-line analyzers that continuously monitor chlorine residuals and restore consistency with the analytical methods in §290.119 referenced in §290.116(c)(3). The commission adopts §290.116(c)(3)(C) and its subdivisions to incorporate the federally-approved analytical method for on-line chlorine residual analyzers by deleting specific analytical methods. The revision to §290.116(c)(3)(C) is necessary to provide consistency with the federally-approved methods. The adopted language is added to chloramines to provide consistency with the federal language and to require approval to use color comparator analytical methods, which gives the commission the authority to deny the use of certain inaccurate color comparator devices. The commission deletes §290.116(c)(3)(D) and inserts a reference to chloramines into adopted §290.116(c)(3)(C). Section 290.116(c)(3)(D) would no longer be necessary because the adopted language for free

chlorine and chloramines is the same; therefore, the commission reletters existing §290.116(c)(3)(E) and (F) to adopted §290.116(c)(3)(D) and (E). These amendments are necessary to provide consistency with the federal language.

§290.119, Analytical Procedures

GWR

The commission adopts §290.119(a)(1) to include "raw groundwater source monitoring" to be consistent with the federal GWR. The commission amends §290.119(b)(8) and (9) to delete "and" from the end of each rule citation as this word is no longer necessary with the adoption of §290.119(b)(10). The commission adopts §290.119(b)(10) include raw groundwater microbiological analyses and reference the CFR methods because existing rule language only addressed total coliform and not *E. coli* which is the fecal indicator used for the GWR. The commission also renumbers the remaining subsection.

§290.122, Public Notification

GWR

The commission adopts §290.122(a) to include "situations" because the heading refers only to violations whereas notice is also required for situations such as an *E. coli*-positive source sample. The commission amends §290.122(a)(1)(F) to include the 24-hour public notice required for systems that have detections of *E. coli* in their source samples because the existing language did not give the time frame. The commission

adopts §290.122(a)(2) to add "public notice and/or boil water notice" because an *E. coli*-positive source sample requires a public notice, but not a boil water notice. The commission adopts §290.122(a)(2) to add "or situation" after "violation" because an *E. coli*-positive source sample is an acute situation, not an acute violation. The commission adopts §290.122(a)(2)(C) and (D) to include electronic delivery options for public notices to allow systems more flexibility for posting public notices. The commission deletes the term "violation" in §290.122(a)(2)(D) because the rule explains how to issue a notice, not a notice violation. This adoption also makes the rule language consistent with associated rules to prevent confusion. The commission adopts §290.122(a)(2)(E) and (4) to add "or situation" to clarify that some acute situations are not violations. The commission adopts §290.122(b)(1)(C) to add uncorrected significant deficiencies as a reason for public notice, to conform to the federal requirements. The commission adopts §290.122(b)(1)(E) to include "or situations" because an *E. coli*-positive sample at the source is not a violation, but an acute situation. The commission adopts §290.122(b)(2) to include "situation" and "significant deficiency" to be consistent with the federal rule. The commission adopts §290.122(b)(2)(A)(ii), (B)(ii), (c)(2)(A), and (B) to include electronic delivery options for public notices to allow systems more flexibility for posting public notices. The commission amends §290.122(c) to include "situations" as required by the federal rule. The commission amends §290.122(d)(1) to include significant deficiency to be consistent with the federal rule and to correct a typographical error. The commission amends §290.122(d)(2) to include "significant

deficiency" and the date of its identification to be consistent with the federal rule. The commission adopts §290.122(d)(3)(A) to include "situations" and uncorrected "significant deficiencies" as required by the federal rule. The commission adopts §290.122(d)(4) to include required federal language regarding details for significant deficiencies. The commission adopts §290.122(d)(7) to include detailed instructions for multilingual notices because the existing state rules did not give instructions on how to obtain a translated notice or help with an interpretation; however, these instructions were included in the federal language.

Subchapter H: Consumer Confidence Reports

§290.275, Appendices A - D

GWR

The commission adopts the figures in §290.275(1) and (2), Appendices A and B, to show that an uncorrected significant deficiency is a treatment technique violation for the GWR and not a Maximum Contaminant Level violation. This provides consistency with the federal language. The commission also adopts language in the figures in §290.275(1) and (2), Appendices A and B, to address raw groundwater source positive samples. This provides consistency with the federal language and differentiates between distribution system positive samples for the Total Coliform Rule and raw groundwater source positive samples for the GWR to prevent confusion among the regulated community.

Final Regulatory Impact Analysis Determination

The commission reviewed the adopted rules in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking does not meet the definition of a "major environmental rule" as defined by that statute. A "major environmental rule" means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state (Texas Government Code, §2001.0225(g)(3)).

This rulemaking does not meet the statutory definition of a "major environmental rule" because it is not the specific intent of the HB 805 amendments to protect the environment or reduce risks to human health from environmental exposure. The specific intent of the HB 805 amendments is to require certain water utilities, providers, and conveyors, to have EPPs for maintaining water pressure following a disruption in service caused by a natural disaster. These rules are not required by federal regulations.

The amendments to Chapter 290 made in response to HB 805 change the county population threshold for identifying affected utilities from 400,000 to 550,000 and provide a timetable for newly affected utilities to comply with TWC, §13.1395.

Further, this rulemaking does not meet the statutory definition of a "major environmental rule" because the amendments do not adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. Although the specific intent of the amendments made in response to the federal regulations is to reduce risks to human health from environmental exposure, it is not a rulemaking that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The specific intent of the rules is to bring Chapter 290 into conformity with HB 805, the federal GWR, TOC rule, the National Primary Drinking Water Regulations (NPDWR), and the chlorine residual analyzer Method 334.0. The federal regulations implement the federal Safe Drinking Water Act (40 CFR §141.1 and §142.1). The amendments made by HB 805 expand the counties to which the EPP requirement applies and provide a timeline for newly affected utilities to comply. The amendments based on the GWR would establish definitions consistent with those used in the federal regulations. The amendments based on the TOC rule are to correct a typographical error that extended the state requirements of this section to treatment plants that are not subject to the corresponding federal requirements. The amendments based on NPDWR would expand the definition of GUI to bring it into conformity with agency practice and 40 CFR §141.2. The amendments based on EPA Method 334.0 would make it an approved method for measuring contaminants in drinking water. It is

not anticipated that the cost of complying with the amendments would be significant with respect to the economy as a whole; therefore, the adopted amendments would not adversely affect in a material way the economy, a sector of the economy, competition, or jobs.

Additionally, this rulemaking does not meet any of the four applicability criteria for requiring a regulatory impact analysis for a major environmental rule, which are listed in Texas Government Code, §2001.0225(a). This section only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule solely under the general powers of the agency instead of under a specific state law.

This rulemaking does not meet any of these four applicability requirements because this rulemaking: 1) does not exceed any standard set by federal law; 2) does not exceed an express requirement of state law; 3) does not exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement any state and federal program in the regulation of PWSs, but rather is adopted to be consistent with state law, to ensure that emergency operations of

water systems following a natural disaster, and with federal regulations in order to ensure consistency of definitions and monitoring requirements across federal and state regulations; and 4) is not adopted solely under the general powers of the agency, but rather specifically under TWC, §13.041, which allows the commission to adopt and enforce rules reasonably required in the exercise of its powers and jurisdiction, including rules governing practice and procedure before the commission, and under Texas Health and Safety Code, §341.031(a), which allows the commission to adopt and enforce rules implement the federal Safe Drinking Water Act (42 United States Code, §300f *et seq.*).

The commission invited public comment regarding the draft regulatory impact analysis determination during the public comment period. The commission did not receive any comments regarding the draft regulatory impact analysis determination.

Takings Impact Assessment

The commission evaluated these rules and performed an analysis of whether they constitute a taking under Texas Government Code, Chapter 2007. The specific purpose of these rules is to implement certain recently enacted legislation relating to the emergency preparedness of affected utilities and federal drinking water regulations. The rules change the number of counties in which an EPP is required (HB 805); certain definitions relating to groundwater sourced drinking water (federal GWR); the reach of

the TOC rule, expanding the definition of GUI; and add Method 334.0 as an alternative method of continuous residual chlorine analysis. This rulemaking substantially advances this stated purpose by making the commission's rules consistent with HB 805 and the federal regulations. The commission's analysis indicates that Texas Government Code, Chapter 2007 does not apply because this action does not affect private real property.

Promulgation and enforcement of these rules will constitute neither a statutory nor a constitutional taking of private real property. These regulations do not adversely affect a landowner's rights in private real property, in whole or in part, temporarily or permanently, because this rulemaking does not burden nor restrict the owner's right to property. More specifically, these rules implement legislation addressing the adoption of EPPs by "affected utilities" (HB 805), the federal GWR, the TOC rule, the NPDWR, and the chlorine analyzer Method 334.0. These provisions do not impose any burdens or restrictions on private real property. Therefore, the amendments do not constitute a taking under Texas Government Code, Chapter 2007.

Consistency with the Coastal Management Program

The commission reviewed the adopted rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor would they affect any action/authorization identified in Coastal Coordination Act

Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the rules are not subject to the Texas Coastal Management Program (CMP).

The commission invited public comment regarding the consistency with the CMP during the public comment period. The commission did not receive any comments regarding the adopted rulemaking's consistency with the CMP.

Public Comment

The commission held a public hearing on July 10, 2012. The comment period closed on July 16, 2012. The commission did not receive any comments on this rulemaking.

SUBCHAPTER D: RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS

§§290.38, 290.39, 290.46

Statutory Authority

These amendments are adopted under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule; Texas Health and Safety Code (THSC), §341.031(a), which establishes the commission's authority to adopt and enforce rules to implement the federal Safe Drinking Water Act (42 United States Code, §§300f *et seq.*); and THSC, §341.0315, which requires public drinking water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

The amendments implement TWC, §13.1395, as amended by House Bill 805, the federal Ground Water Rule, the National Primary Drinking Water Regulations, and the chlorine residual analyzer Method 334.0, which implement the federal Safe Drinking Water Act.

§290.38. Definitions.

The following words and terms, when used in this chapter shall have the following meanings, unless the context clearly indicates otherwise. If a word or term used in this chapter is not contained in the following list, its definition shall be as shown in [Title] 40 Code of Federal Regulations (CFR) §141.2. Other technical terms used shall have the meanings or definitions listed in the latest edition of *The Drinking Water Dictionary*, prepared by the American Water Works Association.

(1) Affected utility--A retail public utility (§291.3 of this title (relating to Definitions of Terms)), exempt utility (§291.3 of this title), or provider or conveyor of potable or raw water service that furnishes water service to more than one customer:

(A) in a county with a population of 3.3 million or more; or

(B) in a county with a population of <u>550,000</u> [400,000] or more adjacent to a county with a population of 3.3 million or more.

(2) Air gap--The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet conveying water to a tank, fixture, receptor, sink, or other assembly and the flood level rim of the receptacle.

The vertical, physical separation must be at least twice the diameter of the water supply outlet, but never less than 1.0 inch.

(3) ANSI standards--The standards of the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(4) Approved laboratory--A laboratory approved by the executive director to analyze water samples to determine their compliance with certain maximum or minimum allowable constituent levels.

(5) ASME standards--The standards of the American Society of Mechanical Engineers, 346 East 47th Street, New York, New York 10017.

(6) ASTM International standards--The standards of the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, Pennsylvania, 19428.

(7) Auxiliary power--Either mechanical power or electric generators which can enable the system to provide water under pressure to the distribution system in the event of a local power failure. With the approval of the executive director, dual primary

electric service may be considered as auxiliary power in areas which are not subject to large scale power outages due to natural disasters.

(8) AWWA standards--The latest edition of the applicable standards as approved and published by the American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235.

(9) Bag Filter--Pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to the outside.

(10) Cartridge filter--Pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

(11) Certified laboratory--A laboratory certified by the commission to analyze water samples to determine their compliance with maximum allowable

constituent levels. After June 30, 2008, laboratories must be accredited, not certified, in order to perform sample analyses previously performed by certified laboratories.

(12) Challenge test--A study conducted to determine the removal efficiency (log removal value) of a device for a particular organism, particulate, or surrogate.

(13) Chemical disinfectant--Any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to the water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

(14) Community water system--A public water system which has a potential to serve at least 15 residential service connections on a year-round basis or serves at least 25 residents on a year-round basis.

(15) Connection--A single family residential unit or each commercial or industrial establishment to which drinking water is supplied from the system. As an example, the number of service connections in an apartment complex would be equal to the number of individual apartment units. When enough data is not available to accurately determine the number of connections to be served or being served, the population served divided by three will be used as the number of connections for

calculating system capacity requirements. Conversely, if only the number of connections is known, the connection total multiplied by three will be the number used for population served. For the purposes of this definition, a dwelling or business which is connected to a system that delivers water by a constructed conveyance other than a pipe shall not be considered a connection if:

(A) the water is used exclusively for purposes other than those defined as human consumption (see human consumption);

(B) the executive director determines that alternative water to achieve the equivalent level of public health protection provided by the drinking water standards is provided for residential or similar human consumption, including, but not limited to, drinking and cooking; or

(C) the executive director determines that the water provided for residential or similar human consumption is centrally treated or is treated at the point of entry by a provider, a pass through entity, or the user to achieve the equivalent level of protection provided by the drinking water standards.

(16) Contamination--The presence of any foreign substance (organic, inorganic, radiological or biological) in water which tends to degrade its quality so as to constitute a health hazard or impair the usefulness of the water.

(17) Cross-connection--A physical connection between a public water system and either another supply of unknown or questionable quality, any source which may contain contaminating or polluting substances, or any source of water treated to a lesser degree in the treatment process.

(18) Direct integrity test--A physical test applied to a membrane unit in order to identify and isolate integrity breaches/leaks that could result in contamination of the filtrate.

(19) Disinfectant--A chemical or a treatment which is intended to kill or inactivate pathogenic microorganisms in water.

(20) Disinfection--A process which inactivates pathogenic organisms in the water by chemical oxidants or equivalent agents.

(21) Distribution system--A system of pipes that conveys potable water from a treatment plant to the consumers. The term includes pump stations, ground and

elevated storage tanks, potable water mains, and potable water service lines and all associated valves, fittings, and meters, but excludes potable water customer service lines.

(22) Drinking water--All water distributed by any agency or individual, public or private, for the purpose of human consumption or which may be used in the preparation of foods or beverages or for the cleaning of any utensil or article used in the course of preparation or consumption of food or beverages for human beings. The term "Drinking Water" shall also include all water supplied for human consumption or used by any institution catering to the public.

(23) Drinking water standards--The commission rules covering drinking water standards in Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems).

(24) Elevated storage capacity--That portion of water which can be stored at least 80 feet above the highest service connection in the pressure plane served by the storage tank.

(25) Emergency operations--The operation of an affected utility during an extended power outage at a minimum water pressure of 35 pounds per square inch.

(26) Emergency power--Either mechanical power or electric generators which can enable the system to provide water under pressure to the distribution system in the event of a local power failure. With the approval of the executive director, dual primary electric service may be considered as emergency power in areas which are not subject to large scale power outages due to natural disasters.

(27) Extended power outage--A [a] power outage lasting for more than 24 hours.

(28) Filtrate--The water produced from a filtration process; typically used to describe the water produced by filter processes such as membranes.

(29) Groundwater--Any water that is located beneath the surface of the ground and is not under the direct influence of surface water.

(30) Groundwater under the direct influence of surface water--Any water beneath the surface of the ground with:

(A) significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*; [or]

(B) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions; or [.]

(C) site-specific characteristics including measurements of water quality parameters, well construction details, existing geological attributes, and other features that are similar to groundwater sources that have been identified by the executive director as being under the direct influence of surface water.

(31) Health hazard--A cross-connection, potential contamination hazard, or other situation involving any substance that can cause death, illness, spread of disease, or has a high probability of causing such effects if introduced into the potable drinking water supply.

(32) Human consumption--Uses by humans in which water can be ingested into or absorbed by the human body. Examples of these uses include, but are not limited to drinking, cooking, brushing teeth, bathing, washing hands, washing dishes, and preparing foods.

(33) Indirect integrity monitoring--The monitoring of some aspect of filtrate water quality, such as turbidity, that is indicative of the removal of particulate matter.

(34) Innovative/alternate treatment--Any treatment process that does not have specific design requirements in §290.42(a) - (f) of this title (relating to Water Treatment). For example, the adjustment of fluoride ion content, special treatment for metals, iron, manganese, organic and inorganic contaminant reduction, special methods for taste and odor control, demineralization, corrosion control processes, membrane filtration, bag/cartridge filters, ozone, chlorine dioxide, Ultraviolet (UV) light disinfection, and other treatment processes.

(35) Interconnection--A physical connection between two public water supply systems.

(36) International Fire Code (IFC)--The standards of the International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001.

(37) Intruder-resistant fence--A fence six feet or greater in height, constructed of wood, concrete, masonry, or metal with three strands of barbed wire

extending outward from the top of the fence at a 45 degree angle with the smooth side of the fence on the outside wall. In lieu of the barbed wire, the fence must be eight feet in height. The fence must be in good repair and close enough to surface grade to prevent intruder passage.

(38) L/d ratio--The dimensionless value that is obtained by dividing the length (depth) of a granular media filter bed by the weighted effective diameter "d" of the filter media. The weighted effective diameter of the media is calculated based on the percentage of the total bed depth contributed by each media layer.

(39) Licensed professional engineer--An engineer who maintains a current license through the Texas Board of Professional Engineers in accordance with its requirements for professional practice.

(40) Log removal value (LRV)--Removal efficiency for a target organism, particulate, or surrogate expressed as $\log_{10}$ (i.e., $\log_{10}$ (feed concentration) - $\log_{10}$ (filtrate concentration)).

(41) Maximum daily demand--In the absence of verified historical data or in cases where a public water system has imposed mandatory water use restrictions

within the past 36 months, maximum daily demand means 2.4 times the average daily demand of the system.

(42) Maximum contaminant level (MCL)--The MCL for a specific contaminant is defined in the section relating to that contaminant.

(43) Membrane filtration--A pressure or vacuum driven separation process in which particulate matter larger than one micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test; includes the following common membrane classifications microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), and reverse osmosis (RO), as well as any "membrane cartridge filtration" (MCF) device that satisfies this definition.

(44) Membrane $LRV_{C\text{-}Test}$ --The number that reflects the removal efficiency of the membrane filtration process demonstrated during challenge testing. The value is based on the entire set of log removal values (LRVs) [LRVs] obtained during challenge testing, with one representative LRV established per module tested.

(45) Membrane module--The smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(46) Membrane sensitivity--The maximum log removal value (LRV) that can be reliably verified by a direct integrity test.

(47) Membrane unit--A group of membrane modules that share common valving, which allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(48) Milligrams per liter (mg/L)--A measure of concentration, equivalent to and replacing parts per million in the case of dilute solutions.

(49) Monthly reports of water works operations--The daily record of data relating to the operation of the system facilities compiled in a monthly report.

(50) National Fire Protection Association (NFPA) standards--The standards of the NFPA, 1 Batterymarch Park, Quincy, Massachusetts, 02269-9101.

(51) National Sanitation Foundation (NSF)--The NSF or reference to the listings developed by the foundation, P.O. Box 1468, Ann Arbor, Michigan 48106.

(52) Noncommunity water system--Any public water system which is not a community system.

(53) Nonhealth hazard--A cross-connection, potential contamination hazard, or other situation involving any substance that generally will not be a health hazard, but will constitute a nuisance, or be aesthetically objectionable, if introduced into the public water supply.

(54) Nontransient noncommunity water system--A public water system that is not a community water system and regularly serves at least 25 of the same persons at least six months out of the year.

(55) psi--Pounds per square inch.

(56) Peak hourly demand--In the absence of verified historical data, peak hourly demand means 1.25 times the maximum daily demand (prorated to an hourly rate) if a public water supply meets the commission's minimum requirements for elevated storage capacity and 1.85 times the maximum daily demand (prorated to an

hourly rate) if the system uses pressure tanks or fails to meet the commission's minimum elevated storage capacity requirement.

(57) Plumbing inspector--Any person employed by a political subdivision for the purpose of inspecting plumbing work and installations in connection with health and safety laws and ordinances, who has no financial or advisory interest in any plumbing company, and who has successfully fulfilled the examinations and requirements of the Texas State Board of Plumbing Examiners.

(58) Plumbing ordinance--A set of rules governing plumbing practices which is at least as stringent and comprehensive as one of the following nationally recognized codes:

(A) the International Plumbing Code; or

(B) the Uniform Plumbing Code.

(59) Potable water customer service line--The sections of potable water pipe between the customer's meter and the customer's point of use.

(60) Potable water service line--The section of pipe between the potable water main to the customer's side of the water meter. In cases where no customer water meter exists, it is the section of pipe that is under the ownership and control of the public water system.

(61) Potable water main--A pipe or enclosed constructed conveyance operated by a public water system which is used for the transmission or distribution of drinking water to a potable water service line.

(62) Potential contamination hazard--A condition which, by its location, piping or configuration, has a reasonable probability of being used incorrectly, through carelessness, ignorance, or negligence, to create or cause to be created a backflow condition by which contamination can be introduced into the water supply. Examples of potential contamination hazards are:

(A) bypass arrangements;

(B) jumper connections;

(C) removable sections or spools; and

(D) swivel or changeover assemblies.

(63) Process control duties--Activities that directly affect the potability of public drinking water, including: making decisions regarding the day-to-day operations and maintenance of public water system production and distribution; maintaining system pressures; determining the adequacy of disinfection and disinfection procedures; taking routine microbiological samples; taking chlorine residuals and microbiological samples after repairs or installation of lines or appurtenances; and operating chemical feed systems, filtration, disinfection, or pressure maintenance equipment; or performing other duties approved by the executive director.

(64) Public drinking water program--Agency staff designated by the executive director to administer the Safe Drinking Water Act and state statutes related to the regulation of public drinking water. Any report required to be submitted in this chapter to the executive director must be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 155, P.O. Box 13087, Austin, Texas 78711-3087.

(65) Public health engineering practices--Requirements in this subchapter or guidelines promulgated by the executive director.

(66) Public water system--A system for the provision to the public of water for human consumption through pipes or other constructed conveyances, which includes all uses described under the definition for drinking water. Such a system must have at least 15 service connections or serve at least 25 individuals at least 60 days out of the year. This term includes; any collection, treatment, storage, and distribution facilities under the control of the operator of such system and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Two or more systems with each having a potential to serve less than 15 connections or less than 25 individuals but owned by the same person, firm, or corporation and located on adjacent land will be considered a public water system when the total potential service connections in the combined systems are 15 or greater or if the total number of individuals served by the combined systems total 25 or greater at least 60 days out of the year. Without excluding other meanings of the terms "individual" or "served," an individual shall be deemed to be served by a water system if he lives in, uses as his place of employment, or works in a place to which drinking water is supplied from the system.

(67) Quality Control Release Value (QCRV)--A minimum quality standard of a non-destructive performance test (NDPT) established by the manufacturer for membrane module production that ensures that the module will attain the targeted log removal value (LRV) demonstrated during challenge testing.

(68) Reactor Validation Testing--A process by which a full-scale Ultraviolet (UV) [UV] reactor's disinfection performance is determined relative to operating parameters that can be monitored. These parameters include flow rate, UV intensity as measured by a UV sensor and the UV lamp status.

(69) Resolution--The size of the smallest integrity breach that contributes to a response from a direct integrity test in membranes used to treat surface water or groundwater under the direct influence of surface water.

(70) Sanitary control easement--A legally binding document securing all land, within 150 feet of a public water supply well location, from pollution hazards. This document must fully describe the location of the well and surrounding lands and must be filed in the county records to be legally binding.

(71) Sanitary survey--An onsite review of a public water system's adequacy for producing and distributing safe drinking water by evaluating the following elements: water source; treatment; distribution system; finished water storage; pump, pump facilities, and controls; monitoring, reporting, and data verification; system management, operation and maintenance; and operator compliance [An onsite review of the water source, facilities, equipment, operation and maintenance of a public water

system, for the purpose of evaluating the adequacy for producing and distributing safe drinking water].

(72) Sensitivity--The maximum log removal value (LRV) that can be reliably verified by a direct integrity test in membranes used to treat surface water or groundwater under the direct influence of surface water; also applies to some continuous indirect integrity monitoring methods.

(73) Service line--A pipe connecting the utility service provider's main and the water meter, or for wastewater, connecting the main and the point at which the customer's service line is connected, generally at the customer's property line.

(74) Service pump--Any pump that takes treated water from storage and discharges to the distribution system.

(75) Significant deficiency--Significant deficiencies cause, or have the potential to cause, the introduction of contamination into water delivered to customers. This may include defects in design, operation, or maintenance of the source, treatment, storage, or distribution systems.

(76) [(75)] Transfer pump--Any pump which conveys water from one point to another within the treatment process or which conveys water to storage facilities prior to distribution.

(77) [(76)] Transient noncommunity water system--A public water system that is not a community water system and serves at least 25 persons at least 60 days out of the year, yet by its characteristics, does not meet the definition of a nontransient noncommunity water system.

(78) [(77)] Wastewater lateral--Any pipe or constructed conveyance carrying wastewater, running laterally down a street, alley, or easement, and receiving flow only from the abutting properties.

(79) [(78)] Wastewater main--Any pipe or constructed conveyance which receives flow from one or more wastewater laterals.

§290.39. General Provisions.

(a) Authority for requirements. Texas Health and Safety Code (THSC), Chapter 341, Subchapter C prescribes the duties of the commission relating to the regulation and control of public drinking water systems in the state. The statute requires that the commission ensure that public water systems: supply safe drinking water in adequate

quantities, are financially stable and technically sound, promote use of regional and area-wide drinking water systems, and review completed plans and specifications and business plans for all contemplated public water systems not exempted by THSC, §341.035(d). The statute also requires the commission be notified of any subsequent material changes, improvements, additions, or alterations in existing systems and, consider compliance history in approving new or modified public water systems. Texas Water Code (TWC), Chapter 13, Subchapter E, §13.1395, prescribes the duties of the commission relating to standards for emergency operations of affected utilities. The statute requires that the commission ensure that affected utilities provide water service as soon as safe and practicable during an extended power outage following the occurrence of a natural disaster.

(b) Reason for this subchapter and minimum criteria. This subchapter has been adopted to ensure regionalization and area-wide options are fully considered, the inclusion of all data essential for comprehensive consideration of the contemplated project, or improvements, additions, alterations, or changes thereto and to establish minimum standardized public health design criteria in compliance with existing state statutes and in accordance with good public health engineering practices. In addition, minimum acceptable financial, managerial, technical, and operating practices must be specified to ensure that facilities are properly operated to produce and distribute safe, potable water.

(c) Required actions and approvals prior to construction. A person may not begin construction of a public drinking water supply system unless the executive director determines the following requirements have been satisfied and approves construction of the proposed system.

(1) A person proposing to install a public drinking water system within the extraterritorial jurisdiction of a municipality; or within 1/2-mile of the corporate boundaries of a district, or other political subdivision providing the same service; or within 1/2-mile of a certificated service area boundary of any other water service provider shall provide to the executive director evidence that:

(A) written application for service was made to that provider; and

(B) all application requirements of the service provider were satisfied, including the payment of related fees.

(2) A person may submit a request for an exception to the requirements of paragraph (1) of this subsection if the application fees will create a hardship on the person. The request must be accompanied by evidence documenting the financial hardship.

(3) A person who is not required to complete the steps in paragraph (1) of this subsection, or who completes the steps in paragraph (1) of this subsection and is denied service or determines that the existing provider's cost estimate is not feasible for the development to be served, shall submit to the executive director:

(A) plans and specifications for the system; and

(B) a business plan for the system.

(4) Emergency Preparedness Plan for Public Water Systems that are Affected Utilities.

(A) Each public water system that is also an affected utility, as defined by §290.38(1) of this title (relating to Definitions), is required to submit to the executive director, receive approval for, and adopt an emergency preparedness plan in accordance with §290.45 of this title (relating to Minimum Water System Capacity Requirements) using either the template in Appendix J of §290.47 of this title (relating to Appendices) or another emergency preparedness plan that meets the requirements of this section. Emergency preparedness plans are required to be prepared under the direction of a licensed professional engineer when an affected utility has been granted or

is requesting an alternative capacity requirement in accordance with §290.45(g) of this title, or is requesting to meet the requirements of TWC, §13.1395, as an alternative to any rule requiring elevated storage, or as determined by the executive director on a case by case basis.

(B) Each affected utility that supplies, provides, or conveys surface water to wholesale customers shall include in its emergency preparedness plan under subparagraph (A) of this paragraph provision for the actual installation and maintenance of automatically starting auxiliary generators or distributive generation facilities for each raw water intake pump station, water treatment plant, pump station, and pressure facility necessary to provide water to its wholesale customers.

(C) The executive director shall review an emergency preparedness plan submitted under subparagraph (A) of this paragraph. If the executive director determines that the plan is not acceptable, the executive director shall recommend changes to the plan. The executive director must make its recommendations on or before the 90th day after the executive director receives the plan. In accordance with commission rules, an emergency preparedness plan must include one of the options listed in §290.45(h)(1)(A) - (H) of this title.

(D) Each affected utility shall install any required equipment to implement the emergency preparedness plan approved by the executive director immediately upon operation.

(E) The executive director may grant a waiver of the requirements for emergency preparedness plans to an affected utility if the executive director determines that compliance with this section will cause a significant financial burden on customers of the affected utility. The affected utility shall submit financial, managerial, and technical information as requested by the executive director to demonstrate the financial burden.

(d) Submission of plans.

(1) Plans, specifications, and related documents will not be considered unless they have been prepared under the direction of a licensed professional engineer. All engineering documents must have engineering seals, signatures, and dates affixed in accordance with the rules of the Texas Board of Professional Engineers.

(2) Detailed plans must be submitted for examination at least 30 days prior to the time that approval, comments or recommendations are desired. From this, it is not to be inferred that final action will be forthcoming within the time mentioned.

(3) The limits of approval are as follows.

(A) The commission's public drinking water program furnishes consultation services as a reviewing body only, and its licensed professional engineers may neither act as design engineers nor furnish detailed estimates.

(B) The commission's public drinking water program does not examine plans and specifications in regard to the structural features of design, such as strength of concrete or adequacy of reinforcing. Only the features covered by this subchapter will be reviewed.

(C) The consulting engineer and/or owner must provide surveillance adequate to assure that facilities will be constructed according to approved plans and must notify the executive director in writing upon completion of all work. Planning materials shall be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 153, P.O. Box 13087, Austin, Texas 78711-3087.

(e) Submission of planning material. In general, the planning material submitted shall conform to the following requirements.

(1) Engineering reports are required for new water systems and all surface water treatment plants. Engineering reports are also required when design or capacity deficiencies are identified in an existing system. The engineering report shall include, at least, coverage of the following items:

(A) statement of the problem or problems;

(B) present and future areas to be served, with population data;

(C) the source, with quantity and quality of water available;

(D) present and estimated future maximum and minimum water quantity demands;

(E) description of proposed site and surroundings for the water works facilities;

(F) type of treatment, equipment, and capacity of facilities;

(G) basic design data, including pumping capacities, water storage and flexibility of system operation under normal and emergency conditions; and

(H) the adequacy of the facilities with regard to delivery capacity and pressure throughout the system.

(2) All plans and drawings submitted may be printed on any of the various papers which give distinct lines. All prints must be clear, legible and assembled to facilitate review.

(A) The relative location of all facilities which are pertinent to the specific project shall be shown.

(B) The location of all abandoned or inactive wells within 1/4-mile of a proposed well site shall be shown or reported.

(C) If staged construction is anticipated, the overall plan shall be presented, even though a portion of the construction may be deferred.

(D) A general map or plan of the municipality, water district, or area to be served shall accompany each proposal for a new water supply system.

(3) Specifications for construction of facilities shall accompany all plans. If a process or equipment which may be subject to probationary acceptance because of limited application or use in Texas is proposed, the executive director may give limited approval. In such a case, the owner must be given a bonded guarantee from the manufacturer covering acceptable performance. The specifications shall include a statement that such a bonded guarantee will be provided to the owner and shall also specify those conditions under which the bond will be forfeited. Such a bond will be transferable. The bond shall be retained by the owner and transferred when a change in ownership occurs.

(4) A copy of each fully executed sanitary control easement and any other documentation demonstrating compliance with §290.41(c)(1)(F) of this title (relating to Water Sources) shall be provided to the executive director prior to placing the well into service. Each original easement document, if obtained, must be recorded in the deed records at the county courthouse. Section 290.47(c) of this title includes a suggested form.

(5) Construction features and siting of all facilities for new water systems and for major improvements to existing water systems must be in conformity with applicable commission rules.

(f) Submission of business plans. The prospective owner of the system or the person responsible for managing and operating the system must submit a business plan to the executive director that demonstrates that the owner or operator of the system has available the financial, managerial, and technical capability to ensure future operation of the system in accordance with applicable laws and rules. The executive director may order the prospective owner or operator to demonstrate financial assurance to operate the system in accordance with applicable laws and rules as specified in Chapter 37, Subchapter O of this title (relating to Financial Assurance for Public Drinking Water Systems and Utilities), or as specified by commission rule, unless the executive director finds that the business plan demonstrates adequate financial capability. A business plan shall include the information and be presented in a format prescribed by the executive director. For community water systems, the business plan shall contain, at a minimum, the following elements:

(1) description of areas and population to be served by the potential system;

(2) description of drinking water supply systems within a two-mile radius of the proposed system, copies of written requests seeking to obtain service from each of those drinking water supply systems, and copies of the responses to the written requests;

(3) time line for construction of the system and commencement of operations;

(4) identification of and costs of alternative sources of supply;

(5) selection of the alternative to be used and the basis for that selection;

(6) identification of the person or entity which owns or will own the drinking water system and any identifiable future owners of the drinking water system;

(7) identification of any other businesses and public drinking water system(s) owned or operated by the applicant, owner(s), parent organization, and affiliated organization(s);

(8) an operations and maintenance plan which includes sufficient detail to support the budget estimate for operation and maintenance of the facilities;

(9) assurances that the commitments and resources needed for proper operation and maintenance of the system are, and will continue to be, available,

including the qualifications of the organization and each individual associated with the proposed system;

(10) for retail public utilities as defined by TWC, §13.002:

(A) projected rate revenue from residential, commercial, and industrial customers; and

(B) pro forma income, expense, and cash flow statements;

(11) identification of any appropriate financial assurance, including those being offered to capital providers;

(12) a notarized statement signed by the owner or responsible person that the business plan has been prepared under his direction and that he is responsible for the accuracy of the information; and

(13) other information required by the executive director to determine the adequacy of the business plan or financial assurance.

(g) Business plans not required. A person is not required to file a business plan if the person:

(1) is a county;

(2) is a retail public utility as defined by TWC, §13.002, unless that person is a utility as defined by that section;

(3) has executed an agreement with a political subdivision to transfer the ownership and operation of the water supply system to the political subdivision; or

(4) is a noncommunity nontransient water system and the person has demonstrated financial assurance under THSC, Chapter 361 or Chapter 382 or TWC, Chapter 26.

(h) Beginning and completion of work.

(1) No person may begin construction on a new public water system before receiving written approval of plans and specifications and, if required, approval of a business plan from the executive director. No person may begin construction of modifications to a public water system without providing notification to the executive

director and submitting and receiving approval of plans and specifications if requested in accordance with subsection (j) of this section.

(2) The executive director shall be notified in writing by the design engineer or the owner before construction is started.

(3) Upon completion of the water works project, the engineer or owner shall notify the executive director in writing as to its completion and attest to the fact that the completed work is substantially in accordance with the plans and change orders on file with the commission.

(i) Changes in plans and specifications. Any addenda or change orders which may involve a health hazard or relocation of facilities, such as wells, treatment units, and storage tanks, shall be submitted to the executive director for review and approval.

(j) Changes in existing systems or supplies. Public water systems shall notify the executive director prior to making any significant change or addition to the system's production, treatment, storage, pressure maintenance, or distribution facilities. Public water systems shall submit plans and specifications for the proposed changes upon request. Changes to an existing disinfection process at a treatment plant that treats surface water or groundwater that is under the direct influence of surface water shall not

be instituted without the prior approval of the executive director. Any long-term change in water treatment that will impact the corrosivity shall not be instituted without the prior approval of the executive director.

(1) The following changes are considered to be significant:

(A) proposed changes to existing systems which result in an increase or decrease in production, treatment, storage, or pressure maintenance capacity;

(B) proposed changes to the disinfection process used at plants that treat surface water or groundwater that is under the direct influence of surface water including changes involving the disinfectants used, the disinfectant application points, or the disinfectant monitoring points;

(C) proposed changes to the type of disinfectant used to maintain a disinfectant residual in the distribution system;

(D) proposed changes in existing distribution systems when the change is greater than 10% of the existing distribution capacity or 250 connections,

whichever is smaller, or results in the water system's inability to comply with any of the applicable capacity requirements of §290.45 of this title;

(E) proposed replacement or change of membranes modules;

(F) any other material changes specified by the executive director; and

(G) examples of long-term treatment changes that could impact the corrosivity of the water include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants, and switching corrosion inhibitor products. Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.

(2) The executive director shall determine whether engineering plans and specifications will be required after reviewing the initial notification regarding the nature and extent of the modifications.

(A) Upon request of the executive director, the water system shall submit plans and specifications in accordance with the requirements of subsection (d) of this section.

(B) Unless plans and specifications are required by Chapter 293 of this title (relating to Water Districts), the executive director will not require another state agency or a political subdivision to submit planning material on distribution line improvements if the entity has its own internal review staff and complies with all of the following criteria:

(i) the internal review staff includes one or more licensed professional engineers that are employed by the political subdivision and must be separate from, and not subject to the review or supervision of, the engineering staff or firm charged with the design of the distribution extension under review;

(ii) a licensed professional engineer on the internal review staff determines and certifies in writing that the proposed distribution system changes comply with the requirements of §290.44 of this title (relating to Water Distribution) and will not result in a violation of any provision of §290.45 of this title;

(iii) the state agency or political subdivision includes a copy of the written certification described in this subparagraph with the initial notice that is submitted to the executive director.

(C) Unless plans and specifications are required by Chapter 293 of this title, the executive director will not require planning material on distribution line improvements from any public water system that is required to submit planning material to another state agency or political subdivision that complies with the requirements of subparagraph (B) of this paragraph. The notice to the executive director must include a statement that a state statute or local ordinance requires the planning materials to be submitted to the other state agency or political subdivision and a copy of the written certification that is required in subparagraph (B) of this paragraph.

(3) If a certificate of convenience and necessity (CCN) is required or must be amended, the CCN application must be included with the notice to the executive director.

(k) Planning material acceptance. Planning material for improvements to an existing system which does not meet the requirements of all sections of this subchapter will not be considered unless the necessary modifications for correcting the deficiencies are included in the proposed improvements, or unless the executive director determines

that reasonable progress is being made toward correcting the deficiencies and no immediate health hazard will be caused by the delay.

(l) Exceptions. Requests for exceptions to one or more of the requirements in this subchapter shall be considered on an individual basis. Any water system which requests an exception must demonstrate to the satisfaction of the executive director that the exception will not compromise the public health or result in a degradation of service or water quality.

(1) The exception must be requested in writing and must be substantiated by carefully documented data. The request for an exception shall precede the submission of engineering plans and specifications for a proposed project for which an exception is being requested.

(2) Any exception granted by the commission is subject to revocation.

(3) Any request for an exception which is not approved by the commission in writing is denied.

(4) The executive director may establish site specific design, operation, maintenance, and reporting requirements for systems that have been issued an exception to the subchapter.

(m) Notification of system startup or reactivation. The owner or responsible official must provide written notification to the commission of the startup of a new public water supply system or reactivation of an existing public water supply system. This notification must be made immediately upon meeting the definition of a public water system as defined in §290.38 of this title.

(n) The commission may require the owner or operator of a public drinking water supply system that was constructed without the approval required by THSC, §341.035, that has a history of noncompliance with THSC, Chapter 341, Subchapter C or commission rules, or that is subject to a commission enforcement action to take the following action:

(1) provide the executive director with a business plan that demonstrates that the system has available the financial, managerial, and technical resources adequate to ensure future operation of the system in accordance with applicable laws and rules. The business plan must fulfill all the requirements for a business plan as set forth in subsection (f) of this section;

(2) provide adequate financial assurance of the ability to operate the system in accordance with applicable laws and rules. The executive director will set the amount of the financial assurance, after the business plan has been reviewed and approved by the executive director.

(A) The amount of the financial assurance will equal the difference between the amount of projected system revenues and the projected cash needs for the period of time prescribed by the executive director.

(B) The form of the financial assurance will be as specified in Chapter 37, Subchapter O of this title and will be as specified by the executive director.

(C) If the executive director relies on rate increases or customer surcharges as the form of financial assurance, such funds shall be deposited in an escrow account as specified in Chapter 37, Subchapter O of this title and released only with the approval of the executive director.

(o) Emergency Preparedness Plans for Affected Utilities.

(1) Each public water system that is also an affected utility and that exists as of November 1, 2011 [December 1, 2009] is required to adopt and submit to the executive director an emergency preparedness plan in accordance with §290.45 of this title and using the template in Appendix J of §290.47 of this title or another emergency preparedness plan that meets the requirements of this subchapter no later than February 1, 2012 [March 1, 2010]. Emergency preparedness plans are required to be prepared under the direction of a licensed professional engineer when an affected utility has been granted or is requesting an alternative capacity requirement in accordance with §290.45(g) of this title, or is requesting to meet the requirements of TWC, §13.1395, as an alternative to any rule requiring elevated storage, or as determined by the executive director on a case by case basis.

(2) Each affected utility that supplies, provides, or conveys surface water to wholesale customers shall include in its emergency preparedness plan under this subsection provisions for the actual installation and maintenance of automatically starting auxiliary generators or distributive generation facilities for each raw water intake pump station, water treatment plant, pump station, and pressure facility necessary to provide water to its wholesale customers.

(3) The executive director shall review an emergency preparedness plan submitted under this subsection. If the executive director determines that the plan is not

acceptable, the executive director shall recommend changes to the plan. The executive director must make its recommendations on or before the 90th day after the executive director receives the plan. In accordance with the commission rules, an emergency preparedness plan must include one of the options listed in §290.45(h)(1)(A) - (H) of this title.

(4) Not later than June 1, 2012 [July 1, 2010], each affected utility shall implement the emergency preparedness plan approved by the executive director.

(5) An affected utility may file with the executive director a written request for an extension not to exceed 90 days, of the date by which the affected utility is required under this subsection to submit the affected utility's emergency preparedness plan or of the date by which the affected utility is required under this subsection to implement the affected utility's emergency preparedness plan. The executive director may approve the requested extension for good cause shown.

(6) The executive director may grant a waiver of the requirements for emergency preparedness plans to an affected utility if the executive director determines that compliance with this section will cause a significant financial burden on customers of the affected utility. The affected utility shall submit financial, managerial, and

technical information as requested by the executive director to demonstrate the financial burden.

§290.46. Minimum Acceptable Operating Practices for Public Drinking Water Systems.

(a) General. When a public drinking water supply system is to be established, plans shall be submitted to the executive director for review and approval prior to the construction of the system. All public water systems are to be constructed in conformance with the requirements of this subchapter and maintained and operated in accordance with the following minimum acceptable operating practices. Owners and operators shall allow entry to members of the commission and employees and agents of the commission onto any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to public water systems in the state <u>including the required elements of a sanitary survey as defined in §290.38(71) of this title (relating to Definitions)</u>. Members, employees, or agents acting under this authority shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials.

(b) Microbiological. Submission of samples for microbiological analysis shall be as required by Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems). Microbiological samples may be required by the executive director for monitoring purposes in addition to the routine samples required by the drinking water standards. These samples shall be submitted to an accredited laboratory. (A list of the accredited laboratories can be obtained by contacting the executive director). The samples shall be submitted to the executive director in a manner prescribed by the executive director.

(c) Chemical. Samples for chemical analysis shall be submitted as directed by the executive director.

(d) Disinfectant residuals and monitoring. A disinfectant residual must be continuously maintained during the treatment process and throughout the distribution system.

(1) Disinfection equipment shall be operated and monitored in a manner that will assure compliance with the requirements of §290.110 of this title (relating to Disinfectant Residuals).

(2) The disinfection equipment shall be operated to maintain the following minimum disinfectant residuals in each finished water storage tank and throughout the distribution system at all times:

(A) a free chlorine residual of 0.2 milligrams per liter (mg/L); or

(B) a chloramine residual of 0.5 mg/L (measured as total chlorine) for those systems that feed ammonia.

(e) Operation by trained and licensed personnel. Except as provided in paragraph (1) of this subsection, the production, treatment, and distribution facilities at the public water system must be operated at all times under the direct supervision of a water works operator who holds an applicable, valid license issued by the executive director.

(1) Transient noncommunity public water systems are exempt from the requirements of this subsection if they use only groundwater or purchase treated water from another public water system.

(2) All public water systems that are subject to the provisions of this subsection shall meet the following requirements.

(A) Public water systems shall not allow new or repaired production, treatment, storage, pressure maintenance, or distribution facilities to be placed into service without the prior guidance and approval of a licensed water works operator.

(B) Public water systems shall ensure that their operators are trained regarding the use of all chemicals used in the water treatment plant. Training programs shall meet applicable standards established by the Occupational Safety and Health Administration (OSHA) or the Texas Hazard Communications Act, Texas Health and Safety Code, Title 6, Chapter 502.

(C) Public water systems using chlorine dioxide shall place the operation of the chlorine dioxide facilities under the direct supervision of a licensed operator who has a Class "C" or higher license.

(3) Systems that only purchase treated water shall meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Purchased water systems serving no more than 250 connections must employ an operator who holds a Class "D" or higher license.

(B) Purchased water systems serving more than 250 connections, but no more than 1,000 connections, must employ an operator who holds a Class "C" or higher license.

(C) Purchased water systems serving more than 1,000 connections must employ at least two operators who hold a Class "C" or higher license and who each work at least 16 hours per month at the public water system's treatment or distribution facilities.

(4) Systems that treat groundwater and do not treat surface water or groundwater that is under the direct influence of surface water shall meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Groundwater systems serving no more than 250 connections must employ an operator with a Class "D" or higher license.

(B) Groundwater systems serving more than 250 connections, but no more than 1,000 connections, must employ an operator with a Class "C" or higher groundwater license.

(C) Groundwater systems serving more than 1,000 connections must employ at least two operators who hold a Class "C" or higher groundwater license and who each work at least 16 hours per month at the public water system's production, treatment, or distribution facilities.

(5) Systems that treat groundwater that is under the direct influence of surface water must meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Systems which serve no more than 1,000 connections and utilize cartridge or membrane filters must employ an operator who holds a Class "C" or higher groundwater license and has completed a four-hour training course on monitoring and reporting requirements or who holds a Class "C" or higher surface water license and has completed the Groundwater Production course.

(B) Systems which serve more than 1,000 connections and utilize cartridge or membrane filters must employ at least two operators who meet the requirements of subparagraph (A) of this paragraph and who each work at least 24 hours per month at the public water system's production, treatment, or distribution facilities.

(C) Systems which serve no more than 1,000 connections and utilize coagulant addition and direct filtration must employ an operator who holds a Class "C" or higher surface water license and has completed the Groundwater Production course or who holds a Class "C" or higher groundwater license and has completed a Surface Water Production course. Effective January 1, 2007, the public water system must employ at least one operator who has completed the Surface Water Unit I course and the Surface Water Unit II course.

(D) Systems which serve more than 1,000 connections and utilize coagulant addition and direct filtration must employ at least two operators who meet the requirements of subparagraph (C) of this paragraph and who each work at least 24 hours per month at the public water system's production, treatment, or distribution facilities. Effective January 1, 2007, the public water system must employ at least two operators who have completed the Surface Water Unit I course and the Surface Water Unit II course.

(E) Systems which utilize complete surface water treatment must comply with the requirements of paragraph (6) of this subsection.

(F) Each plant must have at least one Class "C" or higher operator on duty at the plant when it is in operation or the plant must be provided with continuous turbidity and disinfectant residual monitors with automatic plant shutdown and alarms to summon operators so as to ensure that the water produced continues to meet the commission's drinking water standards during periods when the plant is not staffed.

(6) Systems that treat surface water must meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Surface water systems that serve no more than 1,000 connections must employ at least one operator who holds a Class "B" or higher surface water license. Part-time operators may be used to meet the requirements of this subparagraph if the operator is completely familiar with the design and operation of the plant and spends at least four consecutive hours at the plant at least once every 14 days and the system also employs an operator who holds a Class "C" or higher surface water license. Effective January 1, 2007, the public water system must employ at least one operator who has completed the Surface Water Unit I course and the Surface Water Unit II course.

(B) Surface water systems that serve more than 1,000 connections must employ at least two operators; one of the required operators must hold a Class "B" or higher surface water license and the other required operator must hold a Class "C" or higher surface water license. Each of the required operators must work at least 32 hours per month at the public water system's production, treatment, or distribution facilities. Effective January 1, 2007, the public water system must employ at least two operators who have completed the Surface Water Unit I course and the Surface Water Unit II course.

(C) Each surface water treatment plant must have at least one Class "C" or higher surface water operator on duty at the plant when it is in operation or the plant must be provided with continuous turbidity and disinfectant residual monitors with automatic plant shutdown and alarms to summon operators so as to ensure that the water produced continues to meet the commission's drinking water standards during periods when the plant is not staffed.

(D) Public water systems shall not allow Class "D" operators to adjust or modify the treatment processes at surface water treatment plant unless an operator who holds a Class "C" or higher surface license is present at the plant and has issued specific instructions regarding the proposed adjustment.

(f) Operating records and reports. Water systems must maintain a record of water works operation and maintenance activities and submit periodic operating reports.

(1) The public water system's operating records must be organized, and copies must be kept on file or stored electronically.

(2) The public water system's operating records must be accessible for review during inspections <u>and be available to the executive director upon request</u>.

(3) All public water systems shall maintain a record of operations.

(A) The following records shall be retained for at least two years:

(i) the amount of chemicals used:

(I) Systems that treat surface water or groundwater under the direct influence of surface water shall maintain a record of the amount of each chemical used each day.

(II) Systems that serve 250 or more connections or serve 750 or more people shall maintain a record of the amount of each chemical used each day.

(III) Systems that serve fewer than 250 connections, serve fewer than 750 people, and use only groundwater or purchased treated water shall maintain a record of the amount of each chemical used each week;

(ii) the volume of water treated:

(I) Systems that treat surface water or groundwater under the direct influence of surface water shall maintain a record of the amount of water treated each day.

(II) Systems that serve 250 or more connections or serve 750 or more people shall maintain a record of the amount of water treated each day.

(III) Systems that serve fewer than 250 connections, serve fewer than 750 people, and use only groundwater or purchase treated water shall maintain a record of the amount of water treated each week;

(iii) the date, location, and nature of water quality, pressure, or outage complaints received by the system and the results of any subsequent complaint investigation;

(iv) the dates that dead-end mains were flushed;

(v) the dates that storage tanks and other facilities were cleaned;

(vi) the maintenance records for water system equipment and facilities; and

(vii) for systems that do not employ full-time operators to meet the requirements of subsection (e) of this section, a daily record or a monthly summary of the work performed and the number of hours worked by each of the part-time operators used to meet the requirements of subsection (e) of this section.

(B) The following records shall be retained for at least three years:

(i) copies of notices of violation and any resulting corrective actions. The records of the actions taken to correct violations of primary drinking water regulations must be retained for at least three years after the last action taken with respect to the particular violation involved;

(ii) copies of any public notice issued by the water system;

(iii) the disinfectant residual monitoring results from the distribution system;

(iv) the calibration records for laboratory equipment, flow meters, rate-of-flow controllers, on-line turbidimeters, and on-line disinfectant residual analyzers;

(v) the records of backflow prevention device programs;

(vi) the raw surface water monitoring results and source water monitoring plans required by §290.111 of this title (relating to Surface Water Treatment) must be retained for three years after bin classification required by §290.111 of this title;

(vii) notification to the executive director that a system will provide 5.5-log *Cryptosporidium* treatment in lieu of raw surface water monitoring; and

(viii) except for those specified in <u>subparagraphs</u> [subparagraph] (C)(iv) <u>and</u> [of this paragraph and subparagraph] (E)(i) of this

paragraph, the results of all surface water treatment monitoring that are used to demonstrate log inactivation or removal.

(C) The following records shall be retained for a period of five years after they are no longer in effect:

(i) the records concerning a variance or exemption granted to the system;

(ii) Concentration Time (CT) studies for surface water treatment plants;

(iii) the Recycling Practices Report form and other records pertaining to site-specific recycle practices for treatment plants that recycle; and

(iv) the turbidity monitoring results and exception reports for individual filters as required by §290.111 of this title.

(D) The following records shall be retained for at least five years:

(i) the results of microbiological analyses;

(ii) the results of inspections (as required in subsection (m)(1) of this section) for all water storage and pressure maintenance facilities;

(iii) the results of inspections as required by subsection (m)(2) of this section for all pressure filters;

(iv) documentation of compliance with state approved corrective action plan and schedules required to be completed by groundwater systems that must take corrective actions;

(v) documentation of the reason for an invalidated fecal indicator source sample and documentation of a total coliform-positive sample collected at a location with conditions that could cause such positive samples in a distribution system;

(vi) notification to wholesale system(s) of a distribution coliform positive sample for consecutive systems using groundwater; [and]

(vii) Consumer Confidence Report compliance documentation; [.]

(viii) records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the executive director-approved minimum specified disinfectant residual for a period of more than four hours for groundwater systems providing 4-log treatment; and

(ix) records of executive director-specified compliance requirements for membrane filtration, records of parameters specified by the executive director for approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours for groundwater systems. Membrane filtration can only be used if it is approved by the executive director and if it can be properly validated.

(E) The following records shall be retained for at least ten years:

(i) copies of Monthly Operating Reports and any supporting documentation including turbidity monitoring results of the combined filter effluent;

(ii) the results of chemical analyses;

(iii) any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by the executive director shall be kept for a period not less than ten years after completion of the survey involved;

(iv) copies of the Customer Service Inspection reports required by subsection (j) of this section;

(v) copy of any Initial Distribution System Evaluation (IDSE) plan, report, approval letters, and other compliance documentation required by §290.115 of this title (relating to Stage 2 Disinfection Byproducts (TTHM and HAA5));

(vi) state notification of any modifications to an IDSE report;

(vii) copy of any 40/30 certification required by §290.115 of this title;

(viii) documentation of corrective actions taken by groundwater systems in accordance with §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques); [and]

(ix) any monitoring plans required by §290.121(b) of this title (relating to Monitoring Plans); and [.]

(x) records of the executive director-approved minimum specified disinfectant residual for groundwater systems providing 4-log treatment, including wholesale, consecutive, and mixed systems, regulated under §290.116(c) of this title.

(F) A public water system shall maintain records relating to lead and copper requirements under §290.117 of this title (relating to Regulation of Lead and Copper) for no less than 12 years. Any system subject to the requirements of §290.117 of this title shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, executive determinations, and any other information required by the executive director under §290.117 of this title. These records include, but are not limited to, the following items: tap water monitoring results including the location of each site and date of collection; certification of the volume and validity of first-draw-tap sample criteria via a copy of the laboratory analysis request form; where residents collected the sample; certification that the water system informed the resident of proper sampling procedures; the analytical results for lead and copper concentrations at each tap sample site; and designation of any substitute site not used in previous monitoring periods.

(G) A public water system shall maintain records relating to special studies and pilot projects, special monitoring, and other system-specific matters as directed by the executive director.

(4) Water systems shall submit routine reports and any additional documentation that the executive director may require to determine compliance with the requirements of this chapter.

(A) The reports must be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 155, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(B) The reports must contain all the information required by the drinking water standards and the results of any special monitoring tests which have been required.

(C) The reports must be completed in ink, typed, or computer-printed and must be signed by the licensed water works operator.

(5) All public water systems that are affected utilities must maintain the following records for as long as they are applicable to the system:

(A) An emergency preparedness plan approved by the executive director and a copy of the approval letter.

(B) All required operating and maintenance records for auxiliary power equipment, including periodic testing of the auxiliary power equipment under load and any associated automatic switch over equipment.

(C) Copies of the manufacturer's specifications for all generators that are part of the approved emergency preparedness plan.

(g) Disinfection of new or repaired facilities. Disinfection by or under the direction of water system personnel must be performed when repairs are made to existing facilities and before new facilities are placed into service. Disinfection must be performed in accordance with American Water Works Association (AWWA) requirements and water samples must be submitted to a laboratory approved by the executive director. The sample results must indicate that the facility is free of microbiological contamination before it is placed into service. When it is necessary to

return repaired mains to service as rapidly as possible, doses may be increased to 500 mg/L and the contact time reduced to 1/2 hour.

(h) Calcium hypochlorite. A supply of calcium hypochlorite disinfectant shall be kept on hand for use when making repairs, setting meters, and disinfecting new mains prior to placing them in service.

(i) Plumbing ordinance. Public water systems must adopt an adequate plumbing ordinance, regulations, or service agreement with provisions for proper enforcement to insure that neither cross-connections nor other unacceptable plumbing practices are permitted (See §290.47(b) of this title (relating to Appendices)). Should sanitary control of the distribution system not reside with the purveyor, the entity retaining sanitary control shall be responsible for establishing and enforcing adequate regulations in this regard. The use of pipes and pipe fittings that contain more than 8.0% lead or solders and flux that contain more than 0.2% lead is prohibited for installation or repair of any public water supply and for installation or repair of any plumbing in a residential or nonresidential facility providing water for human consumption and connected to a public drinking water supply system. This requirement may be waived for lead joints that are necessary for repairs to cast iron pipe.

(j) Customer service inspections. A customer service inspection certificate shall be completed prior to providing continuous water service to new construction, on any existing service either when the water purveyor has reason to believe that cross-connections or other potential contaminant hazards exist, or after any material improvement, correction, or addition to the private water distribution facilities. Any customer service inspection certificate form which varies from the format found in §290.47(d) of this title must be approved by the executive director prior to being placed in use.

(1) Individuals with the following credentials shall be recognized as capable of conducting a customer service inspection certification.

(A) Plumbing Inspectors and Water Supply Protection Specialists licensed by the Texas State Board of Plumbing Examiners (TSBPE).

(B) Customer service inspectors who have completed a commission-approved course, passed an examination administered by the executive director, and hold current professional license as a customer service inspector.

(2) As potential contaminant hazards are discovered, they shall be promptly eliminated to prevent possible contamination of the water supplied by the

public water system. The existence of a health hazard, as identified in §290.47(i) of this title, shall be considered sufficient grounds for immediate termination of water service. Service can be restored only when the health hazard no longer exists, or until the health hazard has been isolated from the public water system in accordance with §290.44(h) of this title (relating to Water Distribution).

(3) These customer service inspection requirements are not considered acceptable substitutes for and shall not apply to the sanitary control requirements stated in §290.102(a)(5) of this title (relating to General Applicability).

(4) A customer service inspection is an examination of the private water distribution facilities for the purpose of providing or denying water service. This inspection is limited to the identification and prevention of cross-connections, potential contaminant hazards, and illegal lead materials. The customer service inspector has no authority or obligation beyond the scope of the commission's regulations. A customer service inspection is not a plumbing inspection as defined and regulated by the TSBPE. A customer service inspector is not permitted to perform plumbing inspections. State statutes and TSBPE adopted rules require that TSBPE licensed plumbing inspectors perform plumbing inspections of all new plumbing and alterations or additions to existing plumbing within the municipal limits of all cities, towns, and villages which have passed an ordinance adopting one of the plumbing codes recognized by TSBPE.

Such entities may stipulate that the customer service inspection be performed by the plumbing inspector as a part of the more comprehensive plumbing inspection. Where such entities permit customer service inspectors to perform customer service inspections, the customer service inspector shall report any violations immediately to the local entity's plumbing inspection department.

(k) Interconnection. No physical connection between the distribution system of a public drinking water supply and that of any other water supply shall be permitted unless the other water supply is of a safe, sanitary quality and the interconnection is approved by the executive director.

(l) Flushing of mains. All dead-end mains must be flushed at monthly intervals. Dead-end lines and other mains shall be flushed as needed if water quality complaints are received from water customers or if disinfectant residuals fall below acceptable levels as specified in §290.110 of this title.

(m) Maintenance and housekeeping. The maintenance and housekeeping practices used by a public water system shall ensure the good working condition and general appearance of the system's facilities and equipment. The grounds and facilities shall be maintained in a manner so as to minimize the possibility of the harboring of

rodents, insects, and other disease vectors, and in such a way as to prevent other conditions that might cause the contamination of the water.

(1) Each of the system's ground, elevated, and pressure tanks shall be inspected annually by water system personnel or a contracted inspection service.

(A) Ground and elevated storage tank inspections must determine that the vents are in place and properly screened, the roof hatches closed and locked, flap valves and gasketing provide adequate protection against insects, rodents, and other vermin, the interior and exterior coating systems are continuing to provide adequate protection to all metal surfaces, and the tank remains in a watertight condition.

(B) Pressure tank inspections must determine that the pressure release device and pressure gauge are working properly, the air-water ratio is being maintained at the proper level, the exterior coating systems are continuing to provide adequate protection to all metal surfaces, and the tank remains in watertight condition. Pressure tanks provided with an inspection port must have the interior surface inspected every five years.

(C) All tanks shall be inspected annually to determine that instrumentation and controls are working properly.

(2) When pressure filters are used, a visual inspection of the filter media and internal filter surfaces shall be conducted annually to ensure that the filter media is in good condition and the coating materials continue to provide adequate protection to internal surfaces.

(3) When cartridge filters are used, filter cartridges shall be changed at the frequency required by the manufacturer, or more frequently if needed.

(4) All water treatment units, storage and pressure maintenance facilities, distribution system lines, and related appurtenances shall be maintained in a watertight condition and be free of excessive solids.

(5) Basins used for water clarification shall be maintained free of excessive solids to prevent possible carryover of sludge and the formation of tastes and odors.

(6) Pumps, motors, valves, and other mechanical devices shall be maintained in good working condition.

(n) Engineering plans and maps. Plans, specifications, maps, and other pertinent information shall be maintained to facilitate the operation and maintenance of the

system's facilities and equipment. The following records shall be maintained on file at the public water system and be available to the executive director upon request.

(1) Accurate and up-to-date detailed as-built plans or record drawings and specifications for each treatment plant, pump station, and storage tank shall be maintained at the public water system until the facility is decommissioned. As-built plans of individual projects may be used to fulfill this requirement if the plans are maintained in an organized manner.

(2) An accurate and up-to-date map of the distribution system shall be available so that valves and mains can be easily located during emergencies.

(3) Copies of well completion data such as well material setting data, geological log, sealing information (pressure cementing and surface protection), disinfection information, microbiological sample results, and a chemical analysis report of a representative sample of water from the well shall be kept on file for as long as the well remains in service.

(o) Filter backwashing at surface water treatment plants. Filters must be backwashed when a loss of head differential of six to ten feet is experienced between the

influent and effluent loss of head gauges or when the turbidity level at the effluent of the filter reaches 1.0 nephelometric turbidity unit (NTU).

(p) Data on water system ownership and management. The agency shall be provided with information regarding water system ownership and management.

(1) When a water system changes ownership, a written notice of the transaction must be provided to the executive director. When applicable, notification shall be in accordance with Chapter 291 of this title (relating to Utility Regulations). Those systems not subject to Chapter 291 of this title shall notify the executive director of changes in ownership by providing the name of the current and prospective owner or responsible official, the proposed date of the transaction, and the address and phone number of the new owner or responsible official. The information listed in this paragraph and the system's public drinking water supply identification number, and any other information necessary to identify the transaction shall be provided to the executive director 120 days before the date of the transaction.

(2) On an annual basis, the owner of a public water system shall provide the executive director with a written list of all the operators and operating companies that the public water system employs. The notice shall contain the name, license

number, and license class of each employed operator and the name and registration number of each employed operating company (See §290.47(g) of this title).

(q) Special precautions. Special precautions must be instituted by the water system owner or responsible official in the event of low distribution pressures (below 20 pounds per square inch (psi)), water outages, microbiological samples found to contain *E. coli* or fecal coliform organisms, failure to maintain adequate chlorine residuals, elevated finished water turbidity levels, or other conditions which indicate that the potability of the drinking water supply has been compromised.

(1) Boil water notifications must be issued to the customers within 24 hours using the prescribed notification format as specified in §290.47(e) of this title. A copy of this notice shall be provided to the executive director. Bilingual notification may be appropriate based upon local demographics. Once the boil water notification is no longer in effect, the customers must be notified in a manner similar to the original notice.

(2) The flowchart found in §290.47(h) of this title shall be used to determine if a boil water notification must be issued in the event of a loss of distribution system pressure. If a boil water notice is issued under this section, it shall remain in effect until water distribution pressures in excess of 20 psi can consistently be

maintained, a minimum of 0.2 mg/L free chlorine residual or 0.5 mg/L chloramine residual (measured as total chlorine) is present throughout the system, and water samples collected for microbiological analysis are found negative for coliform organisms.

(3) A boil water notification shall be issued if the turbidity of the finished water produced by a surface water treatment plant exceeds 5.0 NTU. The boil water notice shall remain in effect until the water entering the distribution system has a turbidity level below 1.0 NTU, the distribution system has been thoroughly flushed, a minimum of 0.2 mg/L free chlorine residual or 0.5 mg/L chloramine residual (measured as total chlorine) is present throughout the system, and water samples collected for microbiological analysis are found negative for coliform organisms.

(4) Other protective measures may be required at the discretion of the executive director.

(r) Minimum pressures. All public water systems shall be operated to provide a minimum pressure of 35 psi throughout the distribution system under normal operating conditions. The system shall also be operated to maintain a minimum pressure of 20 psi during emergencies such as fire fighting. As soon as safe and practicable following the occurrence of a natural disaster, a public water system that is an affected utility shall

maintain a minimum of 35 psi throughout the distribution system during an extended power outage.

(s) Testing equipment. Accurate testing equipment or some other means of monitoring the effectiveness of any chemical treatment or pathogen inactivation or removal processes must be used by the system.

(1) Flow measuring devices and rate-of-flow controllers that are required by §290.42(d) of this title (relating to Water Treatment) shall be calibrated at least once every 12 months. Well meters required by §290.41(c)(3)(N) of this title (relating to Water Sources) shall be calibrated at least once every three years.

(2) Laboratory equipment used for compliance testing shall be properly calibrated.

(A) pH meters shall be properly calibrated.

(i) Benchtop pH meters shall be calibrated according to manufacturers specifications at least once each day.

(ii) The calibration of benchtop pH meters shall be checked with at least one buffer each time a series of samples is run, and if necessary, recalibrated according to manufacturers specifications.

(iii) On-line pH meters shall be calibrated according to manufacturer specifications at least once every 30 days.

(iv) The calibration of on-line pH meters shall be checked at least once each week with a primary standard or by comparing the results from the on-line unit with the results from a properly calibrated benchtop unit. If necessary, the on-line unit shall be recalibrated with primary standards.

(B) Turbidimeters shall be properly calibrated.

(i) Benchtop turbidimeters shall be calibrated with primary standards at least once every 90 days. Each time the turbidimeter is calibrated with primary standards, the secondary standards shall be restandardized.

(ii) The calibration of benchtop turbidimeters shall be checked with secondary standards each time a series of samples is tested, and if necessary, recalibrated with primary standards.

(iii) On-line turbidimeters shall be calibrated with primary standards at least once every 90 days.

(iv) The calibration of on-line turbidimeters shall be checked at least once each week with a primary standard, a secondary standard, or the manufacturer's proprietary calibration confirmation device or by comparing the results from the on-line unit with the results from a properly calibrated benchtop unit. If necessary, the on-line unit shall be recalibrated with primary standards.

(C) Chemical disinfectant residual analyzers shall be properly calibrated.

(i) The accuracy of manual disinfectant residual analyzers shall be verified at least once every 90 [30] days using chlorine solutions of known concentrations.

[(ii) Continuous disinfectant residual analyzers shall be calibrated at least once every 90 days using chlorine solutions of known concentrations.]

(ii) [(iii)] The accuracy [calibration] of continuous disinfectant residual analyzers shall be checked at least once every seven days [each month] with a chlorine solution of known concentration or by comparing the results from the on-line analyzer with the result of approved benchtop [amperometric, spectrophotometric, or titration] method in accordance with §290.119 of this title (relating to Analytical Procedures).

(iii) If a disinfectant residual analyzer produces a result which is not within 15% of the expected value, the cause of the discrepancy must be determined and corrected and, if necessary, the instrument must be recalibrated.

(D) Ultraviolet (UV) light disinfection analyzers shall be properly calibrated.

(i) The accuracy of duty UV sensors shall be verified with a reference UV sensor monthly, according to the UV sensor manufacturer.

(ii) The reference UV sensor shall be calibrated by the UV sensor manufacturer on a yearly basis, or sooner if needed.

(iii) If used, the Ultraviolet Transmittance (UVT) analyzer shall be calibrated weekly according to the UVT analyzer manufacturer specifications.

(E) Systems must verify the performance of direct integrity testing equipment in a manner and schedule approved by the executive director.

(t) System ownership. All community water systems shall post a legible sign at each of its production, treatment, and storage facilities. The sign shall be located in plain view of the public and shall provide the name of the water supply and an emergency telephone number where a responsible official can be contacted.

(u) Abandoned wells. Abandoned public water supply wells owned by the system must be plugged with cement according to 16 TAC [Texas Administrative Code (TAC)] Chapter 76 (relating to Water Well Drillers and Water Well Pump Installers). Wells that are not in use and are non-deteriorated as defined in those rules must be tested every five years or as required by the executive director to prove that they are in a non-deteriorated condition. The test results shall be sent to the executive director for review and approval. Deteriorated wells must be either plugged with cement or repaired to a non-deteriorated condition.

(v) Electrical wiring. All water system electrical wiring must be securely installed in compliance with a local or national electrical code.

(w) Security. All systems shall maintain internal procedures to notify the executive director by a toll-free reporting phone number immediately of the following events, if the event may negatively impact the production or delivery of safe and adequate drinking water:

(1) an unusual or unexplained unauthorized entry at property of the public water system;

(2) an act of terrorism against the public water system;

(3) an unauthorized attempt to probe for or gain access to proprietary information that supports the key activities of the public water system;

(4) a theft of property that supports the key activities of the public water system; or

(5) a natural disaster, accident, or act that results in damage to the public water system.

(x) Public safety standards. This subsection only applies to a municipality with a population of 1,000,000 or more, with a public utility within its corporate limits.

(1) In this subsection:

(A) "Regulatory authority" means, in accordance with the context in which it is found, either the commission or the governing body of a municipality.

(B) "Public utility" means any person, corporation, cooperative corporation, affected county, or any combination of these persons or entities, other than a municipal corporation, water supply or sewer service corporation, or a political subdivision of the state, except an affected county, or their lessees, trustees, and receivers, owning or operating for compensation in this state equipment or facilities for the transmission, storage, distribution, sale, or provision of potable water to the public or for the resale of potable water to the public for any use or for the collection, transportation, treatment, or disposal of sewage or other operation of a sewage disposal service for the public, other than equipment or facilities owned and operated for either purpose by a municipality or other political subdivision of this state or a water supply or sewer service corporation, but does not include any person or corporation not otherwise a public utility that furnishes the services or commodity only to itself or its employees or

tenants as an incident of that employee service or tenancy when that service or commodity is not resold to or used by others.

(C) "Residential area" means:

(i) an area designated as a residential zoning district by a governing ordinance or code or an area in which the principal land use is for private residences;

(ii) a subdivision for which a plat is recorded in the real property records of the county and that contains or is bounded by public streets or parts of public streets that are abutted by residential property occupying at least 75% of the front footage along the block face; or

(iii) a subdivision a majority of the lots of which are subject to deed restrictions limiting the lots to residential use.

(2) When the regulatory authority is a municipality, it shall by ordinance adopt standards for installing fire hydrants in residential areas in the municipality. These standards must, at a minimum, follow current AWWA standards pertaining to fire hydrants and the requirements of §290.44(e)(6) of this title.

(3) When the regulatory authority is a municipality, it shall by ordinance adopt standards for maintaining sufficient water pressure for service to fire hydrants adequate to protect public safety in residential areas in the municipality. The standards specified in paragraph (4) of this subsection are the minimum acceptable standards.

(4) A public utility shall deliver water to any fire hydrant connected to the public utility's water system located in a residential area so that the flow at the fire hydrant is at least 250 gallons per minute for a minimum period of two hours while maintaining a minimum pressure of 20 psi throughout the distribution system during emergencies such as fire fighting. That flow is in addition to the public utility's maximum daily demand for purposes other than firefighting.

(5) When the regulatory authority is a municipality, it shall adopt the standards required by this subsection within one year of the effective date of this subsection or within one year of the date this subsection first applies to the municipality, whichever occurs later.

(6) A public utility shall comply with the standards established by a municipality under both paragraphs (2) and (3) of this subsection within one year of the date the standards first apply to the public utility. If a municipality has failed to comply

with the deadline required by paragraph (5) of this subsection, then a public utility shall comply with the standards specified in paragraphs (2) and (4) of this subsection within two years of the effective date of this subsection or within one year of the date this subsection first applies to the public utility, whichever occurs later.

SUBCHAPTER F: DRINKING WATER STANDARDS GOVERNING DRINKING WATER QUALITY AND REPORTING REQUIREMENTS FOR PUBLIC WATER SYSTEMS

§§290.103, 290.109 - 290.112, 290.116, 290.119, 290.122

Statutory Authority

These amendments are adopted under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule; Texas Health and Safety Code (THSC), §341.031(a), which establishes the commission's authority to adopt and enforce rules to implement the federal Safe Drinking Water Act (42 United States Code, §§300f *et seq.*); and THSC, §341.0315, which requires public drinking water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

The amendments implement the federal Ground Water Rule, Total Organic Carbon Rule, and the chlorine residual analyzer Method 334.0, which implement the federal Safe Drinking Water Act.

§290.103. Definitions.

The following definitions shall apply in the interpretation and enforcement of this subchapter. If a word or term used in this subchapter is not contained in the following list, its definition shall be as shown in §290.38 of this title (relating to Definitions) or in [Title] 40 Code of Federal Regulations (CFR) §141.2. Other technical terms used shall have the meanings or definitions listed in the latest edition of "Glossary, Water and Wastewater Control Engineering," prepared by a joint editorial board representing the American Public Health Association, American Society of Civil Engineers, American Water Works Association, and the Water Pollution Control Federation.

(1) Assessment source monitoring--Raw groundwater source monitoring required by the executive director based on groundwater source susceptibility to fecal contaminants.

(2) Combined distribution system (CDS)--The interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

(A) The executive director may determine that the CDS does not include certain systems based on factors such as providing or receiving a relatively small amount of water or only on an emergency basis.

(B) A public water system may be determined to be in a different CDS for the purposes of compliance with regulations based on the Stage 2 Disinfection Byproducts Rule (DBP2) and the Long Term Stage 2 Enhanced Surface Water Treatment Rule (LT2).

(i) For the purposes of raw water monitoring under LT2, the CDS shall be based on the retail and wholesale population served by each surface water treatment plant or plant treating groundwater under the direct influence of surface water.

(ii) For the purposes of DBP2, the CDS shall be determined based on the retail population served within each individual system's distribution system.

(3) Compliance cycle--The nine-year (calendar year) cycle during which public water systems must monitor. Each compliance cycle consists of three, three-year compliance periods. The first compliance cycle begins January 1, 1993, and ends

December 31, 2001. The second begins January 1, 2002, and ends December 31, 2010. The third begins January 1, 2011, and ends December 31, 2019. The cycle continues thereafter in a similar pattern.

(4) Compliance period--A three-year (calendar year) period within a compliance cycle. Each compliance cycle has three, three-year compliance periods. Within the first compliance cycle, the first compliance period is called the initial compliance period and runs from January 1, 1993, to December 31, 1995. The second period from January 1, 1996, to December 31, 1998. The third period from January 1, 1999, to December 31, 2001. Compliance periods in subsequent compliance cycles follow the same pattern.

(5) Comprehensive performance evaluation (CPE)--A thorough review and analysis of a treatment plant's performance-based capabilities and the associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and to emphasize approaches that can be implemented without significant capital improvements. The comprehensive performance evaluation consists of the following components: assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

(6) Consecutive system--A public water system that receives some or all of its finished water from one or more other public water systems.

(7) Disinfection profile--A summary of daily *Cryptosporidium*, *Giardia lamblia* and viral inactivation obtained through disinfection at the treatment plant.

(8) Disinfection by-products (DBP)--Chemical compounds formed by the reaction of a disinfectant with the natural organic matter present in water.

(9) DPD--Abbreviation for N,N-diethyl-p-phenylenediamine, a reagent used in the determination of several residuals. DPD methods are available for both volumetric (titration) and colorimetric determinations, and are commonly used in the field as part of a colorimetric test kit.

(10) Dual sample set--A set of two samples collected at the same time and same location, with one sample analyzed for total trihalomethanes (TTHM) and the other sample analyzed for haloacetic acids-group of five (HAA5). Dual sample sets are collected for the purposes of conducting an initial distribution system evaluation and determining compliance with the TTHM and HAA5 maximum contaminant levels.

(11) Enhanced coagulation--The removal of disinfection by-product precursors to a specified level by conventional coagulation and sedimentation.

(12) Enhanced softening--The removal of disinfection by-product precursors to a specified level by softening.

(13) Entry point--Any point where a source of treated water first enters the distribution system. Entry points to the distribution system may include points where chlorinated well water, treated surface water, rechlorinated water from storage, or water purchased from another supplier enters the distribution system.

(14) Entry point sampling site--A sampling site representing the quality of the water entering the distribution system at each designated entry point.

(15) Fecal indicators--Microbiological organisms used to indicate the presence of fecal contamination. Examples include; fecal coliform, *E. coli*, enterococci, and coliphage.

(16) Filter assessment--An in-depth evaluation of an individual filter, including the analysis of historical filtered water turbidity from the filter, development of a filter profile, evaluation of media condition, identification and prioritization of

factors limiting filter performance, appraisal of the applicability of corrections, and preparation of a filter self-assessment report.

(17) Filter profile--A graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run. The filter profile must include all the data collected from the time that the filter placed into service until the time that the backwash cycle is complete and the filter is restarted. The filter profile must also include data collected as another filter is being backwashed.

(18) Finished water--Water that is introduced into the distribution system of a public water system and intended for distribution and consumption without further treatment, except as necessary to maintain water quality within the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

(19) Groundwater corrective action--Action required when a raw groundwater source sample is found to be positive for *E. coli* or other fecal indicators as described under §290.116(b) of this title (relating to Groundwater Corrective Actions and Treatment Techniques).

(20) Groundwater corrective action plan--A plan approved by the executive director documenting the steps to be taken to address fecal contamination of a groundwater source as described under §290.116(b) of this title (relating to Groundwater Corrective Actions and Treatment Techniques). The groundwater corrective action plan must be approved within 30 days of being notified of the fecal contamination.

(21) Groundwater system--For the purposes of compliance with §290.109 of this title (relating to Microbial Contaminants) and with §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques), a public water system that provides, uses, or distributes any groundwater except if the groundwater is combined with surface water (or with groundwater under the direct influence of surface water) prior to treatment.

(22) Haloacetic acids (five) (HAA5)--The sum of the monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid concentrations in milligrams per liter, rounded to two significant figures after adding the sum.

(23) Halogen--One of the chemical elements chlorine, bromine, or iodine.

(24) Hydrogeologic sensitivity assessment--A determination of whether groundwater systems obtain water from hydrogeologically sensitive sources.

(25) Locational running annual average (LRAA)--The average of analytical results for samples taken at a specific monitoring location during the previous four calendar quarters.

(26) Maximum contaminant level (MCL)--The maximum concentration of a regulated contaminant that is allowed in drinking water before the public water system is cited for a violation. Maximum contaminant levels for regulated contaminants are defined in the applicable sections of this subchapter.

(27) Maximum residual disinfectant level (MRDL)--The disinfectant concentration that may not be exceeded in the distribution system. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants.

(28) Minimum acceptable disinfectant residual--The lowest disinfectant concentration allowed in the distribution system for microbial control.

(29) Operational evaluation level (OEL)--Calculated level of TTHM or HAA5, an exceedance of which requires a system to perform an evaluation of factors in the distribution system contributing to disinfection by-product formation and submit an operation evaluation report as described in §290.115(e)(2) of this title (relating to Stage 2 Disinfection Byproducts [By-products] (TTHM and HAA5)). The OEL at any monitoring location is the sum of the two previous quarters' results plus twice the current quarter's result, divided by 4 to determine an average.

(30) Raw water--Water prior to any treatment including disinfection that is intended to be used, after treatment, as drinking water.

(A) Raw groundwater is water from a groundwater source.

(B) Raw surface water is any water from a surface water source or from a groundwater under the direct influence of surface water source.

(31) Raw groundwater source monitoring [sampling]--Fecal indicator sampling at untreated groundwater sources including triggered source water and assessment source monitoring.

(32) Significant deficiency--Significant deficiencies cause, or have the potential to cause, the introduction of contamination into water delivered to customers. This could include defects in design, operation, or maintenance of the source, treatment, storage, or distribution systems.

(33) [(32)] Specific ultraviolet absorption at 254 nanometers (nm) (SUVA)--An indirect indicator of whether the organic carbon in water is humic or non-humic. It is calculated by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV254) (in inverse meters) by its concentration of dissolved organic carbon (DOC) (in milligrams per liter).

(34) [(33)] Total organic carbon (TOC)--The concentration of total organic carbon, in milligrams per liter, measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures. TOC is a surrogate measure for precursors to formation of disinfection by-products.

(35) [(34)] Total trihalomethanes (TTHM)--The sum of the chloroform, dibromochloromethane, bromodichloromethane, and bromoform concentrations in milligrams per liter, rounded to two significant figures after summing.

(36) [(35)] Triggered source water monitoring--Raw groundwater source monitoring required for systems not providing at least 4-log treatment of viruses when a routine distribution coliform sample is positive.

(37) [(36)] Trihalomethane (THM)--One of the family of organic compounds named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

(38) [(37)] Wholesale system--A public water system that delivers water to another public water system.

(39) 4-log treatment--At least 99.99% (4-log) treatment of viruses using inactivation, removal, or a executive director-approved combination of 4-log virus inactivation and removal. The 4-log treatment must be able to be properly validated and achieved before the first connection of the specified water source.

§290.109. Microbial Contaminants.

(a) Applicability. All public water systems must produce and distribute water that meets the provisions of this section regarding microbial contaminants.

(b) Maximum contaminant levels (MCL) for microbial contaminants. Treatment techniques and MCL requirements for microbial contaminants are based on detection of those contaminants or fecal indicator organisms.

(1) The MCL for microbial contaminants in the distribution system is based on the presence of total or fecal coliform bacteria in routine, repeat, and increased monitoring distribution samples.

(A) For a system which collects at least 40 routine distribution samples per month, the MCL is defined as when more than 5.0% of samples collected in a month are coliform positive.

(B) For a system which collects fewer than 40 routine distribution samples per month, the MCL is defined as when more than one sample is coliform positive.

(C) The acute MCL is defined as when a repeat sample is fecal coliform or *E. coli* positive; or a total coliform positive repeat sample follows a fecal coliform or *E. coli* positive routine sample.

(2) For systems required to collect raw groundwater samples, the standard is no detection of fecal indicators in a raw groundwater samples.

(c) Monitoring requirements for microbial contaminants. Public water systems shall collect samples for total coliform, fecal coliform, *E. coli*, or other fecal indicator organisms at locations and frequency as directed by the executive director. All compliance samples must be collected during normal operating conditions.

(1) Routine microbial sampling locations. Public water systems shall routinely monitor for microbial contaminants at the following locations.

(A) Public water systems must collect routine distribution coliform samples at active service connections which are representative of water quality throughout the distribution system. Other sampling sites may be used if located adjacent to active service connections.

(B) Public water systems shall collect distribution coliform samples at locations specified in the system's monitoring plan.

(2) Routine distribution coliform sampling frequency. Public water systems must sample for distribution coliform at the following frequency:

(A) Community and noncommunity public water systems must collect routine distribution coliform samples at a frequency based on the population served by the system.

(i) the population for noncommunity systems will be based on the maximum number of persons served on any given day during the month;

(ii) the population of community systems will be based on the data reported during the most recent sanitary survey of the public water system; and

(iii) the minimum sampling frequency for public water systems is shown in the following table.

Figure: 30 TAC §290.109(c)(2)(A)(iii) (No change to the figure as it currently exists in TAC.)

(B) A public water system which uses surface water or groundwater under the direct influence of surface water must collect routine distribution coliform samples at regular time intervals throughout the month.

(C) A public water system which uses only uses only purchased water or groundwater not under the direct influence of surface water and serves more than 4,900 persons must collect routine distribution coliform samples at regular time intervals throughout the month.

(D) A public water system which uses only purchased water or groundwater not under the direct influence of surface water and serves 4,900 persons or fewer may collect all required routine distribution coliform samples on a single day if they are taken from different sites.

(E) A total coliform-positive sample invalidated under this subsection does not count towards meeting the minimum routine monitoring requirements of this subsection.

(F) If a system collecting fewer than five routine distribution coliform samples per month has one or more total coliform-positive samples and the executive director does not invalidate the sample(s) in accordance with subsection (d)(1) [(c)(4)] of this section, it must collect at least five routine distribution coliform samples during the next month the system provides water to the public.

(3) Repeat distribution coliform sampling requirements. Systems shall conduct repeat monitoring if one or more of the routine samples is found to contain coliform organisms.

(A) If a routine distribution coliform sample is coliform-positive, the public water system must collect a set of repeat distribution coliform samples within 24 hours of being notified of the positive result, or as soon as possible if the local laboratory is closed.

(i) A system which collects more than one routine distribution coliform sample per month must collect no fewer than three repeat samples for each coliform-positive sample found.

(ii) A system which collects one routine distribution coliform sample per month must collect no fewer than four repeat samples for each coliform-positive sample found.

(B) The system must collect all repeat samples on the same day, except a system with a single service connection may collect daily repeat samples until the required number of repeat samples has been collected.

(C) The system must collect at least one repeat sample from the sampling tap where the original 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 fourth repeat sample is required, it must be collected within five service connections upstream or downstream. If the positive routine sample was collected at the end of the distribution line, one repeat sample must be collected at that point and all other samples must be collected within five connections upstream of that point.

(D) If one or more repeat samples in the set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in subparagraphs (A) - (C) of this paragraph. The additional samples must be collected within 24 hours of being notified of the positive result or as soon as possible if the local laboratory is closed. 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 MCL for total coliforms has been exceeded.

(E) 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 is found to

contain total coliform bacteria, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

(4) Raw groundwater source monitoring. Groundwater systems must comply, unless otherwise noted, with the requirements of this section. Any raw groundwater source sample required under this paragraph must be collected at a location prior to any treatment of the groundwater source and use analytical procedures and methods described in §290.119(b)(10) of this title (relating to Analytical Procedures).

(A) General requirements. A groundwater system must conduct triggered source water monitoring for *E. coli* or other fecal indicators, if both of the following conditions exist.

(i) The system does not provide at least 4-log treatment of viruses (as defined in §290.103(39) of this title (relating to Definitions) before [or at] the first customer for each groundwater source; and

(ii) The system is notified that a routine distribution coliform sample is positive and the sample is not invalidated under subsection (d)(1) of this section [paragraph (5) of this subsection].

(B) Sampling requirements. A groundwater system must collect, within 24 hours of notification of the routine distribution total coliform-positive [coliform positive] sample, at least one raw groundwater source *E. coli* (or other approved fecal indicator) sample from each groundwater source in use at the time the distribution coliform-positive sample was collected.

(i) The executive director may extend the 24-hour time limit on a case-by case basis if the system cannot collect the raw groundwater source sample within 24 hours due to circumstances beyond its control.

(ii) If approved by the executive director and documented in the system's monitoring plan, systems with more than one groundwater source may be allowed to sample a representative groundwater source or sources. Systems must modify their current monitoring plan to identify one or more groundwater sources that are representative of each distribution coliform sampling site and is intended to be used for representative source sampling.

(iii) A groundwater system serving 1,000 people or fewer may use one of the four required repeat samples collected from a raw groundwater source to meet both the repeat requirements of subparagraph (A)(ii) of this paragraph

and the triggered raw source monitoring requirements in this paragraph. If a required repeat sample is used to meet both requirements and found to be *E. coli* positive, the system will have achieved an acute MCL as defined in subsection (b)(1)(C) of this section and corrective action will be required for the groundwater source were the sample was found to be *E. coli* positive.

(C) Consecutive and wholesale systems. Consecutive groundwater systems receiving drinking water from a wholesaler must notify the wholesale system(s) within 24 hours of being notified of the positive coliform distribution sample. The wholesale groundwater system(s) must comply with the following:

(i) A wholesale groundwater system that receives notice of a distribution coliform sample positive from a consecutive system it serves must collect a sample from each of its groundwater sources within 24 hours of the notification and analyze each sample for the presence of *E. coli*.

(ii) If any raw source sample is *E. coli* positive, the wholesale groundwater system must notify all consecutive systems served by that groundwater source of the fecal indicator positive within 24 hours of being notified. <u>The wholesale system and all consecutive systems served by that groundwater source must notify their water system customers in accordance with subsection (g)(2) of this section.</u>

(D) Exceptions to the triggered source monitoring requirements. A groundwater system is not required to comply with the triggered source monitoring requirements if any of the following conditions exist.

(i) The executive director determines and documents in writing, that the distribution coliform positive sample is caused by a distribution system deficiency; or

(ii) The distribution coliform positive sample is collected at a location that meets the distribution coliform sample invalidation criteria as specified in subsection (d)(1) of this section and the replacement sample is negative for coliforms [paragraph (5) of this subsection].

(E) Assessment source monitoring. The executive director may require monthly source assessment raw monitoring without the presence of a positive total coliform distribution sample if well conditions exist that indicate the groundwater may be susceptible to fecal contamination. The executive director may conduct a hydrogeological sensitivity assessment to determine if the source is susceptible to fecal contamination. If requested by the executive director, groundwater systems must provide the executive director with any existing information that will enable the

executive director to perform a hydrogeological sensitivity assessment. A groundwater system conducting assessment source monitoring may use a triggered source sample collected under subparagraph (B) of this paragraph to meet the assessment source monitoring requirement. Additionally, an assessment source monitoring sample may be used as a triggered source monitoring sample if collected within 24 hours of notification of the coliform-positive distribution sample. Assessment source monitoring requirements may include:

(i) Source monitoring, collected in a manner described in §290.119(b)(10) of this title, for a period of 12 months that represents each month that the system provides groundwater to the public from the raw groundwater source or such time period as specified by the executive director.

(ii) Collection of samples from each well unless the system has an approved triggered source monitoring plan under subparagraph (B)(ii) of this paragraph.

(5) Culture analysis. If any routine or repeat sample is total coliform-positive, that total coliform-positive culture medium will be analyzed to determine if fecal coliforms or bacteria are present. If fecal coliforms or *E. coli* are present, the

system must notify the executive director by the end of the day in accordance with subsection (g) of this section.

(d) Analytical and invalidation requirements for microbial contaminants. Analytical procedures shall be performed in accordance with §290.119 of this title [(relating to Analytical Procedures)]. Testing for microbial contaminants shall be performed at a laboratory certified by the executive director.

(1) Distribution coliform sample invalidation. The executive director may invalidate a distribution total coliform-positive sample if one of the following conditions is met.

(A) The executive director may invalidate a sample if the laboratory provides written notice that improper sample analysis caused the total coliform-positive result.

(B) The executive director may invalidate a sample if the results of repeat samples collected as required by this section determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The executive director 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. Under those circumstances, the system may cease resampling and request that the executive director invalidate the sample. The system must provide copies of the routine positive and all repeat samples.

(C) The executive director may invalidate a sample if there are substantial grounds to believe that the total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required by this section, and use them to determine compliance with the MCL for total coliforms in subsection (f) of this section. The system must provide written documentation which must state the specific cause of the total coliform-positive sample, and the action the system has taken, or will take, to correct this problem. The executive director may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

(D) The executive director may invalidate a sample if the laboratory provides written notice that the sample was unsuitable for analysis.

(E) If a sample is invalidated by the laboratory, the system must collect another sample from the same location as the original sample within 24 hours of being notified, or as soon as possible if the laboratory is closed, and have it analyzed for the presence of total coliform. The system must continue to resample within 24 hours and have the samples analyzed until it obtains a valid result.

(2) A groundwater system may obtain invalidation of a fecal indicator positive groundwater source sample if the conditions of subparagraphs (A) and (B) of this paragraph apply. If the executive director invalidates a fecal indicator positive groundwater source sample, the system must collect another source sample as specified in subsection (c)(4) of this section within 24 hours of being notified of the invalidation.

(A) Notice from the laboratory must document that improper sample analysis occurred. If a laboratory invalidates a sample, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the invalidated sample, and have it analyzed for the presence of *E. coli*. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. If approved by the executive director, the 24-hour time limit may be extended.

(B) The executive director may invalidate the sample if the system provides written documentation that there is substantial evidence that a fecal indicator positive groundwater source sample is not related to source water quality. If the executive director invalidates a sample, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the invalidated sample, and have it analyzed for the presence of *E. coli*.

(e) Reporting requirements for microbial contaminants. Upon the request of the executive director, the owner or operator of a public water system must provide the executive director with a copy of the results of any test, measurement, or analysis required by this subsection. The copies must be submitted within ten days of the request or within ten days of their receipt by the public water system, whichever is later. The copies must be mailed to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087.

(f) Compliance determination for microbial contaminants. Compliance with the requirements of this section shall be determined using the following criteria each month that the system is in operation.

(1) A system commits an acute MCL violation if:

(A) A repeat distribution system sample is fecal coliform-positive or *E. coli*-positive; or

(B) A total coliform-positive repeat distribution system sample follows a fecal coliform-positive or *E. coli* -positive routine distribution system sample.

(2) A system that collects at least 40 routine distribution coliform samples per month commits a nonacute MCL violation if more than 5.0 % of the samples collected during a month are total coliform-positive, but none of the initial or repeat samples are fecal coliform-positive or *E. coli* -positive.

(3) A system that collects fewer than 40 routine distribution coliform samples per month commits a nonacute MCL violation if more than one sample collected during a month is total coliform-positive, but none of the initial or repeat samples are fecal coliform-positive or *E. coli* -positive.

(4) A public groundwater system that is required to collect raw source samples [, commits a treatment technique violation if any source sample is found to be positive for *E. coli* or other approved fecal indicator. A public groundwater system] is required to conduct corrective action as described in §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques) <u>and is required to provide</u>

public notification in accordance with §209.122(a) of this title (relating to Public Notification) if a source sample is confirmed positive for *E. coli* or other approved fecal indicators.

(5) A public water system that fails to provide the required number of suitable distribution coliform samples commits a monitoring violation.

(6) A public water system that fails to monitor in accordance with the requirements of subsection (c)(4) of this section commits a monitoring violation and must provide public notification in accordance to §290.122 of this title [provide the required number of suitable raw source samples commits a monitoring violation].

(7) A public water system that fails to report the results of the monitoring tests required by this section commits a reporting violation.

(8) A public water system that fails to do a required public notice or certify that notification has been performed commits a public notice reporting violation.

(9) Results of all routine and repeat distribution coliform samples not invalidated by the executive director must be included in determining compliance with the MCL for total coliforms.

(10) Distribution coliform samples invalidated by the executive director shall not be included in determining compliance with the MCL for total coliforms.

(11) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for microbiological contaminants.

(g) Public notification for microbial contaminants. A system that is out of compliance with the requirements described in this section must notify the public using the procedures described in §290.122 of this title [(relating to Public Notification)] for microbial contamination.

(1) A public water system that commits an acute MCL violation for microbial contaminants must notify the water system customers in accordance with the boil water notice requirements of §290.46(q) of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems) and the public notice requirements of §290.122(a) of this title.

(2) A public groundwater system that receives an [a] *E. coli* or other fecal indicator positive source sample that has not been invalidated by the executive director, or a notice of an *E. coli* or other fecal indicator positive source sample from a wholesale system, including consecutive systems, must notify the water system customers within 24-hours in accordance with the requirements of §290.122(a) [§290.122(a)(1)(F)] of this title and include notice in the next Consumer Confidence Report for community systems or provide as a special notice for noncommunity systems in accordance with §290.272(g)(7) of this title (relating to Content of the Report) for community water systems and §290.116(f)(2) of this title for noncommunity systems. Consecutive systems must issue public notice in accordance with §290.122(g) of this title. The system must continue to notify the public annually until the fecal contamination in the source water is determined by the executive director to be corrected as specified under §290.116 of this title.

(3) A public water system that has fecal coliforms or *E. coli* present must notify the executive director 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 commission's office is closed, in which case the system must notify the executive director before the end of the next business day.

(4) A public water system which commits an MCL violation must report the violation to the executive director immediately after it learns of the violation, but no later than the end of the next business day, and notify the public in accordance with §290.122(b) of this title.

(5) A public water system which has failed to comply with a coliform monitoring requirement must report the monitoring violation to the executive director within ten days after the system discovers the violation and notify the public in accordance with §290.122(c) of this title.

§290.110. Disinfectant Residuals.

(a) Applicability. All public water systems shall properly disinfect water before it is distributed to any customer and shall maintain acceptable disinfectant residuals within the distribution system.

(b) Minimum and maximum acceptable disinfectant concentrations. Public water systems shall provide the minimum levels of disinfectants in accordance with the provisions of this section. Public water systems shall not exceed the maximum residual disinfectant levels (MRDLs) provided in this section.

(1) The disinfection process used by public water systems must ensure that water has been adequately disinfected before it enters the distribution system.

(A) The disinfection process used by public water systems treating surface water sources or groundwater sources that are under the direct influence of surface water must meet the requirements of §290.111(d) of this title (relating to Surface Water Treatment).

(B) The executive director may require the disinfection process used by public water systems treating groundwater sources that are not under the direct influence of surface water to meet the requirements of §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques).

(C) The disinfection process at other types of treatment plants shall provide the level of disinfection required by the executive director.

(2) The residual disinfectant concentration in the water entering the distribution system shall be at least 0.2 milligram per liter (mg/L) free chlorine or 0.5 mg/L chloramine.

(3) The chlorine dioxide residual of the water entering the distribution system shall not exceed an MRDL of 0.8 mg/L.

(4) The residual disinfectant concentration in the water within the distribution system shall be at least 0.2 mg/L free chlorine or 0.5 mg/L chloramine.

(5) The running annual average of the free chlorine or chloramine residual of the water within the distribution system shall not exceed an MRDL of 4.0 mg/L.

(c) Monitoring requirements. Public water systems shall monitor the performance of the disinfection facilities to ensure that appropriate disinfectant levels are maintained. All monitoring conducted pursuant to the requirements of this section must be conducted at sites designated in the public water system's monitoring plan.

(1) Public water systems that treat surface water or groundwater under the direct influence of surface water must verify that they meet the disinfection requirements of subsection (b)(2) of this section.

(A) Public water systems that treat surface water or groundwater under the direct influence of surface water and sell treated water on a wholesale basis or serve more than 3,300 people must continuously monitor and record the disinfectant

residual of the water entering the distribution system. If there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(B) Public water systems that treat surface water or groundwater under the direct influence of surface water, serve 3,300 or fewer people and do not sell treated water on a wholesale basis must monitor and record the disinfectant residual of the water entering the distribution system with either continuous monitors or grab samples.

(i) If a system uses grab samples, the samples must be collected on an ongoing basis at the frequency prescribed in the following table.

Figure: 30 TAC §290.110(c)(1)(B)(i) (No change to the figure as it currently exists in TAC.)

(ii) The grab samples cannot be taken at the same time and the sampling interval is subject to the executive director's review and approval.

(iii) Treatment plants that use grab samples and fail to detect an appropriate disinfectant residual must repeat the test at four-hour or shorter intervals until compliance has been reestablished.

(2) Public water systems that treat groundwater or that purchase and resell treated water must, upon the request of the executive director, verify that they meet the disinfection requirements of subsection (b)(2) of this section.

(3) Each treatment plant using chlorine dioxide must monitor and record the chlorine dioxide residual of the water entering the distribution system at least once each day. If the chlorine dioxide residual in the water entering the distribution system exceeds the MRDL contained in subsection (b)(3) of this section, the treatment plant must conduct additional tests.

(A) If the public water system does not have additional chlorination facilities in the distribution system, it must conduct three additional tests at the service connection nearest the treatment plant where an elevated chlorine dioxide residual was detected. The first additional test must be conducted within two hours after detecting an elevated chlorine dioxide residual at the entry point to the distribution system. The two subsequent tests must be conducted at six-hour to eight-hour intervals thereafter.

(B) If the public water system has additional chlorination facilities in the distribution system, it must conduct an additional test at the service connection nearest the treatment plant where an elevated chlorine dioxide residual was detected, an additional test at the first service connection after the point where the water is rechlorinated, and an additional test at a location in the far reaches of the distribution system. The additional test at the location nearest the treatment plant must be conducted within two hours after detecting an elevated chlorine dioxide residual at the entry point to the distribution system. The two other tests must be conducted at six-hour to eight-hour intervals thereafter.

(4) Public water systems shall monitor the disinfectant residual at various locations throughout the distribution system.

(A) Public water systems that use groundwater or purchased water sources only and serve fewer than 250 connections and fewer than 750 people daily, must monitor the disinfectant residual at representative locations in the distribution system at least once every seven days.

(B) Public water systems that serve at least 250 connections or at least 750 people daily, and use only groundwater or purchased water sources must

monitor the disinfectant residual at representative locations in the distribution system at least once per day.

(C) Public water systems using surface water sources or groundwater under the direct influence of surface water must monitor the disinfectant residual tests at least once per day at representative locations in the distribution system.

(D) All public water systems must monitor the residual disinfectant concentration each time that a bacteriological sample is collected, as specified in §290.109 of this title (relating to Microbial Contaminants).

(d) Analytical requirements. All monitoring required by this section must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(1) The free chlorine <u>or chloramine</u> residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L<u>. Samples tested using a colorimetric method must be analyzed using a colorimeter; spectrophotometer; or, with the written permission of the executive director, a color comparator.</u> [using one of the following methods:]

[(A) Amperometric titration;]

[(B) N,N-diethyl-p -phenylenediamine (DPD) Ferrous titration;]

[(C) DPD colorimetric; or]

[(i) The free chlorine residual within the treatment plant and at the point where the treated water enters the distribution system must be measured with a colorimeter or spectrophotometer.]

[(ii) The free chlorine residual within the distribution system must be measured with a colorimeter, spectrophotometer, or color comparator test kit.]

[(D) Springaldizine (FACTS).]

[(2) The chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L using one of the following methods:]

[(A) Amperometric titration;]

[(B) DPD Ferrous titration; or]

[(C) DPD colorimetric.]

[(i) The chloramine residual within the treatment plant and at the point where the treated water enters the distribution system must be measured with a colorimeter or spectrophotometer.]

[(ii) The chloramine residual within the distribution system must be measured with a colorimeter, spectrophotometer, or color comparator test kit.]

(2) [(3)] The chlorine dioxide residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using one of the following methods:

(A) the amperometric titration method using a titrator with platinum-platinum electrodes;

(B) the spectrophotometric Lissamine Green B method, or

(C) with the written permission of the executive director, the DPD-glycine method using a colorimeter or spectrophotometer.

(e) Reporting requirements. Any owner or operator of a public water system subject to the provisions of this section is required to report to the executive director the results of any test, measurement, or analysis required by this section.

(1) Systems exceeding the MRDL for chlorine dioxide in subsection (b)(3) of this section must report the exceedance to the executive director within 24 hours of the event.

(2) Public water systems that use surface water sources or groundwater sources under the direct influence of surface water must submit a Surface Water Monthly Operating Report (commission Form 0102C) or a Surface Water Monthly Operating Report for 2-Filter Plants (commission Form 0103) each month.

(3) Public water systems that use chlorine dioxide must submit a Chlorine Dioxide Monthly Operating Report (commission Form 0690) each month.

(4) Public water systems that use purchased water or groundwater sources only must complete a Disinfection Level Quarterly Operating Report (DLQOR, commission Form 20067) each quarter.

(A) Community and nontransient noncommunity public water systems must submit the Disinfection Level Quarterly Operating Report each quarter, by the tenth day of the month following the end of the quarter.

(B) Transient noncommunity public water systems must retain the Disinfection Level Quarterly Operating Reports and must provide a copy if requested by the executive director.

(5) Monthly and quarterly reports required by this section must be submitted to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(f) Compliance determinations. Compliance with the requirements of this section shall be determined using the following criteria.

(1) All samples used for compliance must be obtained at sampling sites designated in the monitoring plan.

(A) All samples collected at sites designated in the monitoring plan as microbiological and disinfectant residual monitoring sites shall be included in the compliance determination calculations.

(B) Samples collected at sites in the distribution system not designated in the monitoring plan shall not be included in the compliance determination calculations.

(2) A public water system that fails to conduct the monitoring tests required by this section commits a monitoring violation.

(3) A public water system that fails to report the results of the monitoring tests required by this section commits a reporting violation.

(4) A public water system that uses surface water sources or groundwater sources under the direct influence of surface water and fails to meet the requirements of subsection (b)(2) of this section for a period longer than four consecutive hours commits a nonacute treatment technique violation. A public water system that fails to conduct the additional testing required by subsection (c)(1)(B)(iii) of this section also commits a nonacute treatment technique violation.

(5) A public water system that uses chlorine dioxide and exceeds the level specified in subsection (b)(3) of this section violates the MRDL for chlorine dioxide.

(A) If a public water system violates the MRDL for chlorine dioxide and any of the three additional distribution samples exceeds the MRDL, the system commits an acute MRDL violation for chlorine dioxide.

(B) If a public water system violates the MRDL for chlorine dioxide and fails to collect each of the three additional distribution samples required by subsection (c)(3) of this section, the system commits an acute MRDL violation for chlorine dioxide.

(C) If a public water system violates the MRDL for chlorine dioxide but none of the three additional distribution samples violates the MRDL, the system commits a nonacute MRDL violation for chlorine dioxide.

(6) A public water system that fails to meet the requirements of subsection (b)(4) of this section, in more than 5.0% of the samples collected each month, for any two consecutive months, commits a nonacute treatment technique violation. Specifically, the system commits a nonacute violation if the value "V" in the following formula exceeds 5.0% per month for any two consecutive months:

Figure: 30 TAC §290.110(f)(6) (No change to the figure as it currently exists in TAC.)

(7) A public water system violates the MRDL for chlorine or chloramine if, at the end of any quarter, the running annual average of monthly averages exceeds the level specified in subsection (b)(5) of this section.

(8) Notwithstanding the MRDLs listed in subsection (b) of this section, operators shall increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

(9) If a public water system's failure to monitor makes it impossible to determine compliance with the MRDL for chlorine or chloramines, the system commits an MRDL violation for the entire period covered by the annual average.

(10) A public water system that fails to issue a required public notice or certify that it has issued that notice commits a violation.

(g) Public notification requirements. The owner or operator of a public water system that violates the requirements of this section must notify the executive director and the people served by the system.

(1) A public water system that fails to meet the requirements of subsection (b)(3) of this section, shall notify the executive director within 24 hours of the event and the customers in accordance with the requirements of §290.122 of this title (relating to Public Notification).

(A) A public water system that has an acute violation of the MRDL for chlorine dioxide must notify the customers in accordance with the requirements of §290.122(a) of this title.

(B) A public water system that has a non-acute violation of the MRDL for chlorine dioxide must notify the customers in accordance with the requirements of §290.122(b) of this title.

(2) A public water system that uses surface water sources or groundwater sources under the direct influence of surface water and fails to meet the minimum disinfection requirements of subsection (b)(2) of this section shall notify the executive

director by the end of the next business day and the customers in accordance with the requirements of §290.122(b) of this title.

(3) A public water system that fails to meet the requirements of subsection (b)(4) of this section in more than 5.0% of the samples collected each month for two consecutive months must notify its customers.

(A) A public water system that uses surface water or groundwater under the direct influence of surface water must notify its customers in accordance with the requirements of §290.122(b) of this title.

(B) A public water system that uses only groundwater or purchased water must notify its customers when it issues its annual consumer confidence report.

(4) A public water system that fails to meet the requirements of subsection (b)(5) of this section shall notify the executive director by the end of the next business day and the customers in accordance with the requirements of §290.122(b) of this title.

(5) A public water system which fails to conduct the monitoring required by this section must notify its customers of the violation in accordance with the requirements of §290.122(c) of this title.

§290.111. Surface Water Treatment.

(a) Applicability. A public water system that treats surface water or groundwater under the direct influence of surface water must comply with the requirements of this section.

(1) A public water system that treats surface water must comply with the requirements of this section beginning on the effective date of the rule.

(2) A public water system that treats groundwater under the direct influence of surface water must comply with the requirements of this section beginning on a date specified by the executive director. This compliance date shall not exceed 18 months from the date that the executive director first notifies the system that the groundwater source is under the direct influence of surface water.

(3) A public water system that treats both surface water and groundwater under the direct influence of surface water must meet the compliance date in paragraph (1) of this subsection at plants that treat any surface water and must meet the compliance date in paragraph (2) of this subsection at plants that treat only groundwater under the direct influence of surface water.

(b) Raw surface water monitoring. A public water system that treats surface water or groundwater under the direct influence of surface water must conduct at least two rounds of special raw surface water monitoring at each surface water intake and at each well producing groundwater under the direct influence of surface water for the purpose of establishing minimum treatment technique requirements for *Cryptosporidium* and other pathogens. The executive director may waive the raw surface water monitoring requirements for an intake or a well if the combination of pathogen removal and disinfection processes used to treat the raw water achieves at least a 5.5-log total removal and inactivation of *Cryptosporidium parvum*.

(1) Raw water monitoring plans. A system must submit a proposed raw surface water monitoring plan when requested by the executive director. The proposed plan must identify all of the system's intakes and wells; provide the location of each raw water sampling point; include the parameters that will be monitored and the frequency and dates that samples will be collected; and specify the laboratories that will perform the analyses. Raw surface water monitoring must be conducted in accordance with a monitoring plan that has been approved by the executive director. The executive director shall not approve a raw surface water monitoring plan unless it indicates that the system will meet the requirements of 40 Code of Federal Regulations (CFR) §§141.701 - 141.707.

(2) Sampling location. A system must collect each raw water sample at a location approved by the executive director. Samples must be collected from the raw water line prior to any treatment and before the first point where a recycled stream is returned to the treatment process.

(3) Sampling parameters and frequency. A system must collect raw water samples at a frequency approved by the executive director.

(A) Unless the executive director approves an alternate sampling regimen, a system must monitor turbidity, *E. coli*, and *Cryptosporidium* levels in the raw water at least once each month for a period of not less than 24 consecutive months if the system:

(i) serves at least 10,000 people; or

(ii) is part of combined distribution system in which one or more systems serve at least 10,000 people and the system with the well or intake regularly provides water to another public water supply.

(B) A system that is not required to monitor under subparagraph (A) of this paragraph must either monitor in accordance with the requirements of

subparagraph (A) of this paragraph or monitor *E. coli* levels in their raw water at least once every two weeks for a period of not less than 12 consecutive months. A system that does not initially monitor for *Cryptosporidium* and has elevated *E. coli* levels must conduct additional raw water monitoring.

(i) A system must conduct additional monitoring if the average *E. coli* level exceeds 50 colony-forming units per 100 milliliters in the raw water produced by a surface water intake located on a river or flowing stream or the raw water from a well producing groundwater under the direct influence of surface water located closest to a river or flowing stream.

(ii) A system must conduct additional monitoring if the average *E. coli* level exceeds 10 colony-forming units per 100 milliliters in the raw water from a surface water intake not located on a river or flowing stream or the raw water produced by a well producing groundwater under the direct influence of surface water not located on a river or flowing stream.

(iii) A system that must conduct additional monitoring must monitor *Cryptosporidium* levels in the raw water at least twice each month for a period of not less than 12 consecutive months, or at least once each month for a period of not less than 24 consecutive months.

(C) The executive director may approve an alternate sampling frequency for intakes and wells that operate only part of the year.

(4) Sampling schedule and dates. A system must collect raw water samples in accordance with a schedule approved by the executive director.

(A) Except as provided in subparagraph (B) of this paragraph, a system must begin each round of raw source water monitoring no later than the date shown in the following table titled "Raw Source Water Monitoring Schedule."

Figure: 30 TAC §290.111(b)(4)(A) (No change to the figure as it currently exists in TAC.)

(B) If a system installs a new well or intake after the date the first round of raw source water monitoring must begin, the system must:

(i) submit a proposed monitoring schedule for the first round of special raw surface water monitoring no later than three months after first placing the new source in operation; and

(ii) begin the second round of special raw surface water monitoring no later than six years after initial bin classification.

(C) A system must collect a raw water sample no sooner than two days before the date approved by the executive director and no later than two days after the approved date, unless an extreme condition or situation exists that poses a danger to the sample collector.

(D) A system which is unable to collect a sample within this five-day period must collect the sample as close as possible to the approved date and must notify the executive director in writing why the sample was not collected on the approved date.

(5) Replacement samples. If, for any reason, the laboratory is unable to report a valid analytical result for a scheduled sample, the system must submit a replacement sample on a date approved by the executive director.

(6) Analytical requirements. Raw water samples collected pursuant to this subsection must be analyzed at an approved or accredited laboratory.

(A) *Cryptosporidium* samples must be analyzed using one of the methods approved in 40 CFR §141.704(a) and by a laboratory that is approved under United States Environmental Protection Agency's (EPA) Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water.

(B) *E. coli* samples must be analyzed using one of the methods approved in 40 CFR §136.3(a) for the enumeration of *E. coli* in source water and by a laboratory that is certified or accredited by the executive director.

(i) Systems must ensure that samples are maintained between 0 degrees [o] C and 10 degrees [o] C during storage and transportation to the laboratory.

(ii) The time between sample collection and the initiation of the analysis may not exceed 30 hours without the prior approval of the executive director.

(iii) The executive director may allow up to 48 hours between sample collection and the initiation of the analysis if the analysis is conducted by the Colilert reagent version of Standard Method 9223B.

(C) Turbidity samples must be analyzed using a method and at a laboratory approved by the executive director.

(7) Reporting requirements for raw surface water sample results. The owner or operator of a public water system must provide to the executive director with a copy of the results of any test, measurement, or analysis required by this subsection.

(A) Results must be submitted using the Raw Surface Water Sampling Report (commission Form 20358) or in another format that is approved by the executive director and contains the information required by 40 CFR §141.706(e).

(i) If the sample was not collected within the five-day window described in paragraph (4)(C) of this subsection, the result must be accompanied by the information required in paragraph (4)(D) of this subsection.

(ii) If the laboratory report indicates that a valid analytical result could not be reported, the laboratory report must be accompanied by a request to collect a replacement sample.

(B) The results must be submitted within ten days of their receipt by the public water system and no later than 10 days after the end of the first month following the month that the sample was collected.

(C) The results and any additional information must be mailed to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087.

(c) Treatment technique requirements. A system that treats surface water or groundwater under the direct influence of surface water must meet minimum treatment technique requirements before the water reaches the entry point to the distribution system.

(1) The combination of pathogen removal and disinfection processes used by a public water system must achieve at least a 4.0-log removal/inactivation of viruses.

(2) The combination of pathogen removal and disinfection processes used by a public water system must achieve at least a 3.0-log removal/inactivation of *Giardia lamblia*.

(3) A public water system that is required by subsection (b) of this section to conduct raw surface water monitoring must comply with the requirements of this paragraph.

(A) The average *Cryptosporidium* level and Bin Classification shall be determined in accordance with the requirements established by 40 CFR §141.710.

(i) For systems that collect a total of at least 48 *Cryptosporidium* samples, the average concentration is equal to the arithmetic mean of all sample concentrations.

(ii) For systems that collect a total of at least 24 samples, but not more than 47 *Cryptosporidium* samples, the average concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

(iii) For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the average concentration is equal to the arithmetic mean of all sample concentrations.

(iv) For systems with plants operating only part of the year that monitor fewer than 12 months per year under 40 CFR §141.701(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

(v) If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring.

Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs.

(B) Unless otherwise specified in this paragraph, the combination of pathogen removal and disinfection processes must achieve the removal/inactivation of *Cryptosporidium parvum* specified in the following table titled "Treatment Technique Requirements for *Cryptosporidium*," beginning 36 months after being assigned a Bin Classification by the executive director.

Figure: 30 TAC §290.111(c)(3)(B) (No change to the figure as it currently exists in TAC.)

(i) A system that conducts the first round of special raw surface water monitoring according to the schedule contained in subsection (b)(4)(A) of this section must comply with the requirements of this paragraph no later than the date shown in the following table, titled "Compliance Date for Existing Sources."

Figure: 30 TAC §290.111(c)(3)(B)(i) (No change to the figure as it currently exists in TAC.)

(ii) A system that conducts the first round of special raw surface water monitoring according to the schedule contained in subsection (b)(4)(B)(i)

of this section must comply with the requirements of this paragraph no later than six years after beginning the first round of monitoring on the new source.

(iii) The executive director may allow a system making capital improvements an additional two years to comply with the treatment requirement of this paragraph.

(C) A system that has been assigned to Bin 3 or Bin 4 must achieve at least 1.0-log removal/inactivation of *Cryptosporidium* using one or a combination of the following: bag filters, cartridge filters, chlorine dioxide, membranes, ozone, or ultraviolet light (UV).

(D) Prior to the effective date of subparagraph (B) of this paragraph, the combination of disinfection and filtration processes used by a public water system to treat for *Cryptosporidium* must achieve at least a 2.0-log removal/inactivation of *Cryptosporidium parvum*.

(4) The combination of disinfection and filtration processes at plants that do not monitor each source in accordance with the requirements of subsection (b) of this section must achieve at least a 5.5-log removal /inactivation of *Cryptosporidium*

parvum.

(5) The executive director may require additional levels of treatment in cases of poor source water quality.

(6) The executive director may establish minimum design, operational, and reporting requirements for watershed control programs and treatment processes used to meet the treatment technique requirements of this subsection.

(d) Microbial inactivation requirements. A system that treats surface water or groundwater under the direct influence of surface water must meet minimum disinfection requirements before the water is supplied to any consumer.

(1) Inactivation table. The disinfection process must achieve the minimum microbial inactivation levels shown in the following table.

Figure: 30 TAC §290.111(d)(1) (No change to the figure as it currently exists in TAC.)

(A) The disinfection process at treatment plants not described in the Microbial Inactivation Requirements table must provide the level of disinfection required by the executive director.

(B) The executive director may require additional levels of treatment in cases of poor source water quality.

(C) The executive director may reduce the inactivation requirement for plants that meet the individual filter effluent performance criteria contained in subsection (g)(1) of this section and have been assigned a Bin 1 classification under the provisions of subsection (c)(3) of this section.

(D) A system that fails to meet the inactivation requirements of this section for a period of longer than four consecutive hours commits a nonacute treatment technique violation. A system that fails to conduct the additional testing required by paragraph (2)(C) of this subsection also commits a nonacute treatment technique violation.

(E) A system that has a plant assigned a Bin 2, 3, or 4 classification under the provisions of subsection (c)(3) of this section and uses UV disinfection facilities to meet the treatment technique requirements for *Cryptosporidium* must meet the inactivation requirements of this subsection in at least 95% of the water treated each month.

(2) Monitoring requirements for chemical disinfectants. Public water systems must monitor the performance of the disinfection facilities to ensure that appropriate disinfectant levels are maintained. All monitoring conducted pursuant to the requirements of this subsection must be conducted at sites designated in the public water system's monitoring plan.

(A) The disinfectant residual, pH, temperature, and flow rate of the water in each disinfection zone must be measured at least once each day during a time when peak hourly raw water flow rates are occurring.

(B) Disinfection contact time will be based on tracer study data or a theoretical analysis submitted by the system owner or their designated agent and approved by the executive director and the actual flow rate that is occurring at the time that monitoring occurs.

(C) Treatment plants that fail to demonstrate an appropriate level of treatment must repeat these tests at four-hour or shorter intervals until compliance has been reestablished.

(3) Monitoring requirements for UV disinfection facilities. Public water systems must monitor the performance of the UV disinfection facilities.

(A) A system must continuously monitor and record UV intensity as measured by a UV sensor, lamp status, the flow rate through the unit, and other parameters prescribed by the executive director to ensure that the units are operating within validated conditions.

(B) A system with a plant that has been assigned a Bin 2, 3, or 4 classification under the provisions of subsection (c)(3) of this section must also monitor and record the amount of water treated by each UV unit each month and the amount of water produced each month when the unit was not operating within validated conditions.

(4) Analytical requirements. All monitoring required by this subsection must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(A) The pH analysis must be conducted using a pH meter with a minimum accuracy of plus or minus 0.1 pH units.

(B) The temperature of the water must be measured using a thermometer or thermocouple with a minimum accuracy of plus or minus 0.5 degrees Celsius.

(C) The free chlorine or chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 milligrams per liter (mg/L). Samples tested using a colorimetric method must be analyzed using a colorimeter; spectrophotometer; or, with the written permission of the executive director, a color comparator. [using one of the following methods:]

[(i) Amperometric titration;]

[(ii) DPD Ferrous titration;]

[(iii) a DPD method that uses a colorimeter or spectrophotometer; or]

[(iv) Springaldizine (FACTS).]

[(D) The chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L using one of the following methods:]

[(i) Amperometric titration;]

[(ii) DPD Ferrous titration; or]

[(iii) a DPD method that uses a colorimeter or spectrophotometer.]

(D) [(E)] The chlorine dioxide residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using one of the following methods:

(i) Amperometric titrator with platinum-platinum electrodes; or

(ii) Lissamine Green B.

(E) [(F)] The ozone residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using the Indigo Method and using a colorimeter or spectrophotometer.

(F) [(G)] The UV dose must be measured by a calibrated sensor approved by the executive director.

(e) Filtration requirements for conventional filters. A system that uses granular media filters to treat surface water or groundwater under the direct influence of surface water must meet minimum filtration requirements before the water is supplied to any consumer.

(1) Treatment technique requirements for combined filter effluent. Treatment plants using conventional media filtration must meet the following turbidity requirements.

(A) The turbidity level of the combined filter effluent must never exceed 1.0 nephelometric turbidity unit (NTU).

(B) The turbidity level of the combined filter effluent must be 0.3 NTU or less in at least 95% of the samples tested each month.

(2) Performance criteria for individual filter effluent. The filtration techniques must ensure the public water system meets the following performance criteria.

(A) The turbidity from each individual filter effluent should never exceed 1.0 NTU.

(B) At a public water system that serves 10,000 people or more, the turbidity from each individual filter effluent should not exceed 0.5 NTU at four hours after the individual filter is returned to service after backwash or shutdown.

(3) Routine turbidity monitoring requirements. A system must monitor the performance of its filtration facilities.

(A) A system that serves fewer than 500 people and continuously monitors the turbidity level of each individual filter must measure and record the turbidity level of the combined filter effluent at least once each day that the plant is in operation.

(B) A system that serves at least 500 people and continuously monitors the turbidity level of each individual filter must measure and record the turbidity level of the combined filter effluent at least every four hours that the system serves water to the public.

(C) Except as provided in subparagraph (D) of this paragraph, a system must continuously monitor the filtered water turbidity at the effluent of each individual filter and record the turbidity value every 15 minutes.

(D) A system that serves fewer than 10,000 people and monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity under the provisions of §290.42(d)(11)(E)(ii) of this title (relating to Water Treatment) must:

(i) continuously monitor the turbidity of the combined filter effluent and record the turbidity value every 15 minutes; and

(ii) measure and record the turbidity level at the effluent of each filter at least once each day the plant is in operation.

(4) Special investigation requirements. A system which fails to produce water with acceptable turbidity levels must investigate the cause of the problem and take appropriate corrective action. The executive director can waive these special monitoring requirements for systems that have a corrective action schedule approved by the executive director.

(A) A public water system that fails to meet the turbidity criteria specified in paragraph (2) of this subsection must conduct additional monitoring.

(i) Each time a filter exceeds an applicable filtered water turbidity level specified in paragraph (2) of this subsection for two consecutive 15-minute readings, the public water system must either identify the cause of the exceedance or produce a filter profile on the filter within seven days of the exceedance.

(ii) Each time a filter exceeds the filtered turbidity level specified in paragraph (2)(A) of this subsection for two consecutive 15-minute readings on three separate occasions during any consecutive three-month period, the public water system must conduct a filter assessment on the filter within 14 days of the third exceedance.

(iii) Each time the filtered water turbidity level for a specific filter or any combination of individual filters exceeds 2.0 NTU on two consecutive 15-minute readings during two consecutive months, the public water system must participate in a third-party comprehensive performance evaluation (CPE). If the system serves at least 10,000 people, the CPE must be conducted within 90 days of the first exceedance in the second month. If the system serves fewer than 10,000 people, the CPE must be conducted within 120 days of the first exceedance in the second month.

(B) A system that serves fewer than 10,000 people, monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity, and fails to meet the turbidity criteria in paragraph (1)(A) of this subsection must conduct additional monitoring. The executive director may waive these special monitoring requirements for systems that have a corrective action schedule approved by the executive director.

(i) Each time the combined filter effluent turbidity level exceeds 1.0 NTU for two consecutive 15-minute readings, the public water system must either identify the cause of the exceedance or complete a filter profile on the combined filter effluent within seven days of the exceedance.

(ii) Each time the combined filter effluent turbidity level exceeds 1.0 NTU for two consecutive 15-minute readings on three separate occasions during any consecutive three-month period, the public water system must conduct a filter assessment on each filter within 14 days of the third exceedance.

(iii) Each time the combined filter effluent turbidity level exceeds 2.0 NTU on two consecutive 15-minute readings during two consecutive

months, the public water system must participate in a third-party comprehensive performance evaluation within 120 days of the first exceedance in the second month.

(5) Analytical requirements for turbidity. All monitoring required by this subsection must be conducted by a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title. Equipment used for compliance measurements must be maintained and calibrated in accordance with §290.46(s) of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems).

(A) Turbidity must be measured with turbidimeters that use one of the following methods:

(i) EPA Method 180.1 and Standard Method 2130B;

(ii) Great Lakes Instruments Method 2; or

(iii) Hach FilterTrak Method 10133.

(B) A system monitoring the performance of individual filters with on-line turbidimeters and recorders may monitor combined filter effluent turbidity

levels by either continuously monitoring turbidity levels with an on-line turbidimeter or measuring the turbidity level in grab samples with a bench-top turbidimeter.

(C) Continuous turbidity monitoring must be conducted using a continuous, on-line turbidimeter and a device that records the turbidity level reading at least once every 15 minutes.

(i) Turbidity data may be recorded electronically by a supervisory control and data acquisition system (SCADA) or on a strip chart. The recorder must be designed so that the operator can accurately determine the turbidity level readings at 15-minute intervals.

(ii) If there is a failure in the continuous turbidity monitoring equipment at a system serving 10,000 people or more, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(iii) If the continuous turbidity monitoring equipment at a system serving fewer than 10,000 people malfunctions, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than 14 working days following the failure of the equipment.

(D) A system that monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity under §290.42(d)(11)(E)(ii) of this title must monitor the performance of individual filters using a bench-top turbidimeter.

(f) Filtration requirements for other filters. A system that uses cartridge filters, membrane filters, or other unconventional filtration systems to treat surface water or groundwater under the direct influence of surface water must meet minimum filtration requirements before the water is supplied to any consumer.

(1) Treatment technique requirements. A system that uses unconventional filtration technologies such as membrane filters or cartridge filters must meet treatment technique requirements prescribed by the executive director.

(A) The filtration facilities must meet combined filter effluent and individual filter effluent turbidity limits established by the executive director.

(B) The filtration facilities must be operated and maintained in accordance with requirements that the executive director determines are needed to demonstrate the amount of *Giardia* and *Cryptosporidium* removal achieved.

(2) Monitoring requirements. A system must monitor the performance of its filtration facilities.

(A) A system that serves fewer than 500 people and continuously monitors the turbidity level of each individual cartridge or membrane unit must measure and record the turbidity level of the combined effluent at least once each day that the plant is in operation.

(B) A system that serves at least 500 people and continuously monitors the turbidity level of each individual cartridge or membrane unit must measure and record the turbidity level of the combined effluent at least every four hours that the system serves water to the public.

(C) A system using membranes must use a method approved by the executive director to continuously monitor the quality of the water produced by each membrane unit and record the monitoring results at least once every five minutes. The executive director may approve monitoring parameters other than turbidity and decrease the frequency to once every 15 minutes if the approved operating parameters will allow consecutive readings to be obtained between backwash or backflush cycles.

(D) A system using membranes must conduct direct integrity testing on each membrane unit using a procedure approved by the executive director.

(i) Direct integrity tests must be conducted in a manner that will detect a membrane defect of 3 microns or smaller and demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process by the executive director.

(ii) Direct integrity test method must calculate the log removal value for a 3-micron size particle and establish an upper control limit which assures that the unit is capable of meeting the removal credit approved by the executive director.

(iii) A system that has been assigned a Bin 1 classification under the provisions of subsection (c)(3)(B) of this section must conduct direct integrity tests at least once every seven days. The executive directed may reduce the testing requirements for other membrane units.

(iv) A system that has been assigned a Bin 2, 3, or 4 classification under the provisions of subsection (c)(3)(B) of this section must conduct direct integrity tests at least once each day that the membrane unit is used for filtration.

The executive director may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium* removal or inactivation, or reliable process safeguards.

(v) A system must immediately conduct a direct integrity test on any membrane unit that produces filtered water with turbidity level above 0.15 NTU on two consecutive readings. The executive director must establish alternate site-specific control limits for systems that use other approved technology in lieu of turbidimeters to continuously monitor the performance of membrane units.

(vi) A system must immediately remove any membrane unit that fails a direct integrity test from service until the membrane modules in that unit are inspected and, if necessary, repaired. A membrane unit that has been removed from service may not be returned to service until it has passed a direct integrity test.

(E) A system that uses cartridge filters must continuously monitor the performance of the filtration process in a manner approved by the executive director.

(3) Analytical requirements. All monitoring required by this subsection must be conducted by a facility approved by the executive director and using methods

that conform to the requirements of §290.119 of this title. Equipment used for compliance measurements must be maintained and calibrated in accordance with §290.46(s) of this title.

(A) Turbidity of the combined effluent must be measured with turbidimeters that meet the requirements of subsection (e)(5)(A) of this section.

(B) The turbidity of the water produced by each membrane unit must be measured using the Hach FilterTrak Method 10133. The executive director may approve the use of alternative technology to monitor the quality of the water produced by each membrane unit.

(C) A system continuously monitoring the performance of individual cartridges or membrane units may monitor combined effluent turbidity levels by either continuously monitoring turbidity levels with an on-line turbidimeter, or by measuring the turbidity level in grab samples with a bench-top turbidimeter.

(D) Data collected from on-line instruments may be recorded electronically by a SCADA system or on a strip chart recorder. The recorder must be designed so that the operator can accurately determine the value of readings at the monitoring interval approved by the executive director.

(i) If there is a failure in the continuous monitoring equipment at a system serving 10,000 people or more, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(ii) If there is a failure in the continuous monitoring equipment at a system serving fewer than 10,000 people, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than 14 working days following the failure of the equipment.

(E) A system that uses cartridge filters and does not continuously monitor the turbidity of each filter unit must monitor the performance of individual filters at least once each day using a bench-top turbidimeter.

(g) Other treatment credits for systems in Bins 2 through 4. The executive director may grant additional pathogen removal and inactivation credit to systems that meet enhanced design, operational, maintenance, and reporting requirements.

(1) Individual filter effluent. The executive director may approve an additional 1.0-log removal credit for *Giardia* and *Cryptosporidium* to a treatment plant that uses conventional granular media filters.

(A) The executive director will approve the additional credit for a plant if:

(i) the system continuously monitored the filtered water turbidity at the effluent of each individual filter and recorded the turbidity value every 15 minutes that the filter was sending water to the clearwell;

(ii) the turbidity level at each individual filter effluent is less than or equal to 0.15 NTU in at least 95% of the measurements recorded during the month; and

(iii) no individual filter produced water with turbidity level above 0.3 NTU in two consecutive 15-minute readings.

(B) The executive director may also approve the additional credit for a plant that does not meet the requirements of subparagraph (A) of this paragraph if:

(i) the executive director determines that the failure to meet the requirements of subparagraph (A) of this paragraph could not have been prevented through optimizing plant operations, design, or maintenance; and

(ii) the system has experienced no more than two such failures within the most recent 12 months.

(2) Combined filter effluent. The executive director may approve an additional 0.5-log removal credit for *Cryptosporidium* to a treatment plant that uses conventional granular media filters if:

(A) the system continuously monitored the filtered water turbidity at the effluent of each individual filter and recorded the turbidity value every 15 minutes that the filter was sending water to the clearwell;

(B) the turbidity level at the combined filter effluent is less than or equal to 0.15 NTU in at least 95% of the measurements recorded during the month; and

(C) the plant does not receive additional treatment credit under paragraph (1) of this subsection.

(3) Second stage filtration. The executive director will approve an additional 0.5-log removal credit for *Giardia* and *Cryptosporidium* to a treatment plant that uses a second, separate stage of conventional granular media filters if:

(A) the filters in both stages meet minimum design criteria approved by the executive director;

(B) all of the water produced by the plant passes through both stages of filtration;

(C) the system continuously monitored the filtered water turbidity at the effluent of each individual filter in the first stage of filtration and recorded the turbidity value every 15 minutes that the filter was sending water to the clearwell; and

(D) no individual filter in the first stage of filtration produced water with turbidity level above 1.0 NTU in two consecutive 15-minute readings.

(4) Other pathogen control strategies. The executive director may approve an additional removal or inactivation credit for other pre-filtration, filtration, or post-filtration strategies that can demonstrate effective, consistent levels of enhanced pathogen control.

(A) The alternative strategy must achieve a quantifiable reduction in the risk of waterborne disease in all of the treated water produced by the plant.

(B) The alternative strategy must conform to any applicable requirement of 40 CFR §§141.715 - 141.720.

(C) The executive director may establish minimum site-specific design, operational, maintenance, and reporting requirements for any alternative strategy used to meet minimum treatment technique requirements of subsection (c) of this section.

(D) The executive director may not approve additional removal credit under the provisions of this paragraph to any strategy that includes a treatment process has been assigned additional removal or inactivation credit under any other provision of this subsection.

(h) Reporting requirements. Public water systems must properly complete and submit periodic reports to demonstrate compliance with this section.

(1) A system that has a turbidity level exceeding 1.0 NTU in the combined filter effluent must consult with the executive director within 24 hours.

(2) A system that continuously monitors the performance of individual filters must submit a Surface Water Monthly Operating Report (commission Form 0102C) each month for each plant that treats surface water sources or groundwater sources under the direct influence of surface water.

(3) A system that monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity under §290.42(d)(11)(E)(ii) of this title must submit a Surface Water Monthly Operating Report for 2-Filter Plants (commission Form 0103) each month for each plant that treats surface water or groundwater under the direct influence of surface water.

(4) A system that must complete the additional monitoring required by subsection (e)(4)(A)(i) or (B)(i) of this section must submit a Filter Profile Report for Individual Filters (commission Form 10276) with its Surface Water Monthly Operating Report.

(5) A system that must complete the additional monitoring required by subsection (e)(4)(A)(ii) or (B)(ii) of this section must submit a Filter Assessment Report

for Individual Filters (commission Form 10277) with its Surface Water Monthly Operating Report.

(6) A system that must complete the additional monitoring required by subsection (e)(4)(A)(iii) or (B)(iii) of this section must submit a Comprehensive Performance Evaluation Request Form (commission Form 10278) with its Surface Water Monthly Operating Report.

(7) A system that uses membranes must submit a Membrane Monthly Operating Report (commission Form 20356) for each plant that treats surface water or groundwater under the direct influence of surface water. The report must accompany the plant's Surface Water Monthly Operating Report.

(8) A system that uses UV disinfection to meet the minimum treatment technique requirements for surface water or groundwater under the direct influence of surface water must submit a UV Monthly Operating Report (commission Form 20357) with its Surface Water Monthly Operating Report. The report must accompany the plant's Surface Water Monthly Operating Report.

(9) A system must submit any additional reports required by the executive director to verify the level of pathogen removal or inactivation achieved by the system's treatment plants.

(10) A system must submit its *Cryptosporidium* bin classification.

(11) A system must submit reports required by subsection (b)(7) of this section.

(12) Periodic reports required by this section must be submitted to the Water Supply Division, Texas Commission on Environmental Quality, MC 155, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(i) Compliance determination. Compliance with the requirements of this section must be determined using the criteria of this subsection.

(1) A public water system that fails to complete source water monitoring or conduct the routine monitoring tests and any applicable special investigations required by this section commits a monitoring violation.

(2) A public water system that fails to submit a report required by subsection (h) of this section commits a reporting violation.

(3) A public water system using conventional filters that has a turbidity level exceeding 5.0 NTU in the combined filter effluent commits an acute treatment technique violation.

(4) A public water system using membrane filters that has a turbidity level exceeding 1.0 NTU in the combined filter effluent commits an acute treatment technique violation.

(5) Except as provided in paragraphs (3) and (4) of this subsection, a public water system that violates the requirements of subsections (c), (d)(1), (e)(1), and (f)(1) of this section commits a nonacute treatment technique violation.

(6) A system that fails to request a Bin Classification within six months of completing a round of source water monitoring commits a treatment technique violation.

(7) A system that fails to correct the performance-limiting factors identified in a comprehensive performance evaluation conducted under the requirements of subsection (e)(4)(A)(iii) or (B)(iii) of this section commits a violation.

(8) A system that fails to properly issue a public notice required by subsection (j) of this section commits a violation.

(j) Public notification. The owner or operator of a public water system that violates the requirements of this section must notify the executive director and the people served by the system.

(1) A public water system that commits an acute treatment technique violation must notify the executive director and the water system customers of the acute violation within 24 hours in accordance with the requirements of §290.46(q) of this title and §290.122(a) of this title (relating to Public Notification).

(2) A public water system that has a turbidity level exceeding 1.0 NTU in the combined filter effluent must consult with the executive director within 24 hours of the violation.

(A) Based on the results of the consultation, the executive director will determine whether the water system must notify its customers in accordance with the requirements of §290.122(a) or (b) of this title.

(B) A water system that fails to consult with the executive director as required by this paragraph must notify its customers in accordance with the requirements of §290.122(a) of this title.

(3) Except as provided in paragraphs (1) and (2) of this subsection, a public water system that fails to meet the treatment technique requirements of subsections (c), (d)(1), (e)(1), or (f)(1) of this section must notify the executive director by the end of the next business day and the water system customers in accordance with the requirements of §290.122(b) of this title.

(4) A public water system that fails to conduct the monitoring required by this section must notify its customers of the violation in accordance with the requirements of §290.122(c) of this title.

§290.112. Total Organic Carbon (TOC).

(a) Applicability. <u>A water treatment plant must meet the provisions of this section if the plant:</u> [All community and nontransient, noncommunity public water systems that

treat surface water or groundwater under the direct influence of surface water and use coagulation or flocculation or sedimentation or clarification facilities as part of the treatment process must meet the provisions of this section.]

(1) serves a community or nontransient noncommunity public water system;

(2) treats surface water or groundwater under the direct influence of surface water; and

(3) uses a series of treatment processes that includes coagulation, flocculation, sedimentation or clarification, and filtration as part of the overall treatment protocol.

(b) Treatment technique. Systems must achieve the Step 1 removal requirements in paragraph (1) of this subsection, meet one of the alternative compliance criteria described in paragraph (2) of this subsection, or apply for the alternative Step 2 removal requirements described in paragraph (3) of this subsection.

(1) Systems must determine their ability to meet the Step 1 removal requirements given in the following table. A water treatment plant's Step 1 total organic

carbon (TOC) required percent removal is based upon plant's source water TOC and alkalinity. Step 1 TOC percent removal requirements are indicated in the following table. Systems practicing softening are evaluated based on the Step 1 TOC removal in the far-right column (Source water alkalinity >120 milligrams per liter (mg/L)) for the specified source water TOC.

Figure: 30 TAC §290.112(b)(1) (No change to the figure as it currently exists in TAC.)

(2) Systems may determine their ability to meet one of the eight alternative compliance criteria listed in this paragraph.

(A) A system meets alternative compliance criteria Number 1 if the system's source water TOC level is less than 2.0 mg/L, calculated quarterly as a running annual average.

(B) A system meets alternative compliance criteria Number 2 if the system's treated water TOC level is less than 2.0 mg/L, calculated quarterly as a running annual average.

(C) A system meets alternative compliance criteria Number 3 if: the system's source water TOC level is less than 4.0 mg/L, calculated quarterly as a running

annual average; the source water alkalinity is greater than 60 mg/L (as calcium carbonate (CaCO3), calculated quarterly as a running annual average; and the total trihalomethanes (TTHM) and haloacetic acid-group of five (HAA5) running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively.

(D) The system meets alternative compliance criteria Number 4 if the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

(E) The system meets alternative compliance criteria Number 5 if the system's source water specific ultraviolet absorbance (SUVA), prior to any treatment, measured monthly, is less than or equal to 2.0 liters per milligram-meter (L/mg-m), calculated quarterly as a running annual average.

(F) The system meets alternative compliance criteria Number 6 if the system's finished water SUVA, measured monthly at a point prior to any disinfection, is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(G) The system meets alternative compliance criteria Number 7 if the system practices softening, cannot achieve the Step 1 TOC removals required by paragraph (1) of this subsection, and has treated water alkalinity less than 60 mg/L (as CaCO3) and calculated quarterly as a running annual average.

(H) The system meets alternative compliance criteria Number 8 if the system practices softening, cannot achieve the Step 1 TOC removals required by paragraph (1) of this subsection, and has magnesium hardness removal greater than or equal to 10 mg/L (as CaCO3), measured monthly calculated quarterly as a running annual average.

(3) If a system fails to meet the Step 1 TOC removal requirement required by paragraph (1) of this subsection and does not meet one of eight alternative compliance criteria described in paragraph (2) of this subsection, the system must apply to the executive director for approval of Step 2 removal requirements.

(A) The plant must perform Step 2 jar testing to determine the coagulant dose at which the removal of TOC is less than 0.3 mg/L for an increase in coagulant of 10 mg/L alum or its equivalent. This dose is referred to as the point of diminishing returns (PODR).

(B) The system must submit the results of the Step 2 jar testing to the executive director for approval of the alternative removal requirements at least 15 days before the end of the applicable quarter.

(C) The executive director may approve Step 2 alternative removal requirements.

(i) If approved, the removal achieved at the PODR becomes the alternative full-scale TOC removal requirement for the plant.

(ii) The alternate removal requirements may be applied to the quarter in which the jar test results are received and for the following quarter.

(c) TOC monitoring requirements. Systems must conduct required TOC monitoring during normal operating conditions at sites and at the frequency designated in the system's monitoring plan.

(1) Systems must monitor for TOC and alkalinity in the source water prior to any treatment. Between one and eight hours after taking the source water sample, systems must measure each treatment plant TOC after filtration in the combined filter

effluent stream. These samples (source water alkalinity, source water TOC, and treated water TOC) are referred to as a TOC sample set.

(2) Systems must take one TOC sample set monthly (every 30 days) at a time representative of normal operating conditions and influent water quality. With the executive director's approval, a system may reduce monitoring according to subparagraphs (A) - (C) of this paragraph.

(A) Systems with a running annual average treated water TOC of less than 2.0 mg/L for two consecutive years may reduce monitoring to one TOC sample set per plant per quarter (every 90 days). The system must revert to routine monitoring in the month following the quarter when the running annual average treated water TOC is greater than or equal to 2.0 mg/L.

(B) Systems with a running annual average treated water TOC of less than 1.0 mg/L for one year may reduce monitoring to one TOC sample set per plant per quarter (every 90 days). The system must revert to routine monitoring in the month following the quarter when the running annual average treated water TOC is greater than or equal to 2.0 mg/L.

(C) Systems with a running annual average source water TOC at each plant of less than or equal to 4.0 mg/L based on the running annual average of the most recent four quarters of monitoring may reduce source TOC monitoring to one source TOC sample per quarter (every 90 days) if they also meet criteria for reduced disinfection byproduct monitoring. In order to remain on quarterly source TOC monitoring, the system must also meet the criteria for reduced trihalomethane and haloacetic acid monitoring given in §290.113(c)(4) of this title (relating to Stage 1 Disinfection Byproducts (TTHM and HAA5)) until the date shown in table §290.113(a)(2) of this title. After the date shown in §290.115(a)(2) of this title (relating to Stage 2 Disinfection Byproducts (TTHM and HAA5)), the system must also meet the criteria for reduced trihalomethane and haloacetic acid monitoring in §290.115(c)(3) of this title in order to remain on quarterly source TOC monitoring. The system must revert to routine monitoring in the first month following the quarter when the running annual average source water TOC is greater than 4.0 mg/L, or the system no longer meets the reduced monitoring criteria for disinfection byproducts.

(3) A public water system attempting to meet the treatment technique requirements for TOC using alternative compliance criteria Number 5 (as defined in subsection (b)(2)(E) of this section) must monitor for SUVA in the source water prior to any treatment at least once each month.

(4) A public water system attempting to meet the treatment technique requirements for TOC using alternative compliance criteria Number 7 (as defined in subsection (b)(2)(G) of this section) must monitor for alkalinity in the treated water at any point prior to distribution system at least once each month.

(5) A public water system attempting to meet the treatment technique requirements for TOC using alternative compliance criteria Number 8 (as defined in subsection (b)(2)(H) of this section) must monitor for magnesium in both the source water prior to any treatment at and the treated water at any point prior to the distribution system least once each month.

(d) Analytical requirements for TOC treatment. Analytical procedures required by this section must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(e) Reporting requirements for TOC. Systems treating surface water or groundwater under the direct influence of surface water shall properly complete and submit periodic reports to demonstrate compliance with this section.

(1) The reports must be submitted to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(2) Public water systems must submit a Monthly Operational Report for Total Organic Carbon (commission Form 0879) each month.

(3) A system that does not meet the Step 1 removal requirements must submit a Request for Alternate TOC Requirements at least 15 days before the end of the quarter.

(A) If the system meets alternative compliance criterion Number 3, subsection (b)(2)(C) of this section, the system must report the running annual average TTHM and HAA5 concentrations as determined under the requirements of §290.113 of this title.

(B) If the system meets alternative compliance criterion Number 4, subsection (b)(2)(D) of this section, the system must report the running annual average TTHM and HAA5 concentrations as determined under the requirements of §290.113 [of this title] or §290.115 of this title, and report all disinfectants used by the system during last 12 months.

(C) If the system meets alternative compliance criterion Number 5, subsection (b)(2)(E) of this section, the system must report the average source water SUVA for each of the preceding 12 months.

(D) If the system meets alternative compliance criterion Number 6, subsection (b)(2)(F) of this section, the system must report the average treated water SUVA for each of the preceding 12 months.

(E) If the system practices softening and meets alternative compliance criterion Number 8, subsection (b)(2)(H) of this section, the system must report the source water and treated water magnesium concentrations and the average percent removal of magnesium obtained during each of the preceding 12 months.

(F) A system that does not meet any of the alternative compliance criteria must apply for the Step 2 alternative removal requirements and must submit the results of Step 2 jar testing.

(f) Compliance determination. Compliance with the requirements of this section shall be based on the following criteria:

(1) A system that fails to conduct the monitoring tests required by this section commits a monitoring violation. Failure to monitor will be treated as a violation for the entire period covered by the annual average.

(2) A system that fails to report the results of monitoring tests required by this section commits a reporting violation. Systems may use only data collected under the provisions of this section to qualify for reduced monitoring.

(3) A system that does not meet any of the alternative compliance criteria and does not achieve the required TOC removal commits a treatment technique violation. Compliance shall be determined quarterly by determining an annual average removal ratio using the following method:

(A) The actual monthly TOC percent removal must be determined for each month. The actual removal for a TOC sample set is equal to (1 - treated water TOC/source water TOC). The actual monthly percent removal is calculated by taking average removal for all TOC sample sets collected in the month, and expressing that value as a percent.

(B) The required monthly Step 1 or Step 2 TOC percent removal must be determined as provided in subsection (b) of this section. The executive director

will approve or disapprove Step 2 requirements based on jar or pilot data. Until the executive director approves the Step 2 TOC removal requirements, the system must meet the Step 1 TOC removals contained in subsection (b)(1) of this section.

(C) The monthly removal ratio must be determined. The monthly removal ratio is determined by dividing the actual monthly TOC percent removal for each month by the required monthly Step 1 or approved Step 2 TOC percent removal for the month. The alternative compliance criteria may be used on a monthly basis as described in clauses (i) - (iv) of this subparagraph.

(i) If the monthly average source or treated water TOC is less than 2.0 mg/L, a monthly removal ratio value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(ii) If the monthly average water source or treated SUVA level is less than 2.0 L/mg-m, a monthly removal ratio value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(iii) In any month that a softening system lowers alkalinity below 60 mg/L (as CaCO3), a monthly removal ratio value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(iv) In any month that a softening system removes at least 10 mg/L of magnesium hardness (as CaCO3) a monthly value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(D) The yearly removal ratio must be determined. The yearly removal ratio is the running annual average of the quarterly averages of the monthly averages. To determine this value, for each quarter in the compliance year, determine the monthly removal ratio, add the removal ratios and divide by three. Then, add the quarterly removal ratio and divide by four.

(E) If the yearly removal ratio is less than 1.00, the system commits a treatment technique violation.

(4) A public water system that fails to do a required public notice or certify that the public notice has been performed commits a public notice violation.

(g) Public Notification. A public water system that violates the treatment technique requirements of this section must notify the executive director and the system's customers.

(1) A public water system that commits a TOC treatment technique violation shall notify the executive director and the water system customers in accordance with the requirements of §290.122(b) of this title (relating to Public Notification).

(2) A public water system which fails to conduct the monitoring required by this section must notify its customers of the violation in accordance with the requirements of §290.122(c) of this title.

§290.116. Groundwater Corrective Actions and Treatment Techniques.

(a) Applicability. All groundwater public water systems, including such systems that use surface water or groundwater under the direct influence of surface water (mixed systems), must comply with one or more of the treatment techniques and corrective actions of this section if a raw groundwater source sample was positive for fecal indicators, if a significant deficiency was identified, or if the system is not required to

conduct raw groundwater source monitoring because it provides at least 4-log treatment of viruses at each groundwater source.

(1) A groundwater system must provide written notification to the executive director [before December 1, 2009,] that it is not required to meet the raw groundwater source monitoring requirements under §290.109(c)(4) of this title (relating to Microbial Contaminants) because it provides at least 4-log treatment of viruses for the specified groundwater source and begin compliance monitoring in accordance with subsection (c) this section. The notification must include engineering, operational, and other information required by the executive director to evaluate the submission. If the executive director determines and documents in writing that 4-log treatment of viruses is no longer necessary for a specified groundwater source or if the system discontinues 4-log treatment of viruses before the first connection [customer] for any groundwater source, the system must document this in writing and conduct raw groundwater source sampling as required under §290.109(c)(4) of this title.

(2) A groundwater system that places a groundwater source in service after November 30, 2009, that is not required to meet the raw source monitoring requirements under §290.109(c)(4) of this title because the system provides at least 4-log treatment of viruses for a specified groundwater source must begin compliance monitoring within 30 days of placing the source in service in accordance with subsection

(c) of this section. The system must provide written notification to the executive director that it provides at least 4-log treatment of viruses [at or] before the first connection [customer] for the specified groundwater source. The notification must include engineering, operational, and other information required by the executive director to evaluate the submission. The system must conduct triggered source monitoring under §290.109(c)(4) of this title until the executive director provides written approval of the system's request to provide the 4-log treatment. If the system discontinues 4-log treatment of viruses before [or at] the first connection [customer] for a groundwater source, the system must conduct raw groundwater source sampling as required under §290.109(c)(4) [subsection (c)(4)] of this title [section].

(b) Groundwater corrective action plan. All public water systems using groundwater must submit a corrective action plan and implement corrective action if a raw groundwater source sample was positive for fecal indicators or if a significant deficiency was identified.

(1) If a groundwater source sample was found to be fecal indicator positive or if a significant deficiency was identified, the system must consult with the executive director regarding appropriate corrective action and have an approved corrective action plan in place within 30 days of receiving written notification from a laboratory of the fecal indicator positive source sample collected under §290.109(c)(4) [subsection (c)(4)]

of this title or within 30 days of receiving written notification from the executive director of the identification of a significant deficiency [section].

(2) Within 120 days of receiving written notification from a laboratory of the fecal indicator positive source sample or receiving written notification from the executive director of a significant deficiency, the system must have completed corrective action or be in compliance with an approved corrective action plan and schedule.

(3) Any changes to the approved corrective action plan or schedule must be approved by the executive director.

(4) The executive director may require interim measures for the protection of public health pending approval of the corrective action plan. The system must comply with these interim measures as well as with any schedules specified by the executive director.

(5) Systems that are required to complete corrective action must implement one or more of the procedures in this paragraph and the details of the implementation must be specified in the approved corrective action plan.

(A) The system may disinfect the groundwater source where the fecal indicator positive source sample was collected following the American Water Works Association (AWWA) standards for well disinfection and start monthly fecal indicator sampling at that source within 30 days after well disinfection. The executive director may discontinue the monthly source sampling requirement if corrective action is sufficient.

(B) The system may eliminate the groundwater source that was found to be fecal indicator positive and provide an alternate groundwater source if necessary. Eliminated groundwater sources must be disconnected from the distribution system until the contamination is corrected and the executive director approves it for use.

(C) The system may identify and eliminate the source of fecal contamination followed by well disinfection according to AWWA well disinfection standards and begin monthly fecal indicator sampling within 30 days after well disinfection. The executive director may allow the system to discontinue the monthly source sampling requirement after making a determination that corrective action is sufficient.

(D) The system may provide treatment that reliably achieves at least 4-log treatment of viruses using inactivation, removal or an executive director-approved combination of inactivation and removal before the first connection [customer] of the groundwater source.

(E) Correct all significant deficiencies.

(F) Assessment source monitoring for a period of 12 months or a time period specified by the executive director from the raw groundwater source in accordance with §290.109(c)(4)(E) of this title.

(c) Microbial inactivation requirements. A system that treats groundwater in response to a fecal indicator positive source sample, significant deficiency, or in lieu of the raw groundwater source monitoring shall meet minimum disinfection requirements demonstrating at least 4-log treatment of viruses before the water is distributed to the first connection of the specified groundwater source.

(1) Monitoring requirements for chemical disinfectants. Groundwater systems shall monitor the performance of the disinfection facilities to ensure that appropriate disinfectant levels are maintained every day the specified source serves the public. All monitoring conducted pursuant to the requirements of this section must be

conducted at sites designated in the system's monitoring plan in accordance with §290.121 of this title (relating to Monitoring Plans).

(A) Groundwater systems serving a population greater than 3,300 must continuously monitor the residual disinfectant concentration in accordance with the analytical methods specified in 40 Code of Federal Regulations (CFR) §141.74(a)(2) at a location approved by the executive director and must record the lowest residual disinfectant concentration every day the groundwater source serves the public.

(i) The groundwater system must maintain the executive director-approved minimum specified disinfectant residual every day the groundwater system serves water from the specified groundwater source to the public. If there is a failure in the continuous monitoring equipment, the groundwater system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service.

(ii) The system must resume continuous residual disinfectant monitoring within 14 days.

(B) Groundwater systems serving a population of [less than] 3,300 or fewer must monitor the disinfectant residual in accordance with the analytical

methods specified in 40 CFR §141.74(a)(2) in each disinfection zone at least once each day that water from the specified groundwater source is served to the public during either a time when peak hourly raw water flow rates are occurring or at another time specified by the executive director. The system must record and maintain the disinfectant residual every day the system serves water from the groundwater source to the public. The system must collect a daily grab sample during the hour of peak flow or at another time specified by the executive director. If any daily grab sample measurement falls below the executive director-approved minimum specified disinfectant residual, the groundwater system must collect follow-up samples every four hours until the residual disinfectant concentration is restored to the executive director-approved level. Alternatively, a groundwater system that serves 3,300 or fewer people may monitor the residual disinfectant concentration continuously and meet the requirements of subparagraph (A) of this paragraph.

(C) Disinfection contact time will be based on tracer study data or a theoretical analysis submitted by the system owner or their designated agent and approved by the executive director.

(D) Groundwater treatment plants that fail to demonstrate an appropriate level of treatment must repeat these tests at four-hour or shorter intervals until compliance has been reestablished.

(2) Monitoring and operating requirements for commission-approved alternative treatment, including ultraviolet light (UV) disinfection facilities and other methods that can obtain 4-log inactivation of viruses and can be properly validated. Public water systems shall monitor the UV intensity as measured by a UV sensor, lamp status, the flow rate through the unit, and other parameters prescribed by the executive director as specified in §290.42(g)(5) of this title (relating to Water Treatment) to ensure that the units are operating within validated conditions.

(3) Analytical requirements. All monitoring required by this section must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(A) The pH analysis must be conducted using a pH meter with a minimum accuracy of plus or minus 0.1 pH units.

(B) The temperature of the water must be measured using a thermometer or thermocouple with a minimum accuracy of plus or minus 0.5 degrees Celsius.

(C) The free chlorine or chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L. Samples tested using a colorimetric method must be analyzed using a colorimeter; spectrophotometer; or, with the written permission of the executive director, a color comparator. [using one of the following methods:]

[(i) Amperometric titration;]

[(ii) DPD Ferrous titration;]

[(iii) a DPD method that uses a colorimeter or spectrophotometer; or]

[(iv) Springaldizine (FACTS)]

[(D) The chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L using one of the following methods:]

[(i) Amperometric titration;]

[(ii) DPD Ferrous titration; or]

[(iii) a DPD method that uses a colorimeter or spectrophotometer.]

(D) [(E)] The chlorine dioxide residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using one of the following methods:

(i) Amperometric titrator with platinum-platinum electrodes; or

(ii) Lissamine Green B.

(E) [(F)] The ozone residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using an indigo method that uses a colorimeter or spectrophotometer.

(4) Recordkeeping requirements for microbial inactivation treatment. Groundwater systems, including wholesale, consecutive, and mixed systems, regulated under this subsection must comply with §290.46 of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems).

(d) Reporting requirements. Groundwater systems conducting 4-log treatment in lieu of the raw groundwater source monitoring or required to conduct corrective action in response to a fecal indicator positive source sample, or a significant deficiency, [or in lieu of the raw groundwater source monitoring] must report to the executive director in accordance with this subsection.

(1) A groundwater system required to conduct compliance monitoring for chemical disinfectants must complete [submit] a Groundwater Treatment Monthly Operating Report (commission Form 20362) for groundwater disinfection facilities monthly. Groundwater systems must maintain the reports on site and make them available to the executive director upon request. [submit the first form starting before the month of December 2009, to avoid raw groundwater source monitoring.]

(2) A groundwater system must provide written notification to the executive director [before December 1, 2009,] that it is not required to meet the raw groundwater source monitoring requirements under [paragraph] §290.109(c)(4) of this title [(relating to Microbial Contaminants)] because it provides at least 4-log treatment of viruses for a specified groundwater source and begin compliance monitoring in accordance with subsection (c) [§290.116(c)] of this section. The notification must include engineering, operational, and other information required by the executive director to evaluate the submission.

(3) A groundwater system required to complete corrective action under subsection (b) of this section must notify the executive director within 30 days of completing the corrective action.

(4) If a groundwater system is subject to the triggered source monitoring requirements of §290.109(c)(4)(A) of this title and does not conduct source monitoring, the system must provide written documentation that it was providing 4-log treatment of viruses for the specified groundwater source or that it met the criteria set out in §290.109(c)(4)(D) of this title within 30 days of the positive distribution coliform sample.

(5) A groundwater system conducting compliance monitoring under subsection (a) of this section must notify the executive director any time the system fails to meet any executive director-specified requirements (including, but not limited to, minimum residual disinfectant concentration, and alternative treatment operating criteria) if the operation in accordance with the criteria or requirements is not restored within four hours. The system must notify the executive director as soon as possible, but no later than the end of the next business day.

(e) Compliance determination. In accordance with this subsection, the [The] executive director shall determine compliance for groundwater systems required to conduct corrective action within 120 days, or pursuant to a groundwater corrective action plan [in response to a fecal indicator positive source sample or in lieu of the raw groundwater source monitoring in accordance with this subsection].

(1) A groundwater system is in violation of the treatment technique requirement if it does not complete corrective action in accordance with the executive director-approved corrective action plan or any interim measures required by the executive director.

(2) A groundwater system is in violation of the treatment technique requirement if it is not in compliance with the executive director-approved corrective action plan and schedule.

(3) A groundwater system subject to the requirements of subsection (c) [§290.116(c)] of this section [title] that fails to maintain at least 4-log treatment of viruses is in violation of the treatment technique requirement if the failure is not corrected within four hours. The groundwater system must notify the executive director as soon as possible but no later than the next business day if there is a failure in maintaining the 4-log treatment for more than four hours.

(4) A groundwater system that fails to conduct the disinfectant monitoring required under subsection (c) of this section commits a monitoring violation.

(5) A groundwater system that fails to report the results of the disinfectant monitoring required under subsection (c) of this section commits a reporting violation.

(6) A groundwater system that fails to issue a required public notice or certify that the public notice has been performed commits a public notice violation.

(f) Public notification. A groundwater system that commits a treatment technique, monitoring, or reporting violation <u>or situation</u> as identified in this section must notify its customers of the violation in accordance with the requirements of §290.122 of this title (relating to Public Notification).

<u>(1) Special notice to the public of significant deficiencies or source water fecal contamination for community systems. In addition to the applicable public notice requirements of §290.122(a) of this title, a community groundwater system that receives notice from the executive director of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated under §290.109(d)(2) of this title must inform the public served by the water system of the</u>

fecal indicator-positive source sample or of any significant deficiency that has not been corrected in its Consumer Confidence Report as specified in §290.272(g)(7) and (8) of this title (relating to Content of the Report).

(2) Special notice to the public of significant deficiencies or source water fecal contamination for noncommunity systems. In addition to the applicable public notice requirements of §290.122(a) of this title, a noncommunity groundwater system that receives notice from the executive director of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated under §290.109(d)(2) of this title must inform the public served by the water system of any significant deficiency that has not been corrected within 12 months of being notified by the executive director, or earlier if directed by the executive director. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:

(A) posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection; and

(B) any other method reasonably calculated to notify other persons served by the system, if they would not normally be notified by the methods set out in

subparagraph (A) of this paragraph. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely frequent. Other methods may include publication in a local newspaper, newsletter, or e-mail; or, delivery of multiple copies in central locations (e.g., community centers).

(C) If directed by the executive director, a noncommunity groundwater system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how deficiencies were corrected, and the dates of correction.

§290.119. Analytical Procedures.

(a) Acceptable laboratories. Samples collected to determine compliance with the requirements of this chapter shall be analyzed at accredited or approved laboratories.

(1) Samples used to determine compliance with the maximum contaminant levels, samples used to determine compliance with action level, and raw groundwater source monitoring requirements of this subchapter, and samples for microbial contaminants must be analyzed by a laboratory accredited by the executive director in accordance with Chapter 25 of this title (relating to Environmental Testing Laboratory Accreditation and Certification). These samples include:

(A) compliance samples for synthetic organic chemicals;

(B) compliance samples for volatile organic chemicals;

(C) compliance samples for inorganic contaminants;

(D) compliance samples for radiological contaminants;

(E) compliance samples for microbial contaminants;

(F) compliance samples for total trihalomethanes (TTHM);

(G) compliance samples for haloacetic acid-group of five (HAA5);

(H) compliance samples for chlorite;

(I) compliance samples for bromate; and

(J) compliance samples for lead and copper.

(2) Samples used to determine compliance with the treatment technique requirements and maximum residual disinfectant levels (MRDLs) of this subchapter must be analyzed by a laboratory approved by the executive director. These samples include:

(A) compliance samples for turbidity treatment technique requirements;

(B) compliance samples for the chlorine MRDL;

(C) compliance samples for the chlorine dioxide MRDL;

(D) compliance samples for the combined chlorine (chloramine) MRDL;

(E) compliance samples for the disinfection byproduct precursor treatment technique requirements, including alkalinity, total organic carbon, dissolved organic carbon analyses, and specific ultraviolet absorbance;

(F) samples used to monitor chlorite levels at the point of entry to the distribution system; and

(G) samples used to determine pH.

(3) Non-compliance tests, such as control tests taken to operate the system, may be run in the plant or at a laboratory of the system's choice.

(b) Acceptable analytical methods. Methods of analysis shall be as specified in 40 Code of Federal Regulations (CFR) or by any alternative analytical technique as specified by the executive director and approved by the Administrator under 40 CFR §141.27. Copies are available for review in the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. The following National Primary Drinking Water Regulations set forth in Title 40 CFR are adopted by reference:

(1) section 141.21(f) for microbiological analyses;

(2) section 141.74(a)(1) for turbidity analyses;

(3) section 141.23(k) for inorganic analyses;

(4) section 141.24(e), (f), and (g) for organic analyses;

(5) section 141.25 for radionuclide analyses;

(6) section 141.131(a) and (b) for disinfection byproduct methods and analyses;

(7) section 141.131(c) for disinfectant analyses other than ozone, and 141.74(b) for ozone disinfectant;

(8) section 141.131(d) for alkalinity analyses, bromide and magnesium, total organic carbon analyses, dissolved organic carbon analyses, specific ultraviolet absorbance analyses, and pH analyses; [and]

(9) section 141.89 for lead and copper analyses and for water quality parameter analyses that are performed as part of the requirements for lead and copper; [and]

<u>(10) section 141.402(c) for groundwater source microbiological analyses; and</u>

(11) [(10)] if a method is not contained in this section, a drinking water quality method can be approved for analysis if it is listed in 40 CFR Part 141, Subpart C, Appendix A.

(c) The definition of detection contained in 40 CFR §141.151(d) is adopted by reference.

§290.122. Public Notification.

(a) Public notification requirements for acute violations or situations. The owner or operator of a public water system must notify persons served by their system of any maximum contaminant limit (MCL), maximum residual disinfectant level (MRDL), treatment technique violation, or other situation that poses an acute threat to public health. Each notice required by this section must meet the requirements of subsection (d) of this section.

(1) Situations that pose an acute threat to public health include:

(A) a violation of the acute MCL for microbial contaminants as defined in §290.109(f)(1) of this title (relating to Microbial Contaminants);

(B) an acute turbidity issue at a treatment plant that is treating surface water or groundwater under the direct influence of surface water, specifically:

(i) a combined filter effluent turbidity level above 5.0 nephelometric turbidity units (NTU);

(ii) a combined filter effluent turbidity level above 1.0 NTU at a treatment plant using membrane filters; or

(iii) a combined filter effluent turbidity level above 1.0 NTU at a plant using other than membrane filters at the discretion of the executive director after consultation with the system; or

(iv) failure of a system with treatment other than membrane filters to consult with the executive director within 24 hours after a combined filter effluent reading of 1.0 NTU;

(C) a violation of the MCL for nitrate or nitrite as defined in §290.106(f)(2) of this title (relating to Inorganic Contaminants);

(D) a violation of the acute MRDL for chlorine dioxide as defined in §290.110(f)(5)(A) or (B) of this title (relating to Disinfectant Residuals);

(E) occurrence of a waterborne disease outbreak;

(F) Detection of *E. coli* or other fecal indicators in source water samples as specified in §290.109(b)(2) of this title, which requires a public notice to be issued within 24 hours of notification of the positive sample; and

(G) other situations deemed by the executive director to pose an acute risk to human health.

(2) The initial acute public notice and/or [and] boil water notice required by this subsection shall be issued as soon as possible, but in no case later than 24 hours after the violation or situation is identified. The initial public notice for an acute violation or situation shall be issued in the following manner.

(A) The owner or operator of a water system with an acute microbiological or turbidity violation as described in paragraph (1)(A) or (B) of this subsection shall include a boil water notice issued in accordance with the requirements

of §290.46(q) of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems).

(B) The owner or operator of a community water system shall furnish a copy of the notice to the radio and television stations serving the area served by the public water system.

(C) The owner or operator of a community water system shall publish the notice in a daily newspaper of general circulation in the area served by the system. If the area is not served by a daily newspaper of general circulation, notice shall instead be issued by direct delivery or by continuous posting in conspicuous places within the area served by the system. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(D) The owner or operator of a noncommunity water system shall issue the notice [violation] by direct delivery or by continuously posting the notice in conspicuous places within the area served by the water system. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(E) If notice is provided by posting, the posting must remain in place for as long as the violation or situation exists or seven days, whichever is longer.

(3) The owner or operator of a water system required to issue an initial notice for an acute MCL or treatment technique violation shall issue additional notices. The additional public notices for acute violations shall be issued in the following manner.

(A) Not later than 45 days after the violation, the owner or operator of a community water system shall notify persons served by the system using mail (by direct mail or with the water bill) or hand delivery. The executive director may waive mail or hand delivery if it is determined that the violation was corrected within the 45-day period. The executive director must make the waiver in writing and within the 45-day period.

(B) The owner or operator of a community water system must issue a notice at least once every three months by mail delivery (by direct mail or with the water bill) or by hand delivery, for as long as the violation exists.

(C) If the owner or operator of a noncommunity water system issued the initial notice by continuous posting, posting must continue for as long as the violation exists and in no case less than seven days. If the owner or operator of a

noncommunity water system issued the initial notice by direct delivery, notice by direct delivery must be repeated at least every three months for as long as the violation exists.

(4) The owner or operator of the public water system must issue a notice when the public water system has corrected the acute violation or situation. This notice must be issued in the same manner as the original notice was issued.

(5) Copies of all notifications required under this subsection must be submitted to the executive director within ten days of its distribution.

(b) Public notification requirements for other MCL, MRDL, or treatment technique violations and for variance and exemption violations. The owner or operator of a public water system must notify persons served by their system of any MCL, MRDL, or treatment technique violation other than those described in subsection (a)(1) of this section and of any violation involving a variance or exemption requirement. Each notice required by this section must meet the requirements of subsection (d) of this section.

(1) Violations that require notification under this subsection include:

(A) any violation of an MCL, MRDL, or treatment technique not listed under subsection (a) of this section;

(B) failure to comply with the requirements of any variance or exemption granted under §290.102(d) of this title (relating to General Applicability);

(C) failure for a groundwater system to take corrective action, including uncorrected significant deficiencies, or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a combination of 4-log virus inactivation and removal approved by the executive director) before or at the first customer under §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques); or

(D) failure to perform any 3 months of raw surface water monitoring as required by §290.111(b) of this title (relating to Surface Water Treatment) or request bin classification from the executive director under §290.111(c)(3)(A) of this title; or

(E) other violations or situations deemed appropriate by the executive director that pose a non-acute risk to human health.

(2) The initial public notice for any violation, situation, or significant deficiency identified in this subsection must be issued as soon as possible, but in no case

later than 30 days after the violation is identified. The initial public notice shall be issued in the following manner.

(A) The owner or operator of a community water system shall issue the notice by:

(i) mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

(ii) any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in clause (i) of this subparagraph. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.) Other methods may include: publication in a local newspaper; delivery of multiple copies for distribution by customers that provide drinking water to others (e.g., apartment building owners or large private employers); continuous posting in conspicuous public places within the area served by the system or on the Internet; <u>electronic delivery or alert systems (e.g. reverse 911);</u> or delivery to community organizations.

(B) The owner or operator of a noncommunity water system shall issue the notice by:

(i) posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

(ii) any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: publication in a local newspaper or newsletter distributed to customers; use of e-mail to notify employees or students; electronic delivery or alert systems (e.g. reverse 911); or, delivery of multiple copies in central locations (e.g., community centers).

(C) If notice is provided by posting, the posting must remain in place for as long as the violation exists or seven days, whichever is longer.

(3) The owner or operator of a system required to issue an initial violation notice shall issue additional notices. The additional notices shall be issued in the following manner.

(A) The owner or operator of a community water system must issue a notice at least once every three months by mail delivery (by direct mail or with the water bill) or by direct delivery, for as long as the violation exists.

(B) If the owner or operator of a noncommunity water system issued the initial notice by continuously posting the notice, the posting must continue for as long as the violation exists, and in no case less than seven days. If the owner or operator of a noncommunity water system issued the initial notice by direct delivery, notice by direct delivery must be repeated at least every three months for as long as the violation exists.

(4) The owner or operator of the public water system must issue a notice when the public water system has corrected the violation. This notice must be issued in the same manner as the original notice was issued.

(c) Public notification requirements for other violations, <u>situations,</u> variances, exemptions. The owner or operator of a public water system who fails to perform

monitoring required by this chapter, fails to comply with a testing procedure established by this chapter, or is subject to a variance or exemption granted under §290.102(b) of this title shall notify persons served by the system. Each notice required by this section must meet the requirements of subsection (d) of this section.

(1) Violations that require notification as described in this section include:

(A) exceedance of the secondary constituent levels (SCL) for fluoride;

(B) failure to perform monitoring or reporting required by this subchapter;

(C) failure to comply with the analytical requirements or testing procedures required by this subchapter;

(D) operating under a variance or exemption granted under §290.102(b) of this title; and

(E) failure to maintain records on recycle practices as required by §290.46(f)(3)(C)(iii) of this title.

(2) The initial public notice issued pursuant to this section shall be issued within three months of the violation or the granting of a variance or exemption. The initial public notice shall be issued in the following manner.

(A) The owner or operator of a community water system shall issue the notice by mail or other direct delivery to each customer receiving a bill and to other service connections. The owner or operator of a noncommunity water system shall issue the notice by either posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(B) The owner or operator of any public water system shall also notify the public using another method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subparagraph (A) of this paragraph. Such persons may include people who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). These other methods may include publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g.,

apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(C) If notice is provided by posting, the posting must remain in place for as long as the violation exists or seven days, whichever is longer.

(3) The owner or operator of a system required to issue an initial violation notice shall issue additional notices. The additional notices shall be issued in the following manner.

(A) The owner or operator of a community water system shall issue repeat notices at least once every 12 months by mail delivery (by direct mail or with the water bill) or by hand delivery, for as long as the violation exists or variance or exemption remains in effect. Repeat public notice may be included as part of the Consumer Confidence Report.

(B) If the owner or operator of a noncommunity water system issued the initial notice by continuously posting the notice, the posting must continue for as long as the violation exists, and in no case less than seven days. If the owner or operator of a noncommunity water system issued the initial notice by direct delivery,

notice by direct delivery must be repeated at least every 12 months for as long as the violation exists.

(4) The owner or operator of the public water system must issue a notice when the public water system has corrected the violation. This notice must be issued in the same manner as the original notice was issued.

(d) Each public notice must conform to the following general requirements.

(1) The notice must contain a clear and readily understandable explanation of the violation, significant deficiency, or situation that led [lead] to the notification. The notice must not contain very small print, unduly technical language, formatting, or other items that frustrate or defeat the purpose of the notice.

(2) If the notice is required for a specific event or significant deficiency, it must state when the event occurred or the date the significant deficiency was identified by the executive director.

(3) For notices required under subsections (a), (b), or (c)(1)(A) of this section, the notice must describe potential adverse health effects.

(A) For MCL, MRDL, or treatment technique violations or situations (including uncorrected significant deficiencies), the notice must contain the mandatory federal contaminant-specific language contained in 40 Code of Federal Regulations (CFR) Subpart Q, Appendix B, in addition to any language required by the executive director.

(B) For fluoride SCL violations, the notice must contain the mandatory federal contaminant-specific language contained in 40 CFR §141.208, in addition to any language required by the executive director.

(C) For failure to perform any 3 months of raw surface water monitoring or request bin classification from the executive director, the notice must contain the mandatory federal contaminant specific language contained in 40 CFR §141.211(d)(1) and (2) [40 CFR §141.211(d)(2)], respectively, in addition to any language required by the executive director.

(D) The notice must describe the population at risk, especially subpopulations particularly vulnerable if exposed to the given contaminant.

(4) The notice must state what actions the water system is taking to correct the violation or situation, and when the water system expects to return to compliance.

For groundwater systems with significant deficiencies, the notice must contain the executive director-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed.

(5) The notice must state whether alternative drinking water sources should be used, and what other actions consumers should take, including when they should seek medical help, if known.

(6) Each notice must contain the name, business address and telephone number at which consumers may contact the owner, operator, or designee of the public water system for additional information concerning the notice.

(7) Where appropriate, the notice must be multilingual. The multilingual notice must explain the importance of the notice or provide a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

(8) The notice shall include a statement to encourage the notice recipient to distribute the public notice to the other persons served.

(9) Systems with variances or exemptions must notify in accordance with 40 CFR §141.205(b).

(10) Systems must notify customers at sampled taps of the results of any required lead or copper analyses and certify completion of the notification to the executive director.

(e) Notice to new billing units. The owner or operator of a community water system must give a copy of the most recent public notice for any outstanding violation of any MCL, or any treatment technique requirement, or any variance or exemption schedule to all new billing units or new hookups prior to or at the time service begins. The owner or operator of a noncommunity water system must continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

(f) Proof of public notification. A copy of any public notice required under this section must be submitted to the executive director within ten days of its distribution as proof of public notification. The copies must be mailed to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas

78711-3087. Each proof of public notification must be accompanied with a signed Certificate of Delivery.

(g) Notice to consecutive systems. A public water system that is required to notify its customers must also provide a copy of the notification to the owner or operator of any public water systems that purchase or otherwise receive water from it in the same manner in which they inform their customers. Each public water system that is affected by the subject of the notification is responsible for notification to its own customers.

(h) Notices given by the executive director. The executive director may give the notice required by this section on behalf of the owner and operator of the public water system following the requirements of this section. The owner or operator of the public water system remains responsible for ensuring that the requirements of this section are met.

(i) If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the executive director may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the executive director for limiting distribution of the notice must be granted in writing.

SUBCHAPTER H: CONSUMER CONFIDENCE REPORTS

§290.275

Statutory Authority

The amendment is adopted under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule; Texas Health and Safety Code (THSC), §341.031(a), which establishes the commission's authority to adopt and enforce rules to implement the federal Safe Drinking Water Act (42 United States Code, §§300f *et seq.*); THSC, §341.0315, which requires public drinking water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

The amendment implements the federal Ground Water Rule, which implements the federal Safe Drinking Water Act.

§290.275. Appendices A - D.

The following appendices are integral components of the subchapter.

(1) Appendix A--Converting MCL Compliance Values for Consumer Confidence Reports.

Figure: 30 TAC §290.275(1)

[Figure: 30 TAC §290.275(1)]

Appendix A--Converting Maximum Contaminant Level Compliance Values for Consumer Confidence Reports (CCR)				
Key				
AL =	Action Level			
MCL =	Maximum Contaminant Level			
MCLG =	Maximum Contaminant Level Goal			
MFL =	million fibers per liter			
mrem/year =	millirems per year (a measure of radiation absorbed by the body)			
n/a =	Not Applicable			
NTU =	Nephelometric Turbidity Units			
pCi/L =	picocuries per liter (a measure of radioactivity)			
ppm =	parts per million, or milligrams per liter (mg/L)			
ppb =	parts per billion, or micrograms per liter (µg/L)			
ppt =	parts per trillion, or nanograms per liter			
ppq =	parts per quadrillion, or picograms per liter			
TT =	Treatment Technique			
Contaminant	**MCL in compliance units (mg/L)**	**multiply by...**	**MCL in CCR units**	**MCLG in CCR units**
Microbiological Contaminants				
1. Total Coliform Bacteria			For systems that collect 40 or more samples per month - Presence of coliform bacteria in more than 5% of monthly samples. For systems that collect fewer than 40 samples per month - Presence of coliform bacteria in more than 1 sample	0

			per month.	
2. Fecal coliform and *E. coli*			A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or *E. coli* positive. An uncorrected *E. coli*-positive sample at the raw groundwater source is a TT for the Ground Water Rule (GWR).	0
3. Fecal indicators (enterococci or coliphage)			TT. An uncorrected fecal indicator-positive sample at the raw groundwater source is a TT for the GWR.	n/a
4. Total organic carbon			TT (ppm)	n/a
5. Turbidity			TT (NTU)	n/a
Radioactive Contaminants				
6. Beta/photon emitters	4 mrem/yr		4 mrem/yr	0
7. Alpha emitters	15 pCi/L		15 pCi/L	0
8. Combined radium	5 pCi/L		5 pCi/L	0
9. Uranium	30 µg/L		30 µg/L	0
Inorganic Contaminants				
10. Antimony	.006	1000	6 ppb	6
11. Arsenic	.010	1000	10 ppb	n/a
12. Asbestos	7 MFL		7 MFL	7
13. Barium	2		2 ppm	2
14. Beryllium	.004	1000	4 ppb	4
15. Bromate	.010	1000	10 ppb	0
16. Cadmium	.005	1000	5 ppb	5
17. Chloramines	MRDL=4		MRDL=4 ppm	4
18. Chlorine	MRDL=4		MRDL=4 ppm	4
19. Chlorine Dioxide	MRDL=.8	1000	MRDL=800 ppb	800
20. Chlorite	1.0		1 ppm	0.8
21. Chromium	.1	1000	100 ppb	100
22. Copper	AL=1.3		AL=1.3 ppm	1.3
23. Cyanide	.2	1000	200 ppb	200
24. Fluoride	4		4 ppm	4
25. Lead	AL=.015	1000	AL=15 ppb	0

26. Mercury (inorganic)	.002	1000	2 ppb	2
27. Nitrate (as Nitrogen)	10		10 ppm	10
28. Nitrite (as Nitrogen)	1		1 ppm	1
29. Selenium	.05	1000	50 ppb	50
30. Thallium	.002	1000	2 ppb	0.5
Synthetic Organic Contaminants including Pesticides and Herbicides				
31. 2,4-D	.07	1000	70 ppb	70
32. 2,4,5-TP (Silvex)	.05	1000	50 ppb	50
33. Acrylamide			TT	0
34. Alachlor	.002	1000	2 ppb	0
35. Atrazine	.003	1000	3 ppb	3
36. Benzo(a)pyrene (PAH)	.0002	1,000,000	200 ppt	0
37. Carbofuran	.04	1000	40 ppb	40
38. Chlordane	.002	1000	2 ppb	0
39. Dalapon	.2	1000	200 ppb	200
40. Di(2-ethylhexyl) adipate	.4	1000	400 ppb	400
41. Di(2-ethylhexyl) phthalate	.006	1000	6 ppb	0
42. Dibromochloropropane	.0002	1,000,000	200 ppt	0
43. Dinoseb	.007	1000	7 ppb	7
44. Diquat	.02	1000	20 ppb	20
45. Dioxin (2,3,7,8-TCDD)	.00000003	1,000,000,000	30 ppq	0
46. Endothall	.1	1000	100 ppb	100
47. Endrin	.002	1000	2 ppb	2
48. Epichlorohydrin			TT	0
49. Ethylene dibromide	.00005	1,000,000	50 ppt	0
50. Glyphosate	.7	1000	700 ppb	700
51. Heptachlor	.0004	1,000,000	400 ppt	0
52. Heptachlor epoxide	.0002	1,000,000	200 ppt	0
53. Hexachlorobenzene	.001	1000	1 ppb	0
54. Hexachloro-cyclopentadiene	.05	1000	50 ppb	50
55. Lindane	.0002	1,000,000	200 ppt	200
56. Methoxychlor	.04	1000	40 ppb	40
57. Oxamyl (Vydate)	.2	1000	200 ppb	200
58. PCBs (Polychlorinated biphenyls)	.0005	1,000,000	500 ppt	0
59. Pentachlorophenol	.001	1000	1 ppb	0
60. Picloram	.5	1000	500 ppb	500

61. Simazine	.004	1000	4 ppb	4
62. Toxaphene	.003	1000	3 ppb	0
Volatile Organic Contaminants				
63. Benzene	.005	1000	5 ppb	0
64. Carbon tetrachloride	.005	1000	5 ppb	0
65. Chlorobenzene	.1	1000	100 ppb	100
66. o-Dichlorobenzene	.6	1000	600 ppb	600
67. p-Dichlorobenzene	.075	1000	75 ppb	75
68. 1,2-Dichloroethane	.005	1000	5 ppb	0
69. 1,1-Dichloroethylene	.007	1000	7 ppb	7
70. cis-1,2-Dichloroethylene	.07	1000	70 ppb	70
71. trans-1,2-Dichloroethylene	.1	1000	100 ppb	100
72. Dichloromethane	.005	1000	5 ppb	0
73. 1,2-Dichloropropane	.005	1000	5 ppb	0
74. Ethylbenzene	.7	1000	700 ppb	700
75. Haloacetic acids	0.060	1000	60 ppb	n/a
76. Styrene	.1	1000	100 ppb	100
77. Tetrachloroethylene	.005	1000	5 ppb	0
78. 1,2,4-Trichlorobenzene	.07	1000	70 ppb	70
79. 1,1,1-Trichloroethane	.2	1000	200 ppb	200
80. 1,1,2-Trichloroethane	.005	1000	5 ppb	3
81. Trichloroethylene	.005	1000	5 ppb	0
82. TTHMs (Total trihalomethanes)	.10	1000	100 ppb	n/a
83. Toluene	1		1 ppm	1
84. Vinyl Chloride	.002	1000	2 ppb	0
85. Xylenes	10		10 ppm	10

(2) Appendix B--Sources of Regulated Contaminants.

Figure: 30 TAC §290.275(2)

[Figure: 30 TAC §290.275(2)]

Appendix B--Sources of Regulated Contaminants	
Key	
AL =	Action Level

MCL =	Maximum Contaminant Level
MCLG =	Maximum Contaminant Level Goal
MFL =	million fibers per liter
mrem/year =	millirems per year (a measure of radiation absorbed by the body)
n/a =	Not Applicable
NTU =	Nephelometric Turbidity Units
pCi/L =	picocuries per liter (a measure of radioactivity)
ppm =	parts per million, or milligrams per liter (mg/L)
ppb =	parts per billion, or micrograms per liter (µg/L)
ppt =	parts per trillion, or nanograms per liter
ppq =	parts per quadrillion, or picograms per liter
TT =	Treatment Technique

Contaminant (units)	**MCLG**	**MCL**	**Major sources in drinking water**
Microbiological Contaminants			
1. Total Coliform Bacteria	0	For systems that collect 40 or more samples per month - Presence of coliform bacteria in more than 5% of monthly samples. For systems that collect fewer than 40 samples per month - Presence of coliform bacteria in more than 1 sample per month.	Naturally present in the environment.
2. Fecal coliform and *E. coli*	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or *E. coli* positive. An uncorrected *E. coli*-positive sample at the raw groundwater source is a TT for the Ground Water Rule (GWR).	Human and animal fecal waste.
3. Fecal indicators (enterococci or coliphage)	n/a	TT. An uncorrected fecal indicator-positive sample at the raw groundwater source is a TT for the	Human and animal fecal waste.

		GWR.	
4. Total organic carbon (ppm)	n/a	TT	Naturally present in the environment.
5. Turbidity	n/a	TT	Soil runoff.
Radioactive Contaminants			
6. Beta/photon emitters (mrem/yr)	0	4	Decay of natural and man-made deposits.
7. Alpha emitters (pCi/L)	0	15	Erosion of natural deposits.
8. Combined radium (µg/L)	0	5	Erosion of natural deposits.
Inorganic Contaminants			
9. Uranium (µg/L)	0	30	Erosion of natural deposits.
10. Antimony (ppb)	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
11. Arsenic (ppb)	n/a	10	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
12. Asbestos (MFL)	7	7	Decay of asbestos cement water mains; Erosion of natural deposits.
13. Barium (ppm)	2	2	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
14. Beryllium (ppb)	4	4	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries.
15. Bromate (ppb)	0	10	By-product of drinking water disinfection.
16. Cadmium (ppb)	5	5	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; runoff from waste batteries and paints.
17. Chloramines (ppm)	MRDLG=4	MRDL=4	Water additive used to control microbes.
18. Chlorine (ppm)	MRDLG=4	MRDL=4	Water additive used to control microbes.
19. Chlorine Dioxide (ppb)	800	800	Water additive used to control microbes.
20. Chlorite (ppm)	1.0	1.0	By-product of drinking water disinfection.

21. Chromium (ppb)	100	100	Discharge from steel and pulp mills; Erosion of natural deposits.
22. Copper (ppm)	1.3	AL=1.3	Corrosion of household plumbing systems; Erosion of natural deposits.
23. Cyanide (ppb)	200	200	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.
24. Fluoride (ppm)	4	4	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
25. Lead (ppb)	0	AL=15	Corrosion of household plumbing systems; Erosion of natural deposits.
26. Mercury (inorganic) (ppb)	2	2	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland.
27. Nitrate (as Nitrogen) (ppm)	10	10	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
28. Nitrite (as Nitrogen) (ppm)	1	1	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
29. Selenium (ppb)	50	50	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.
30. Thallium (ppb)	0.5	2	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories.
Synthetic Organic Contaminants including Pesticides and Herbicides			
31. 2,4-D (ppb)	70	70	Runoff from herbicide used on row crops.
32. 2,4,5-TP (Silvex) (ppb)	50	50	Residue of banned herbicide.
33. Acrylamide	0	TT	Added to water during sewage/wastewater treatment.
34. Alachlor (ppb)	0	2	Runoff from herbicide used on row crops.
35. Atrazine (ppb)	3	3	Runoff from herbicide used on

			row crops.
36. Benzo(a)pyrene (PAH) (nanograms/L)	0	200	Leaching from linings of water storage tanks and distribution lines.
37. Carbofuran (ppb)	40	40	Leaching of soil fumigant used on rice and alfalfa.
38. Chlordane (ppb)	0	2	Residue of banned termiticide.
39. Dalapon (ppb)	200	200	Runoff from herbicide used on rights of way.
40. Di(2-ethylhexyl) adipate (ppb)	400	400	Discharge from chemical factories.
41. Di(2-ethylhexyl)phthalate (ppb)	0	6	Discharge from rubber and chemical factories.
42. Dibromochloropropane (ppt)	0	200	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards.
43. Dinoseb (ppb)	7	7	Runoff from herbicide used on soybeans and vegetables.
44. Diquat (ppb)	20	20	Runoff from herbicide use.
45. Dioxin (2,3,7,8-TCDD) (ppq)	0	30	Emissions from waste incineration and other combustion; Discharge from chemical factories.
46. Endothall (ppb)	100	100	Runoff from herbicide use.
47. Endrin (ppb)	2	2	Residue of banned insecticide.
48. Epichlorohydrin	0	TT	Discharge from industrial chemical factories; An impurity of some water treatment chemicals.
49. Ethylene dibromide (ppt)	0	50	Discharge from petroleum refineries.
50. Glyphosate (ppb)	700	700	Runoff from herbicide use.
51. Heptachlor (ppt)	0	400	Residue of banned termiticide.
52. Heptachlor epoxide (ppt)	0	200	Breakdown of heptachlor.
53. Hexachlorobenzene (ppb)	0	1	Discharge from metal refineries and agricultural chemical factories.
54. Hexachlorocyclopentadiene (ppb)	50	50	Discharge from chemical factories.
55. Lindane (ppt)	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens.
56. Methoxychlor (ppb)	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa,

			livestock.
57. Oxamyl (Vydate) (ppb)	200	200	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes.
58. PCBs (Polychlorinated biphenyls) (ppt)	0	500	Runoff from landfills; Discharge of waste chemicals.
59. Pentachlorophenol (ppb)	0	1	Discharge from wood preserving factories.
60. Picloram (ppb)	500	500	Herbicide runoff.
61. Simazine (ppb)	4	4	Herbicide runoff.
62. Toxaphene (ppb)	0	3	Runoff/leaching from insecticide used on cotton and cattle.
Volatile Organic Compounds			
63. Benzene (ppb)	0	5	Discharge from factories; Leaching from gas storage tanks and landfills.
64. Carbon tetrachloride (ppb)	0	5	Discharge from chemical plants and other industrial activities.
65. Chlorobenzene (ppb)	100	100	Discharge from chemical and agricultural chemical factories.
66. o-Dichlorobenzene (ppb)	600	600	Discharge from industrial chemical factories.
67. p-Dichlorobenzene (ppb)	75	75	Discharge from industrial chemical factories.
68. 1,2-Dichloroethane (ppb)	0	5	Discharge from industrial chemical factories.
69. 1,1-Dichloroethylene (ppb)	7	7	Discharge from industrial chemical factories.
70. cis-1,2-Dichloroethylene (ppb)	70	70	Discharge from industrial chemical factories.
71. trans-1,2-Dichloroethylene (ppb)	100	100	Discharge from industrial chemical factories.
72. Dichloromethane (ppb)	0	5	Discharge from pharmaceutical and chemical factories.
73. 1,2-Dichloropropane (ppb)	0	5	Discharge from industrial chemical factories.
74. Ethylbenzene (ppb)	700	700	Discharge from petroleum refineries.
75. Haloacetic acids (HAA) (ppb)	n/a	60	By-product of drinking water disinfection.
76. Styrene (ppb)	100	100	Discharge from rubber and plastic factories; Leaching from landfills.
77. Tetrachloroethylene (ppb)	0	5	Leaching from PVC pipes;

			Discharge from factories and dry cleaners.
78. 1,2,4-Trichlorobenzene (ppb)	70	70	Discharge from textile-finishing factories.
79. 1,1,1-Trichloroethane (ppb)	200	200	Discharge from metal degreasing sites and other factories.
80. 1,1,2-Trichloroethane (ppb)	3	5	Discharge from industrial chemical factories.
81. Trichloroethylene (ppb)	0	5	Discharge from metal degreasing sites and other factories.
82. TTHMs (Total trihalomethanes) (ppb)	n/a	80	By-product of drinking water disinfection.
83. Toluene (ppm)	1	1	Discharge from petroleum factories.
84. Vinyl Chloride (ppb)	0	2	Leaching from PVC piping; Discharge from plastics factories.
85. Xylenes (ppm)	10	10	Discharge from petroleum factories; Discharge from chemical factories.

(3) Appendix C-Health Effects Language.

Figure: 30 TAC §290.275(3) (No change to the figure as it currently exists in TAC.)

(4) Appendix D--Unregulated Contaminants.

Figure: 30 TAC §290.275(4) (No change to the figure as it currently exists in TAC.)

The Texas Commission on Environmental Quality (TCEQ or commission) adopts amendments to §291.161 and §291.162.

Sections 291.161 and 291.162 are adopted *without changes* to the proposed text as published in the June 15, 2012, issue of the *Texas Register* (37 TexReg 4398) and will not be republished.

Background and Summary of the Factual Basis for the Adopted Rules

This rulemaking amends Chapter 291 to incorporate the requirements of House Bill (HB) 805 from the 82nd Legislature, 2011. Senate Bill (SB) 361, 81st Legislature, 2009, was incorporated into the TCEQ rules in 2009. SB 361 required a retail public utility, exempt utility, or provider or conveyor of potable or raw water in a county with a population of 3.3 million or in an adjacent county with a population of 400,000 or more that furnishes water service to more than one customer to: ensure the emergency operation of its water system during an extended power outage, as soon as safe and practicable following the occurrence of a natural disaster; adopt an emergency preparedness plan (EPP) that demonstrates the affected utility's ability to provide emergency operations; and, submit the plan to the commission for approval. SB 361 required TCEQ to adopt rules implementing Texas Water Code (TWC), §13.1395, that required affected utilities ensure emergency operation at 35 pounds per square inch through the adoption of an EPP. In 2010, affected utilities with customers in Harris

County were required to submit and implement an EPP. Based on HB 805, affected utilities in Harris and Fort Bend Counties were required to prepare and submit an EPP for TCEQ review and approval by February 1, 2012, and to begin implementing the plan by June 1, 2012.

In a corresponding rulemaking published in this issue of the *Texas Register*, the commission also adopts revisions to 30 TAC Chapter 290, Public Drinking Water.

Section by Section Discussion

§291.161, Definitions

The commission adopts §290.161(1)(B), the definition of "Affected utility," changing the population threshold from 400,000 to 550,000 as required by HB 805.

§291.162, Emergency Operation of an Affected Utility

The commission adopts §291.162(j) updating the due dates for submitting the EPP. The existing rule requires systems that exist as of December 1, 2009, to submit an EPP by March 1, 2010. The adopted changes require a system that exists as of November 1, 2011, to submit an EPP by February 1, 2012. These dates were included in HB 805. The commission adopts §291.162(k) to include the due date for implementing an EPP as June 1, 2012, as required by HB 805. As a result of adopted §291.162(k), the commission reletters existing §291.162(k) - (m).

Final Regulatory Impact Analysis Determination

The commission reviewed the adopted rules in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking does not meet the definition of a "major environmental rule" as defined by that statute. A "major environmental rule" means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state, Texas Government Code, §2001.0225(g)(3).

This rulemaking does not meet the statutory definition of a "major environmental rule" because it is not the specific intent of these rules to protect the environment or reduce risks to human health from environmental exposure. The specific intent of the rules are to require certain water utilities, providers, and conveyors to have EPPs for maintaining water pressure following a disruption in service caused by a natural disaster. These rules are not required by federal regulations.

The amendments to Chapter 291 made in response to HB 805 change the county population threshold from 400,000 to 550,000 for identifying affected utilities, as well as providing time tables for newly affected utilities to comply with the requirements of

TWC, §13.1395.

Further, this rulemaking does not meet the statutory definition of a "major environmental rule" because the amendments would not adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The specific intent of the rules is to bring Chapter 291 into conformity with HB 805. The amendments expand the counties to which the EPP requirement applies and provides a timeline for newly affected utilities to comply. It is not anticipated that the cost of complying with the amendments will be significant with respect to the economy as a whole; therefore, the amendments will not adversely affect in a material way the economy, a sector of the economy, competition, or jobs.

Additionally, the rulemaking does not meet any of the four applicability criteria for requiring a regulatory impact analysis for a major environmental rule, which are listed in Texas Government Code, §2001.0225(a). This section only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule

solely under the general powers of the agency instead of under a specific state law.

This rulemaking does not meet any of these four applicability requirements because this rulemaking: 1) does not exceed any standard set by federal law; 2) does not exceed an express requirement of state law; 3) does not exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement any state and federal program on treatment of water used in public water systems, but rather is adopted to be consistent with state law, to ensure the emergency operation of water systems following a natural disaster; and 4) is not adopted solely under the general powers of the agency, but rather specifically under TWC, §13.041, which allows the commission to adopt and enforce rules reasonably required in the exercise of its powers and jurisdiction, including rules governing practice and procedure before the commission.

The commission invited public comment regarding the draft regulatory impact analysis determination during the public comment period. The commission did not receive any comments regarding the draft regulatory impact analysis determination.

Takings Impact Assessment

The commission evaluated these rules and performed an analysis of whether these adopted rules constitute a taking under Texas Government Code, Chapter 2007. The

specific purpose of the rules is to implement legislation relating to the emergency preparedness of affected utilities. The rules change the number of counties in which "affected utility" will be required to have EPPs. This rulemaking substantially advances this stated purpose by making the commission's rules consistent with HB 805. The commission's analysis indicates that Texas Government Code, Chapter 2007 does not apply to these rules because this action does not affect private real property.

Promulgation and enforcement of these rules will constitute neither a statutory nor a constitutional taking of private real property. The adopted regulations do not adversely affect a landowner's rights in private real property, in whole or in part, temporarily or permanently, because this rulemaking does not burden nor restrict the owner's right to property. More specifically, these rules implement legislation addressing the adoption of EPPs by "affected utilities." These provisions do not impose any burdens or restrictions on private real property. Therefore, the amendments do not constitute a taking under Texas Government Code, Chapter 2007.

Consistency with the Coastal Management Program

The commission reviewed the rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor will they affect any action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the rules are not subject to the Texas Coastal

Management Program (CMP).

The commission invited public comment regarding the consistency with the CMP during the public comment period. The commission did not receive any comments regarding the rulemaking's consistency with the CMP.

Public Comment

The commission held a public hearing on July 10, 2012. The comment period closed on July 16, 2012. The commission did not receive any comments on this rulemaking.

SUBCHAPTER L: STANDARDS OF EMERGENCY OPERATIONS

§291.161, §291.162

Statutory Authority

These amendments are adopted under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule. In addition, TWC, §13.041 states that the commission may regulate and supervise the business of every water and sewer utility within its jurisdiction and may do all things, whether specifically designated or implied by TWC, Chapter 13, necessary and convenient to the exercise of this power and jurisdiction. Further, TWC, §13.041 states that the commission shall adopt and enforce rules reasonably required in the exercise of its powers and jurisdiction, including rules governing practice and procedure before the commission.

The amendments implement TWC, §13.1395 as amended by HB 805.

§291.161. Definitions.

For the purposes of this subchapter, the following definitions apply.

(1) Affected utility--Any retail public utility, exempt utility, or provider or conveyor of potable or raw water service that furnishes water service to more than one customer:

(A) In a county with a population of 3.3 million or more; or

(B) In a county with a population of 550,000 [400,000] or more adjacent to a county with a population of 3.3 million or more.

(2) Emergency operations--The operation of a water system during an extended power outage at a minimum water pressure of 35 pounds per square inch.

(3) Extended power outage--A power outage lasting for more than 24 hours.

(4) Population--The population shown by the most recent federal decennial census.

§291.162. Emergency Operation of an Affected Utility.

(a) An affected utility shall adopt and submit to the executive director for its approval an emergency preparedness plan that demonstrates the utility's ability to provide emergency operations.

(b) The executive director shall review an emergency preparedness plan submitted by an affected utility. If the executive director determines that the plan is not acceptable, the executive director shall recommend changes to the plan. The executive director must make its recommendations on or before the 90th day after the executive director receives the plan.

(c) An emergency preparedness plan shall provide for one of the following:

(1) the maintenance of automatically starting auxiliary generators;

(2) the sharing of auxiliary generator capacity with one or more affected utilities;

(3) the negotiation of leasing and contracting agreements, including emergency mutual aid agreements with other retail public utilities, exempt utilities, or

providers or conveyors of potable or raw water service, if the agreements provide for coordination with the division of emergency management in the governor's office;

(4) the use of portable generators capable of serving multiple facilities equipped with quick-connect systems;

(5) the use of on-site electrical generation or distributed generation facilities;

(6) hardening the electric transmission and distribution system serving the water system;

(7) for existing facilities, the maintenance of direct engine or right angle drives; or

(8) any other alternative determined by the executive director to be acceptable.

(d) Each affected utility that supplies, provides, or conveys surface water to wholesale customers shall include in its emergency preparedness plan provisions for the actual installation and maintenance of automatically starting auxiliary generators or

distributive generation facilities for each raw water intake pump station, water treatment plant, pump station, and pressure facility necessary to provide water to its wholesale customers.

(e) The affected utility may use the template in Appendix J of §290.47 of this title (relating to Appendices) to assist in preparation of the plan.

(f) An emergency generator used as part of an approved emergency preparedness plan must be operated and maintained according to the manufacturer's specifications.

(g) The executive director may grant a waiver of the requirements of this section to an affected utility if the executive director determines that compliance with this section will cause a significant financial burden on customers of the affected utility. The affected utility shall submit financial, managerial, and technical information as requested by the executive director to demonstrate the financial burden.

(h) An affected utility may adopt and is encouraged to enforce limitations on water use while the utility is providing emergency operations.

(i) Information provided by an affected utility under this subchapter is confidential and is not subject to disclosure under Texas Government Code, Chapter 552.

(j) Affected utilities that are existing as of November 1, 2011 [December 1, 2009], shall submit the emergency preparedness plan to the executive director no later than February 1, 2012 [March 1, 2010].

(k) Affected utilities that are existing as of November 1, 2011, shall implement the emergency preparedness plan approved by the executive director no later than June 1, 2012.

(l) [(k)] Affected utilities which are established after the effective date of this rule must have emergency preparedness plans approved and implemented prior to providing water to customers.

(m) [(l)] An affected utility may file with the executive director a written request for an extension, not to exceed 90 days, of the date by which the affected utility is required under this subchapter to submit the affected utility's emergency preparedness plan or the date the affected utility is required to implement the plan.

(n) [(m)] If an affected utility fails to provide a minimum of 35 pounds per square inch throughout the distribution system during emergency operations as soon as it is safe and practicable following the occurrence of a natural disaster, a revised emergency preparedness plan shall be submitted for review and approval within 180 days of the date normal power is restored. Based on the review of the revised emergency preparedness plan, the executive director may require additional or alternative auxiliary emergency facilities.

ORDER ADOPTING AMENDED RULES

Docket No. 2011-1226-RUL

On October 17, 2012, the Texas Commission on Environmental Quality (Commission) considered amending rules in 30 TAC Chapter 290, concerning Public Drinking Water and 30 TAC Chapter 291, concerning Utility Regulations. The proposed rules were published for comment in the June 15, 2012, issue of the *Texas Register* (37 TexReg 4353) for Chapter 290 and (37 TexReg 4398) for Chapter 291.

IT IS THEREFORE ORDERED BY THE COMMISSION that the amended rules are hereby adopted. The Commission further authorizes staff to make any non-substantive revisions to the rules necessary to comply with *Texas Register* requirements. The adopted rules and the preamble to the adopted rules are incorporated by reference in this Order as if set forth at length verbatim in this Order.

This Order constitutes the Order of the Commission required by the Administrative Procedure Act, Government Code, § 2001.033.

If any portion of this Order is for any reason held to be invalid by a court of competent jurisdiction, the invalidity of any portion shall not affect the validity of the remaining portions.

Issued date:

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

_____

Bryan W. Shaw, Ph.D., Chairman

DRAFT

(C) Dispersion Modeling. A refined dispersion model may be used to demonstrate acceptable emissions from an OGS under this section if all of the parameters in the refined dispersion modeling protocol provided by the commission are met.

(l) The requirements in this subsection are applicable to new and modified facilities except those specified in subsection (a)(1) of this section. Any oil or gas production facility, carbon dioxide separation facility, or oil or gas pipeline facility consisting of one or more tanks, separators, dehydration units, free water knockouts, gunbarrels, heater treaters, natural gas liquids recovery units, or gas sweetening and other gas conditioning facilities, including sulfur recovery units at facilities conditioning produced gas containing less than two long tons per day of sulfur compounds as sulfur are permitted by rule, provided that the following conditions of this subsection are met. This subsection applies only to those facilities named which handle gases and liquids associated with the production, conditioning, processing, and pipeline transfer of fluids found in geologic formations beneath the earth's surface.

(1) Compressors and flares shall meet the requirements of §106.492 and §106.512 of this title (relating to Flares; and Stationary Engines and Turbines, respectively). Oil and gas facilities which are authorized under historical standard exemptions and remain unchanged maintain that authorization and the remainder of this subsection does not apply.

(2) Total emissions, including process fugitives, combustion unit stacks, separator, or other process vents, tank vents, and loading emissions from all such facilities constructed at a site under this subsection shall not exceed 25 tpy each of SO_2 all other sulfur compounds combined, or all VOCs combined; and 250 tpy each of NO_x and CO. Emissions of VOC and sulfur compounds other than SO_2 must include gas lost by equilibrium flash as well as gas lost by conventional evaporation.

(3) Any facility handling sour gas shall be located at least one-quarter mile from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facility or the owner of the property upon which the facility is located.

(4) Total emissions of sulfur compounds, excluding sulfur oxides, from all vents shall not exceed 4.0 pounds per hour (lb/hr) and the height of each vent emitting sulfur compounds shall meet the following requirements, except in no case shall the height be less than 20 feet, where the total emission rate as H_2S, lb/hr, and minimum vent height (feet), and other values may be interpolated:

(A) 0.27 lb/hr at 20 feet;

(B) 0.60 lb/hr at 30 feet;

(C) 1.94 lb/hr at 50 feet;

(D) 3.00 lb/hr at 60 feet; and

(E) 4.00 lb/hr at 68 feet.

(5) Before operation begins, facilities handling sour gas shall be registered with the executive director [~~commission's Office of Permitting and Registration~~] in Austin using Form PI-7 along with supporting documentation that all requirements of this subsection will be met. For facilities constructed under §106.353 of this title (relating to Temporary Oil and Gas Facilities), the registration is required before operation under this subsection can begin. If the facilities cannot meet this subsection, a permit under Chapter 116 of this title (relating to Control of Air Pollution by Permits for New Construction or Modification) is required prior to continuing operation of the facilities.

(m) The following tables shall be used as required in this section.

Figure: 30 TAC §106.352(m) (No change.)

This agency hereby certifies that the proposal has been reviewed by legal counsel and found to be within the agency's legal authority to adopt.

Filed with the Office of the Secretary of State on June 1, 2012.

TRD-201202802
Robert Martinez
Director, Environmental Law Division
Texas Commission on Environmental Quality
Earliest possible date of adoption: July 15, 2012
For further information, please call: (512) 239-2548

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CHAPTER 290. PUBLIC DRINKING WATER

The Texas Commission on Environmental Quality (TCEQ, agency, or commission) proposes amendments to §§290.38, 290.39, 290.46, 290.103, 290.109 - 290.112, 290.116, 290.119, 290.122, and 290.275.

Background and Summary of the Factual Basis for the Proposed Rules

The commission proposes this rulemaking for several reasons. First, the commission proposes to amend Chapter 290 for consistency with the federal Ground Water Rule (GWR) and the federal Total Organic Carbon (TOC) Rule. The proposed rulemaking also addresses an inconsistency with federal rules that resulted when the United States Environmental Protection Agency (EPA) adopted Method 334.0 for continuous chlorine residual analyzers. In addition, this rulemaking proposes to expand the definition of groundwater under the direct influence of surface water (GUI) to bring it into conformity with agency practice and federal rules. Finally, the commission proposes changes to Chapter 290 to incorporate the requirements of House Bill (HB) 805 from the 82nd Legislature, 2011.

The purpose of the GWR is to provide increased protection against microbial pathogens in public water systems (PWSs) that use groundwater sources. The EPA is particularly concerned about groundwater systems that are susceptible to fecal contamination since disease-causing pathogens may be found in fecal contamination. The GWR requires additional microbial sampling from the groundwater source in the event of a coliform-positive sample in the distribution system. The GWR also requires that "significant deficiencies" identified by the TCEQ be corrected by the water system within an established time frame. In reviewing the state rule, the EPA and the executive director determined that state revisions are needed to conform to the federal GWR. The majority of the changes are minor, such as adding the terms "raw groundwater source monitoring," "significant deficiencies," and "situations." These terms are prominent in the federal language and are proposed in several areas to provide consistency with the federal rule and add clarity to the state rule.

GWR

Federal rules for microbiological monitoring have been in place since 1989. The GWR, which focuses primarily on groundwater sources, was adopted by the EPA on October 12, 2006, to provide additional protection from fecal contamination. The commission adopted the GWR on December 19, 2008 (Rule Project No. 2006-045-290-PR). The EPA granted the TCEQ a two-year

extension until October 12, 2010, to complete the TCEQ's version of the rule. Under 40 Code of Federal Regulations (CFR) §142.10, the commission must adopt rules at least as stringent as the federal rules to maintain primacy over PWSs in Texas. The TCEQ is proposing revisions to Chapter 290 to provide language that is consistent with the federal rule.

HB 805

Senate Bill (SB) 361, 81st Legislature, 2009, was incorporated into TCEQ rules in 2009. SB 361 required a retail public utility, exempt utility, or provider or conveyor of potable or raw water in a county with a population of 3.3 million or in an adjacent county with a population of 400,000 or more that furnishes water service to more than one customer to: ensure the emergency operation of its water system during an extended power outage, as soon as safe and practicable following the occurrence of a natural disaster; adopt an emergency preparedness plan (EPP) that demonstrates the affected utility's ability to provide emergency operations; and submit the plan to the commission for approval.

SB 361 required TCEQ to adopt rules implementing Texas Water Code (TWC), §13.1395, that required affected utilities ensure emergency operation at 35 pounds per square inch (psi) through the adoption of the EPP. Currently, affected utilities with customers in Harris County are required to submit and implement an EPP. Based on HB 805, affected utilities in Harris and Fort Bend Counties would be required by the proposed rules to prepare and submit an EPP for TCEQ review and approval by February 1, 2012, and to begin implementing the plan by June 1, 2012.

In a corresponding rulemaking published in this issue of the *Texas Register,* the commission also proposes revisions to 30 TAC Chapter 291, Utility Regulations.

Section by Section Discussion

In addition to implementation of the state and federal laws discussed previously, the commission proposes administrative changes throughout the proposed rules to reflect the agency's existing practices and to conform with *Texas Register* and agency guidelines. These changes include updating cross-references and correcting typographical, spelling, and grammatical errors.

Subchapter D. Rules and Regulations for Public Water Systems

§290.38. Definitions.

HB 805

The commission proposes to amend §290.38(1), the definition of "affected utility," to change the population threshold to 550,000 as required by HB 805.

GWR

The commission proposes to amend §290.38(30) to update the definition of "groundwater under the direct influence of surface water" to better reflect the criteria the commission uses to identify these types of water sources and also provide consistency with the federal definition outlined in 40 CFR §141.2. "Groundwater under the direct influence of surface water" is mentioned in the federal GWR citation, 40 CFR §141.403(a)(3), and the commission is also proposing to amend §290.116(a) which is the corresponding state citation for 40 CFR §141.403(a)(3) to harmonize the state definition with the federal definition. In reviewing the state definition for a GUI, the executive director determined that the definition in §290.38(30) needed to be revised to provide consistency with the federal definition for a GUI. The federal definition allows for "site-specific" criteria which is not included in the state definition. Furthermore, the federal definition states that "direct influence must be determined for individual sources in accordance with criteria established by the state." The commission also proposes to amend §290.38(71), the definition for "sanitary survey," to include all eight elements of the investigation process. The existing state definition does not include a list of the eight elements that are in the federal definition. The commission proposes to add §290.38(75), defining "significant deficiency," because the state rules do not currently have a definition, whereas the federal rules do. These amendments are necessary to provide consistency with the CFR. The commission also proposes to renumber the existing definitions to maintain alphanumeric order.

§290.39. General Provisions.

HB 805

The commission proposes to amend §290.39(o)(1) to update the due dates for submitting the EPP. The existing rule requires systems that exist as of December 1, 2009 to submit the EPP by March 1, 2010. The proposed changes would require a system that exists as of November 1, 2011 to submit the EPP by February 1, 2012. The updated dates derive from HB 805. The commission proposes to amend §290.39(o)(4) to update the due date for implementing the EPP from July 1, 2010, to June 1, 2012, as required by HB 805.

§290.46. Minimum Acceptable Operating Practices for Public Drinking Water Systems.

GWR

The commission proposes to amend §290.46(a) to include a reference to the definition of routine sanitary surveys. EPA staff recommended this clarification as sanitary surveys are one of the primary components of the GWR. The commission proposes to amend §290.46(b) to add the statement that samples shall be submitted in a manner prescribed by the executive director to give the commission more flexibility with how data should be reported. The commission proposes to amend §290.46(f)(2), which requires records to be available during investigation to also require the PWS to make records available to the executive director upon request. This requirement is in the CFR but not in all the appropriate state citations. The commission proposes to amend §290.46(f)(3)(D)(v) to add the federal requirement to retain documentation of coliform-positive samples that could have been caused by distribution deficiencies rather than source issues. The commission proposes to amend §290.46(f)(3)(D)(vi) to delete "and" from the end of the clause because it would no longer be necessary with the addition of §290.46(f)(3)(D)(viii) and (ix). The commission proposes to amend §290.46(f)(3)(D)(vii) to delete the period at the end of the rule citation and add a semicolon because of the proposed addition of §290.46(f)(3)(D)(viii) and (ix). The commission proposes to add §290.46(f)(3)(D)(viii) to include the federal requirement to retain records of the lowest daily residual and of any failure to maintain 4-log treatment. The commission proposes to add §290.46(f)(3)(D)(ix) to include the federal requirement to retain compliance requirements and records for any executive director-approved alternative treatment techniques, including membrane filtration. These requirements are not currently in the state language but they are in the CFR. The commission proposes to amend §290.46(f)(3)(E)(viii) to delete "and" from the end of the clause because it would no longer be necessary with

the addition of §290.46(f)(3)(E)(x). The commission proposes to amend §290.46(f)(3)(E)(ix) to delete the period and add a semicolon and the word "and" to the end of the clause because of the proposed addition of §290.46(f)(3)(E)(x). The commission proposes to add §290.46(f)(3)(E)(x) to include the federal requirement to retain records of executive director-approved minimum specified disinfectant residual for systems providing 4-log treatment.

Method 334.0

The commission proposes to amend §290.46(s)(2)(C)(i) by reducing the frequency that the manual disinfectant residual analyzer accuracy must be evaluated from at least once every 30 days to at least once every 90 days to be consistent with the provisions of federally-approved EPA Method 334.0. The commission proposes to delete existing §290.46(s)(2)(C)(ii) because Method 334.0 does not require on-line disinfectant residual analyzers to be recalibrated every 90 days. The commission proposes to renumber §290.46(s)(2)(C)(iii) as §290.46(s)(2)(C)(ii). Further, in order to achieve consistency with federally-approved procedures, the commission proposes to amend proposed §290.46(s)(2)(C)(ii) by replacing the term "calibration" with the term "accuracy," increasing the frequency that the accuracy of on-line instruments must be checked from at least one every 30 days to at least once every seven days, and adding a reference to the federally-approved analytical methods identified in §290.119. The commission proposes to add §290.46(s)(2)(C)(iii), which would require a system to determine and correct the cause of a performance inaccuracy and, if necessary, to adjust, repair, or recalibrate the analyzer to be consistent with the provisions of federally-approved EPA Method 334.0.

Subchapter F. Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems

§290.103. Definitions.

GWR

The commission proposes to amend §290.103(20) to insert the word "days" after "30" which was inadvertently omitted from the rule. The commission proposes to amend §290.103(31) to replace the word "sampling" with "monitoring" to provide consistency with the GWR language and prevent additional confusion among the regulated community. The commission proposes to add §290.103(32) to include a definition for "significant deficiency" because it is used throughout the rule and is defined in the GWR. The commission proposes to add §290.103(39) to include a definition of "4-log treatment." TCEQ rules do not have a definition for "4-log treatment" and it is necessary to conform to the federal rule because this term is discussed throughout the GWR. The commission further proposes to renumber the existing definitions to maintain alphanumeric order.

§290.109. Microbial Contaminants.

GWR

The commission proposes to amend §290.109(c)(4) to include a reference to the updated analytical procedures to more accurately reflect the federal groundwater analytical methods because the state's current methods do not include the *Escherichia coliform (E. coli)* methods. The commission proposes to amend §290.109(c)(4)(A)(i) to add a reference to the 4-log treatment definition and also remove the words "or at" to more accurately reflect the federal rule language as recommended by the EPA. The commission proposes to amend §290.109(c)(4)(A)(ii) to add a reference to the invalidation criteria specified in §290.109(d)(1). The existing reference in §290.109(c)(4)(A)(ii) and (D)(ii) says "as specified in paragraph (5)," which is incorrect. The commission proposes to amend §290.109(c)(4)(B) to specify that only "routine" coliform-positive samples trigger the raw sampling requirement because currently it can be interpreted that coliform-positive "repeat" samples trigger the GWR. The commission also proposes to amend §290.109(c)(4)(B) to specify that samples must be analyzed for *E. coli* or "other approved fecal indicator" because currently the language only includes *E. coli* and the federal rule allows for the analysis of additional fecal indicators. The commission further proposes to amend §290.109(c)(4)(B) to correct a typographical error. The commission proposes to amend §290.109(c)(4)(C)(ii) to include a statement that wholesale systems and all consecutive systems served by that groundwater source must notify all customers in accordance with §290.109(g)(2), which is consistent with federal language. The existing language only places the requirement on the initial wholesale system and not the consecutive systems. The commission proposes to amend §290.109(c)(4)(D)(ii) to clarify that this exception to the triggered source monitoring is contingent on a system meeting the distribution coliform sample invalidation criteria outlined in §290.109(d)(1) and to specify that the replacement sample must be negative for coliforms to meet the criteria. These revisions are necessary to provide consistency with the federal rule language while also deleting an incorrect reference in the existing language to "paragraph (5)." The commission proposes to amend §290.109(c)(4)(E) to add language that describes a hydrogeological sensitivity assessment to be consistent with the federal rule. The commission proposes to add two citations, §290.109(c)(4)(E)(i) and (ii), under the assessment source monitoring subsection that better describe the assessment source monitoring requirements because the existing language does not have all of the requirements outlined in the federal language. The commission proposes to amend §290.109(f)(4) to add language that specifies that an *E. coli*-positive is not a treatment technique violation but a situation that requires public notice and that it is a violation if corrective action is not addressed within 120 days. The existing language is incorrect in stating that collecting an *E. coli*-positive sample is a violation. The commission proposes to amend §290.109(f)(6) to update the language in the compliance determination subsection to be more specific with the violation criteria and add language that a violation requires public notice. Existing language is not consistent with federal language. The commission proposes to amend §290.109(g)(2) to add language to the public notification subsection to better reflect the intent of the federal rule, specify consecutive system requirements, and include instructions on posting the notice annually. The existing language does not include requirements for annual posting and consecutive systems.

§290.110. Disinfectant Residuals.

Method 334.0

The proposed changes would update the analytical requirements in this section to incorporate a federally-approved analytical method for on-line analyzers that continuously monitor chlorine residuals and to restore consistency with the analytical methods in §290.119 which are referenced in §290.110(d). The commission proposes to amend §290.110(d)(1) and its subparagraphs to incorporate the federally-approved analytical method for on-line chlorine residual analyzers by deleting spe-

cific analytical methods. Language is proposed to be added for chloramines and to require approval to use color comparator analytical methods. The commission proposes to delete §290.110(d)(2) and its subparagraphs and insert a reference to chloramines into §290.110(d)(1). Section 290.110(d)(2) is no longer necessary because the proposed language for free chlorine and chloramines is the same; therefore, the commission proposes to renumber §290.110(d)(3) to subsection (d)(2).

§290.111. Surface Water Treatment.

Method 334.0

The proposed changes in this section would update the analytical requirements to incorporate the federally-approved analytical method for on-line analyzers that continuously monitor chlorine residuals and to restore consistency with the analytical methods in §290.119 which are referenced in §290.111(d)(4). The commission proposes to amend §290.111(d)(4)(C) and its clauses to incorporate the federally-approved analytical method for on-line chlorine residual analyzers by deleting specific analytical methods listed as §290.111(d)(4)(C)(i) - (iv). Language would be added referencing chloramines and the requirement that approval is needed to use color comparator analytical methods. The commission proposes to delete §290.111(d)(4)(D) and its clauses and insert a reference to chloramines into §290.111(d)(4)(C). The remaining subparagraphs would be re-lettered accordingly. Section 290.111(d)(4)(D) is no longer necessary because the proposed language for free chlorine and chloramines is the same; therefore, the commission proposes to delete §290.111(d)(4)(D) and its clauses. As a result of these proposed amendments to §290.111(d)(4), the commission would reletter the remaining subparagraphs.

§290.112. Total Organic Carbon (TOC).

TOC Rule

The commission proposes to amend §290.112(a) to correct an inaccuracy in the applicability statement that extended the state requirements of this section to treatment plants that are not subject to the corresponding federal requirements.

§290.116. Groundwater Corrective Actions and Treatment Techniques.

GWR

The commission proposes to amend §290.116(a) to include a description of mixed systems, state that significant deficiencies require corrective action, and specify that 4-log treatment is for each source. The existing language does not specify mixed systems, does not mention significant deficiencies, and implies that 4-log treatment is per PWS, not sources within a PWS. The existing language is not consistent with the federal language. The commission proposes to amend §290.116(a)(1) to: specify that 4-log treatment is on a source basis, not a system basis; remove the December 1, 2009, deadline; and state that a system must notify the TCEQ in writing if they plan to discontinue the 4-log treatment to be consistent with federal rule language. The commission proposes to amend §290.116(a)(1) and (2) to replace the term "customer" with "connection" because this is more consistent with commission terminology. The commission also proposes to amend §290.116(a)(2) to state that a system must conduct triggered source monitoring until the system is approved by TCEQ to do 4-log treatment, and that a system must conduct triggered source sampling if 4-log treatment is discontinued. The commission proposes to amend §290.116(b) to include significant deficiencies as an additional reason that a corrective action may be necessary, which is included in the federal language. The commission proposes to amend §290.116(b)(1) to include significant deficiencies as an additional reason that a corrective action may be necessary, which is included in the federal language. The commission proposes to amend §290.116(b)(2) to include significant deficiencies as an additional reason that a corrective action may be necessary, which is included in the federal language. The commission proposes to amend §290.116(b)(5)(B) to specify that "by source" the rule refers to groundwater sources as opposed to potential contaminant sources. The commission proposes to amend §290.116(b)(5)(D) to replace the term "customer" with "connection" because this is more accurate with commission terminology. The commission proposes to add §290.116(b)(5)(E) to include the federal corrective action option to correct all significant deficiencies. The commission proposes to add §290.116(b)(5)(F) to include the federal corrective action option of assessment source monitoring. The state language does not contain two of the federal corrective action options. To make the language consistent with the federal GWR, the commission proposes to amend §290.116(c) to add "significant deficiency" and specify that 4-log is achieved at or before the first connection for the specified groundwater source. To add clarity and consistency with the federal rule, the commission proposes to amend §290.116(c)(1) to specify that disinfectant levels must be maintained "every day the source serves the public" and add a reference to the monitoring plans required by §290.121. The commission proposes to amend §290.116(c)(1)(A) to reference 40 CFR §141.74(a)(2), the requirement of continuous monitoring of chlorine residuals. The commission proposes to add §290.116(c)(1)(A)(i) to specify that a system must conduct grab sampling every four hours if the continuous monitoring equipment fails. The commission proposes to add §290.116(c)(1)(A)(ii) to require the PWS to return to continuous monitoring within 14 days. These requirements are included in the federal language and need to be included within the state rule. The commission proposes to amend §290.116(c)(1)(B) to state that the system population threshold is "3,300 or fewer" not "less than 3,300" and to include the federal requirements if such systems fall below the specified disinfectant residual. The amendment to §290.116(c)(1)(B) is necessary because the existing rule language would exclude any system with a population of exactly 3,300 and the language being proposed would provide consistency with the corresponding federal citation and also give the regulated community the necessary instructions for the situation described in §290.116(c)(1)(B). The commission proposes to amend §290.116(c)(2) to update the language for the alternative treatment requirements to reflect the federal language. The commission proposes to add §290.116(c)(4) to include the federal recordkeeping requirements for systems that provide 4-log treatment or other alternative treatment techniques. The proposed amendment to §290.116(c)(4) would provide consistency with the corresponding federal citation, provide a reference to the recordkeeping requirements of §290.46, and also provide clarity for the regulated community. The commission proposes to amend §290.116(d) by adding the phrases "a significant deficiency" and "conducts 4-log treatment" to add clarity and consistency with the federal rule. The commission proposes to amend §290.116(d)(1) to specify that documents must be made available upon request of the executive director because this is included in the federal rule. The commission proposes to amend §290.116(d)(2) to remove the December 1, 2009, deadline and to add the phrase "for a specified groundwater source" to clarify that 4-log treatment is per source and not

per PWS. The commission proposes to amend §290.116(d)(4) to clarify that 4-log treatment is "for the specified groundwater source" and not the system and that when a system "met the state criteria" it is exempt from triggered source monitoring. The commission proposes to add §290.116(d)(5) to include the federal requirement that systems must notify the executive director if they fall below the minimum specified residual for more than four hours. The commission proposes to amend §290.116(e) to add the 120-day time frame and remove the duplicative language which is already listed in §290.116(a). This amendment is necessary for consistency with the federal rule. The commission proposes to amend §290.116(e)(3) to specify that systems are in violation if they do not notify the executive director that their 4-log treatment was non-operational for more than four hours, to be consistent with the federal rule. The commission proposes to amend §290.116(f) to add the phrase "or situation" to be more specific and consistent with the federal requirements. The commission proposes to add §290.116(f)(1) and (2) and its subparagraphs to include the special notice requirements for community and noncommunity systems, which would be consistent with the federal rule.

Method 334.0

The proposed changes in this section would incorporate the federally-approved analytical method for on-line analyzers that continuously monitor chlorine residuals and restore consistency with the analytical methods in §290.119 referenced in §290.116(c)(3). The commission proposes to amend §290.116(c)(3)(C) and its clauses to incorporate the federally-approved analytical method for on-line chlorine residual analyzers by deleting specific analytical methods. The revision to §290.116(c)(3)(C) is necessary to provide consistency with the federally-approved methods. Language is proposed to be added for chloramines to provide consistency with the federal language and to add the requirement that approval is needed to use color comparator analytical methods which would give the commission the necessary authority to deny the use of certain inaccurate color comparator devices. The commission proposes to delete §290.116(c)(3)(D) and its clauses and insert a reference to chloramines into §290.116(c)(3)(C). Section 290.116(c)(3)(D) would no longer be necessary because the proposed language for free chlorine and chloramines is the same; therefore, the commission proposes to re-letter existing §290.116(c)(3)(E) and (F) to proposed §290.116(c)(3)(D) and (E). These amendment are necessary to provide consistency with the federal language.

§290.119. Analytical Procedures.

GWR

The commission proposes to amend §290.119(a)(1) to include "raw groundwater source monitoring" to be consistent with the federal GWR. The commission proposes to amend §290.119(b)(8) and (9) to delete "and" from the end of each rule citation as this word is no longer necessary with the addition of §290.119(b)(10). The commission proposes to add §290.119(b)(10) to the acceptable analytical methods to include raw groundwater microbiological analyses and reference the CFR methods because existing rule language only addresses total coliform and not *E. coli* which is the fecal indicator used for the GWR. The commission also proposes to renumber the remaining paragraph.

§290.122. Public Notification.

GWR

The commission proposes to amend §290.122(a) to include "situations" because the heading refers only to violations whereas notice is also required for situations such as an *E. coli*-positive source sample. The commission proposes to amend §290.122(a)(1)(F) to include the 24-hour public notice required for systems that have detections of *E. coli* in their source samples because the existing language does not give the time frame. The commission proposes to amend §290.122(a)(2) to add "public notice and/or boil water notice" because an *E. coli*-positive source sample requires a public notice but not a boil water notice. The commission proposes to amend §290.122(a)(2) to add "or situation" after "violation" because an *E. coli*-positive source sample is an acute situation not an acute violation. The commission proposes to amend §290.122(a)(2)(C) and (D) to include electronic delivery options for public notices to allow systems more flexibility for posting public notices. The commission further proposes to amend §290.122(a)(2)(D) to delete the term "violation" because the rule is explaining how to issue a notice, not a notice violation. This would also make the rule language consistent with how the associated rules are written and prevent confusion. The commission proposes to amend §290.122(a)(2)(E) and (4) to add "or situation" to clarify that some acute situations are not violations. The commission proposes to amend §290.122(b)(1)(C) to add uncorrected significant deficiencies as a reason for public notice, to conform to the federal requirements. The commission proposes to amend §290.122(b)(1)(E) to include "or situations" because an *E. coli*-positive sample at the source is not a violation, but an acute situation. The commission proposes to amend §290.122(b)(2) to include "situations" and "significant deficiencies" to be consistent with the federal rule. The commission proposes to amend §290.122(b)(2)(A)(ii), (B)(ii), (c)(2)(A), and (B) to include electronic delivery options for public notices to allow systems more flexibility for posting public notices. The commission proposes to amend §290.122(c) to include "situations" as required by the federal rule. The commission proposes to amend §290.122(d)(1) to include significant deficiency to be consistent with the federal rule and to correct a typographical error. The commission proposes to amend §290.122(d)(2) to include "significant deficiency" and the date of its identification to be consistent with the federal rule. The commission proposes to amend §290.122(d)(3)(A) to include "situations" and uncorrected "significant deficiencies" as required by the federal rule. The commission proposes to amend §290.122(d)(4) to include required federal language regarding details for significant deficiencies. The commission proposes to amend §290.122(d)(7) to include detailed instructions for multilingual notices because the existing state rules do not give instructions on how to obtain a translated notice or help with an interpretation; however, these instructions were included in the federal language.

Subchapter H. Consumer Confidence Reports

§290.275. Appendices A - D.

GWR

The commission proposes to amend the figures in §290.275(1) and (2), Appendices A and B, to show that an uncorrected significant deficiency is a treatment technique violation for the GWR and not a Maximum Contaminant Level violation. This would provide consistency with the federal language. The commission also proposes to add language to the figures in §290.275(1) and (2), Appendices A and B, to address raw groundwater source positive samples. This would provide consistency with the federal language and differentiate between distribution system pos-

itive samples for the Total Coliform Rule and raw groundwater source positive samples for the GWR to prevent confusion among the regulated community.

Fiscal Note: Costs to State and Local Government

Jeffrey Horvath, Strategic Planning and Assessment Section Analyst, has determined that for the first five-year period the proposed rules are in effect, no significant fiscal implications are anticipated for the agency or for other units of state or local government as a result of administration or enforcement of the proposed rules. The proposed rules would affect certain water utilities in Harris and Fort Bend Counties and may result in fiscal implications for these utilities as they may choose to purchase backup power generators.

The rules are proposed in order to provide consistency between agency rules and the federal GWR and the federal TOC rule previously adopted by the agency. The proposed rulemaking would also address an inconsistency with federal rules that resulted when the EPA adopted Method 334.0 for continuous chlorine residual analyzers. This rulemaking also proposes to expand the definition of a GUI to bring it into conformity with agency practice and federal rules.

GWR, TOC, and Method 334.0

The proposed rulemaking includes minor revisions to the requirements of the GWR and TOC monitoring requirements originally promulgated under federal rules. These minor revisions resulted from the EPA Region 6 primacy review, where minor changes were identified that are proposed to be included in this rulemaking. These minor revisions do not impose any new procedures or requirements. Incorporation of the EPA requested revisions would clarify requirements and implementation protocols for the purpose of avoiding misinterpretation and misapplication of the rules. The proposed rules for EPA Method 334.0, TOC, and GWR have no fiscal implications for PWSs. In addition, updates to the definition of "groundwater under the direct influence of surface water" are proposed in order to better reflect the criteria the commission uses to identify these types of water sources and also provide consistency with the federal definition. No fiscal implications are anticipated for PWSs as a result of this proposed change as the revisions merely clarify existing requirements in order to avoid misinterpretation and misapplication of the rules.

HB 805

The proposed rulemaking implements the requirements of HB 805 from the 82nd Legislature, 2011. In 2009, the 81st Legislature enacted SB 361 to require that certain water utilities located in Harris County ensure the emergency operation of their water systems during an extended power outage after a natural disaster. The requirements of the bill did not include utilities in Fort Bend County. HB 805 amended the TWC by changing the population threshold of an affected county from 400,000 to 550,000. This statutory change mandates that the water utility EPP requirements apply to Fort Bend County as well as to Harris County. HB 805 also specifies that the newly affected utilities in Fort Bend and Harris Counties are required to submit an EPP to the TCEQ for review and approval by February 1, 2012.

The newly affected utilities include those owned or operated by cities, water districts, river authorities, non-profit water supply corporations, and investor owned utilities. The proposed rules are anticipated to affect approximately 157 water systems in Harris and Fort Bend Counties. These systems include all affected utilities in Fort Bend County and the utilities in Harris County that began operation after the deadlines set forth in SB 361. Of the 157 systems, the proposed rules are anticipated to affect approximately 120 water systems owned by local governments, four state-owned water systems, and 33 privately owned systems.

In a corresponding rulemaking, the commission also proposes revisions to Chapter 291, which would also incorporate changes required by the passage of HB 805. The proposed revisions to both of these chapters would affect 161 utilities. This fiscal note however would address the 157 newly affected utilities that meet the definition of a PWS applicable to Chapter 290 (PWSs with at least 15 connections or 25 people).

Affected water utilities would have to prepare an EPP that would ensure the operation of its water system at 35 psi during an extended power outage by one or more of the following options: automatically starting auxiliary generators, sharing of auxiliary generator capacity, negotiation of leasing and contracting agreements (mutual aid agreements), use of portable generators, on-site electrical generation, hardening of the electric transmission and distribution system, or direct engine or right angle drives. Even though affected utilities have these options, agency experience with utilities in Harris County already subject to the EPP requirements has shown that utilities have chosen to either purchase a generator or enter into a mutual aid agreement with another utility. In fact, based upon this experience, staff estimates that 80% of the newly affected utilities would choose to purchase a generator rather than enter into a mutual aid agreement even though a mutual aid agreement that complies with the requirements of the proposed rules is not expected to result in additional costs for the affected utilities. This fiscal note assumes that utility costs would be based upon whether they purchase a generator or enter into a mutual aid agreement.

Systems serving 250 or more connections that do not have elevated storage were already required to have emergency power before the passage of SB 361. Therefore, it is assumed that entities with less than 250 connections would need to either enter into a mutual aid agreement or purchase a generator (typically a 150 kilowatt diesel generator is adequate to power their facilities). There are approximately 34 systems with fewer than 250 connections that are owned by units of state or local government. Staff estimates that the cost of a new 150 kilowatt generator including installation is approximately $55,000. Staff also estimates that 80% of the newly affected utilities would choose to purchase a generator rather than enter into a mutual aid agreement. Therefore, the total estimated costs to purchase generators for approximately 27 water utilities owned by units of state or local government is estimated to be $1,485,000. Maintenance costs are estimated to be approximately $1,000 each year per generator or $27,000 each year for all 27 utilities. Individuals served by these systems can expect to pay more for their water services if the utility purchases a generator. The cost increase would depend upon the number of connections serviced by the utility and the number of facilities owned by the local government. Individuals would also be expected to benefit from the continued function of their water service during and after a natural disaster.

The TCEQ would be required to review and respond to EPP submittals from the newly affected utilities. The agency would also be required to inspect the newly affected utilities to ensure compliance with the approved EPP. The Water Supply Division would use currently available resources to contract for the review of the EPP submittals in Fiscal Year 2012. The agency would also be required to inspect the newly affected utilities for compliance and

may need to expend additional resources in Fiscal Year 2013, depending on compliance rates and whether follow up enforcement activities would be required.

Public Benefits and Costs

Mr. Horvath also determined that for each year of the first five years the proposed rules are in effect, the public benefit anticipated from the changes seen in the proposed rules would be the additional protection of human health and safety by ensuring the continued operation of water utilities following a natural disaster.

In general, the proposed rules are not anticipated to have significant fiscal implications for businesses or individuals. However, the proposed rules would affect approximately 33 private or investor owned water utilities in Harris and Fort Bend Counties. Individual customers of these newly affected utilities may be required to pay higher water rates if these utilities purchase and maintain generators. Of the 33 identified water utilities, some have more than 100 connections and therefore would have to spend more for larger generators than those utilities with 100 or less connections. Staff estimates that a privately owned utility with 100 connections or less would need to purchase a 50 kilowatt generator that is estimated to cost $31,900 (about $6.00 per connection per month including maintenance costs). However, these costs are highly dependent of the number of facilities the utility has and the number of customers. Maintenance costs are estimated to be approximately $1,000 each year. If all 33 utilities purchase a 50 kilowatt generator, costs could total approximately $1,052,700 in the first year the rules become effective.

Small Business and Micro-Business Assessment

In general, no adverse fiscal implications are anticipated for small or micro-businesses as a result of the administration or implementation of the proposed rules. However, the proposed rules would affect approximately 33 private or investor owned water utilities in Harris and Fort Bend Counties. These privately owned utilities are thought to be either a small or micro-business. Individuals who are customers of these affected utilities may be required to pay higher water rates if these utilities choose to purchase generators. Of the 33 identified water utilities, some have more than 100 connections and therefore would have to spend more for larger generators than those utilities with 100 or less connections. Staff estimates that a 50 kilowatt generator would cost approximately $31,900 and that consumers may see a cost increase of about $6.00 per connection per month. However, these costs are highly dependent on the number of utility facilities and the number of customers. If all 33 utilities purchase a 50 kilowatt generator, costs could total approximately $1,052,700 in the first year the rules become effective.

Small Business Regulatory Flexibility Analysis

The commission has reviewed this proposed rulemaking and determined that a small business regulatory flexibility analysis is not required because the proposed rules are required in order to implement state law and are necessary to protect public health and safety in the event of a natural disaster.

Local Employment Impact Statement

The commission has reviewed this proposed rulemaking and determined that a local employment impact statement is not required because the proposed rules do not adversely affect a local economy in a material way for the first five years that the proposed rules are in effect.

Draft Regulatory Impact Analysis Determination

The commission reviewed the proposed rules in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking does not meet the definition of a "major environmental rule" as defined by that statute. A "major environmental rule" means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. Texas Government Code, §2001.0225(g)(3).

This rulemaking does not meet the statutory definition of a "major environmental rule" because it is not the specific intent of the HB 805 amendments to protect the environment or reduce risks to human health from environmental exposure. The specific intent of the proposed HB 805 amendments is to require certain water utilities, providers, and conveyors, to have EPPs for maintaining water pressure following a disruption in service caused by a natural disaster. These rules are not required by federal regulations.

The proposed amendments to Chapter 290 made in response to HB 805 would change the county population threshold from 400,000 to 550,000 for identifying affected utilities, as well as provide a timetable for newly affected utilities to comply with the requirements of TWC, §13.1395.

Further, this rulemaking does not meet the statutory definition of a "major environmental rule" because the proposed amendments would not adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. Although the specific intent of the amendments made in response to the federal regulations is to reduce risks to human health from environmental exposure, it is not a rule that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The specific intent of the proposed rules is to bring Chapter 290 into conformity with HB 805, the federal GWR, TOC rule, the National Primary Drinking Water Regulations (NPDWR), and the chlorine residual analyzer Method 334.0. The federal regulations implement the federal Safe Drinking Water Act (40 CFR §141.1 and §142.1). The proposed amendments made by HB 805 expand the counties to which the EPP requirement applies and provide a timeline for newly affected utilities to comply. The amendments proposed based on the GWR would establish definitions consistent with those used in the federal regulations. The amendments proposed based on the TOC rule are to correct a typographical error that extended the state requirements of this section to treatment plants that are not subject to the corresponding federal requirements. The amendments proposed based on NPDWR would expand the definition of GUI to bring it into conformity with agency practice and 40 CFR §141.2. The amendments proposed based on EPA Method 334.0 would make it an approved method for measuring contaminants in drinking water. It is not anticipated that the cost of complying with the proposed amendments would be significant with respect to the economy as a whole; therefore, the proposed amendments would not adversely affect in a material way the economy, a sector of the economy, competition, or jobs.

Additionally, the proposed rulemaking does not meet any of the four applicability criteria for requiring a regulatory impact analysis for a major environmental rule, which are listed in Texas Govern-

ment Code, §2001.0225(a). This section only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule solely under the general powers of the agency instead of under a specific state law.

This rulemaking does not meet any of these four applicability requirements because this rulemaking: 1) does not exceed any standard set by federal law; 2) does not exceed an express requirement of state law; 3) does not exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement any state and federal program in the regulation of PWSs, but rather is proposed to be consistent with state law, to ensure that emergency operations of water systems following a natural disaster, and with federal regulations in order to ensure consistency of definitions and monitoring requirements across federal and state regulations; and 4) is not adopted solely under the general powers of the agency, but rather specifically under TWC, §13.041, which allows the commission to adopt and enforce rules reasonably required in the exercise of its powers and jurisdiction, including rules governing practice and procedure before the commission, and under THSC, §341.031(a), which allows the commission to adopt and enforce rules implement the federal Safe Drinking Water Act (42 United States Code, §300f *et seq.).*

The commission invites public comment regarding the draft regulatory impact analysis determination during the public comment period. Written comments on the draft regulatory impact analysis determination may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Takings Impact Assessment

The commission evaluated these proposed rules and performed an analysis of whether these proposed rules constitute a taking under Texas Government Code, Chapter 2007. The specific purpose of these proposed rules is to implement certain recently enacted legislation relating to the emergency preparedness of affected utilities and federal drinking water regulations. The proposed rules would change the number of counties in which an EPP is required (HB 805); certain definitions relating to groundwater sourced drinking water (federal GWR); the reach of the TOC rule, expanding the definition of GUI; and add Method 334.0 as an alternative method of continuous residual chlorine analysis. This rulemaking would substantially advance this stated purpose by making the commission's rules consistent with HB 805 and the federal regulations. The commission's analysis indicates that Texas Government Code, Chapter 2007 does not apply to these proposed rules because this action does not affect private real property.

Promulgation and enforcement of these proposed rules would constitute neither a statutory nor a constitutional taking of private real property. The proposed regulations do not adversely affect a landowner's rights in private real property, in whole or in part, temporarily or permanently, because this rulemaking does not burden nor restrict the owner's right to property. More specifically, these rules implement legislation addressing the adoption of EPPs by "affected utilities" (HB 805), the federal GWR, the TOC rule, the NPDWR, and the chlorine analyzer Method 334.0. These provisions do not impose any burdens or restrictions on private real property. Therefore, the proposed amendments do not constitute a taking under Texas Government Code, Chapter 2007.

Consistency with the Coastal Management Program

The commission reviewed the proposed rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor would they affect any action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the proposed rules are not subject to the Texas Coastal Management Program.

Written comments on the consistency of this rulemaking may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Announcement of Hearing

The commission will hold a public hearing on this proposal in Austin on July 10, 2012, at 10:00 a.m. in Building E, Room 201S, at the commission's central office located at 12100 Park 35 Circle. The hearing is structured for the receipt of oral or written comments by interested persons. Individuals may present oral statements when called upon in order of registration. Open discussion will not be permitted during the hearing; however, commission staff members will be available to discuss the proposal 30 minutes prior to the hearing.

Persons who have special communication or other accommodation needs who are planning to attend the hearing should contact Sandy Wong, Office of Legal Services, at (512) 239-1802. Requests should be made as far in advance as possible.

Submittal of Comments

Written comments may be submitted to Michael Parrish, MC 205, Office of Legal Services, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087, or faxed to (512) 239-4808. Electronic comments may be submitted at: *http://www5.tceq.texas.gov/rules/ecomments/.* File size restrictions may apply to comments being submitted via the eComments system. All comments should reference Rule Project Number 2011-056-290-OW. The comment period closes July 16, 2012. Copies of the proposed rulemaking can be obtained from the commission's Web site at *http://www.tceq.texas.gov/nav/rules/propose_adopt.html.* For further information, please contact Matt Court, Public Drinking Water Section, (512) 239-5844.

SUBCHAPTER D. RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS

30 TAC §§290.38, 290.39, 290.46

Statutory Authority

These amendments are proposed under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule; Texas Health and Safety Code

(THSC), §341.031(a), which establishes the commission's authority to adopt and enforce rules to implement the federal Safe Drinking Water Act (42 United States Code, §§300f *et seq.);* and THSC, §341.0315, which requires public drinking water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

The proposed amendments implement TWC, §13.1395, as amended by House Bill 805, the federal Ground Water Rule, the National Primary Drinking Water Regulations, and the chlorine residual analyzer Method 334.0, which implement the federal Safe Drinking Water Act.

§290.38. Definitions.

The following words and terms, when used in this chapter shall have the following meanings, unless the context clearly indicates otherwise. If a word or term used in this chapter is not contained in the following list, its definition shall be as shown in [~~Title~~] 40 Code of Federal Regulations (CFR) §141.2. Other technical terms used shall have the meanings or definitions listed in the latest edition of *The Drinking Water Dictionary,* prepared by the American Water Works Association.

(1) Affected utility--A retail public utility (§291.3 of this title (relating to Definitions of Terms)), exempt utility (§291.3 of this title), or provider or conveyor of potable or raw water service that furnishes water service to more than one customer:

(A) in a county with a population of 3.3 million or more; or

(B) in a county with a population of 550,000 [~~400,000~~] or more adjacent to a county with a population of 3.3 million or more.

(2) Air gap--The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet conveying water to a tank, fixture, receptor, sink, or other assembly and the flood level rim of the receptacle. The vertical, physical separation must be at least twice the diameter of the water supply outlet, but never less than 1.0 inch.

(3) ANSI standards--The standards of the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

(4) Approved laboratory--A laboratory approved by the executive director to analyze water samples to determine their compliance with certain maximum or minimum allowable constituent levels.

(5) ASME standards--The standards of the American Society of Mechanical Engineers, 346 East 47th Street, New York, New York 10017.

(6) ASTM International standards--The standards of the American Society for Testing and Materials, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, Pennsylvania, 19428.

(7) Auxiliary power--Either mechanical power or electric generators which can enable the system to provide water under pressure to the distribution system in the event of a local power failure. With the approval of the executive director, dual primary electric service may be considered as auxiliary power in areas which are not subject to large scale power outages due to natural disasters.

(8) AWWA standards--The latest edition of the applicable standards as approved and published by the American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235.

(9) Bag Filter--Pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed of a non-rigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to the outside.

(10) Cartridge filter--Pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media. They are typically constructed as rigid or semi-rigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

(11) Certified laboratory--A laboratory certified by the commission to analyze water samples to determine their compliance with maximum allowable constituent levels. After June 30, 2008, laboratories must be accredited, not certified, in order to perform sample analyses previously performed by certified laboratories.

(12) Challenge test--A study conducted to determine the removal efficiency (log removal value) of a device for a particular organism, particulate, or surrogate.

(13) Chemical disinfectant--Any oxidant, including but not limited to chlorine, chlorine dioxide, chloramines, and ozone added to the water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.

(14) Community water system--A public water system which has a potential to serve at least 15 residential service connections on a year-round basis or serves at least 25 residents on a year-round basis.

(15) Connection--A single family residential unit or each commercial or industrial establishment to which drinking water is supplied from the system. As an example, the number of service connections in an apartment complex would be equal to the number of individual apartment units. When enough data is not available to accurately determine the number of connections to be served or being served, the population served divided by three will be used as the number of connections for calculating system capacity requirements. Conversely, if only the number of connections is known, the connection total multiplied by three will be the number used for population served. For the purposes of this definition, a dwelling or business which is connected to a system that delivers water by a constructed conveyance other than a pipe shall not be considered a connection if:

(A) the water is used exclusively for purposes other than those defined as human consumption (see human consumption);

(B) the executive director determines that alternative water to achieve the equivalent level of public health protection provided by the drinking water standards is provided for residential or similar human consumption, including, but not limited to, drinking and cooking; or

(C) the executive director determines that the water provided for residential or similar human consumption is centrally treated or is treated at the point of entry by a provider, a pass through entity, or the user to achieve the equivalent level of protection provided by the drinking water standards.

(16) Contamination--The presence of any foreign substance (organic, inorganic, radiological or biological) in water which tends to degrade its quality so as to constitute a health hazard or impair the usefulness of the water.

(17) Cross-connection--A physical connection between a public water system and either another supply of unknown or questionable quality, any source which may contain contaminating or polluting substances, or any source of water treated to a lesser degree in the treatment process.

(18) Direct integrity test--A physical test applied to a membrane unit in order to identify and isolate integrity breaches/leaks that could result in contamination of the filtrate.

(19) Disinfectant--A chemical or a treatment which is intended to kill or inactivate pathogenic microorganisms in water.

(20) Disinfection--A process which inactivates pathogenic organisms in the water by chemical oxidants or equivalent agents.

(21) Distribution system--A system of pipes that conveys potable water from a treatment plant to the consumers. The term includes pump stations, ground and elevated storage tanks, potable water mains, and potable water service lines and all associated valves, fittings, and meters, but excludes potable water customer service lines.

(22) Drinking water--All water distributed by any agency or individual, public or private, for the purpose of human consumption or which may be used in the preparation of foods or beverages or for the cleaning of any utensil or article used in the course of preparation or consumption of food or beverages for human beings. The term "Drinking Water" shall also include all water supplied for human consumption or used by any institution catering to the public.

(23) Drinking water standards--The commission rules covering drinking water standards in Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems).

(24) Elevated storage capacity--That portion of water which can be stored at least 80 feet above the highest service connection in the pressure plane served by the storage tank.

(25) Emergency operations--The operation of an affected utility during an extended power outage at a minimum water pressure of 35 pounds per square inch.

(26) Emergency power--Either mechanical power or electric generators which can enable the system to provide water under pressure to the distribution system in the event of a local power failure. With the approval of the executive director, dual primary electric service may be considered as emergency power in areas which are not subject to large scale power outages due to natural disasters.

(27) Extended power outage--A [a] power outage lasting for more than 24 hours.

(28) Filtrate--The water produced from a filtration process; typically used to describe the water produced by filter processes such as membranes.

(29) Groundwater--Any water that is located beneath the surface of the ground and is not under the direct influence of surface water.

(30) Groundwater under the direct influence of surface water--Any water beneath the surface of the ground with:

(A) significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium;* [or]

(B) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions; or [.]

(C) site-specific characteristics including measurements of water quality parameters, well construction details, existing geological attributes, and other features that are similar to groundwater sources that have been identified by the executive director as being under the direct influence of surface water.

(31) Health hazard--A cross-connection, potential contamination hazard, or other situation involving any substance that can cause death, illness, spread of disease, or has a high probability of causing such effects if introduced into the potable drinking water supply.

(32) Human consumption--Uses by humans in which water can be ingested into or absorbed by the human body. Examples of these uses include, but are not limited to drinking, cooking, brushing teeth, bathing, washing hands, washing dishes, and preparing foods.

(33) Indirect integrity monitoring--The monitoring of some aspect of filtrate water quality, such as turbidity, that is indicative of the removal of particulate matter.

(34) Innovative/alternate treatment--Any treatment process that does not have specific design requirements in §290.42(a) - (f) of this title (relating to Water Treatment). For example, the adjustment of fluoride ion content, special treatment for metals, iron, manganese, organic and inorganic contaminant reduction, special methods for taste and odor control, demineralization, corrosion control processes, membrane filtration, bag/cartridge filters, ozone, chlorine dioxide, Ultraviolet (UV) light disinfection, and other treatment processes.

(35) Interconnection--A physical connection between two public water supply systems.

(36) International Fire Code (IFC)--The standards of the International Code Council, 500 New Jersey Avenue, NW, 6th Floor, Washington, DC 20001.

(37) Intruder-resistant fence--A fence six feet or greater in height, constructed of wood, concrete, masonry, or metal with three strands of barbed wire extending outward from the top of the fence at a 45 degree angle with the smooth side of the fence on the outside wall. In lieu of the barbed wire, the fence must be eight feet in height. The fence must be in good repair and close enough to surface grade to prevent intruder passage.

(38) L/d ratio--The dimensionless value that is obtained by dividing the length (depth) of a granular media filter bed by the weighted effective diameter "d" of the filter media. The weighted effective diameter of the media is calculated based on the percentage of the total bed depth contributed by each media layer.

(39) Licensed professional engineer--An engineer who maintains a current license through the Texas Board of Professional Engineers in accordance with its requirements for professional practice.

(40) Log removal value (LRV)--Removal efficiency for a target organism, particulate, or surrogate expressed as $\log_{10}$ (i.e., $\log_{10}$ (feed concentration) - $\log_{10}$ (filtrate concentration)).

(41) Maximum daily demand--In the absence of verified historical data or in cases where a public water system has imposed mandatory water use restrictions within the past 36 months, maximum daily demand means 2.4 times the average daily demand of the system.

(42) Maximum contaminant level (MCL)--The MCL for a specific contaminant is defined in the section relating to that contaminant.

(43) Membrane filtration--A pressure or vacuum driven separation process in which particulate matter larger than one micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test; includes the following common membrane classifications microfiltration (MF), ultrafiltration (UF), nanofiltration

(NF), and reverse osmosis (RO), as well as any "membrane cartridge filtration" (MCF) device that satisfies this definition.

(44) Membrane $LRV_{C\text{-}Test}$--The number that reflects the removal efficiency of the membrane filtration process demonstrated during challenge testing. The value is based on the entire set of log removal values (LRVs) [~~LRVs~~] obtained during challenge testing, with one representative LRV established per module tested.

(45) Membrane module--The smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(46) Membrane sensitivity--The maximum log removal value (LRV) that can be reliably verified by a direct integrity test.

(47) Membrane unit--A group of membrane modules that share common valving, which allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(48) Milligrams per liter (mg/L)--A measure of concentration, equivalent to and replacing parts per million in the case of dilute solutions.

(49) Monthly reports of water works operations--The daily record of data relating to the operation of the system facilities compiled in a monthly report.

(50) National Fire Protection Association (NFPA) standards--The standards of the NFPA, 1 Batterymarch Park, Quincy, Massachusetts, 02269-9101.

(51) National Sanitation Foundation (NSF)--The NSF or reference to the listings developed by the foundation, P.O. Box 1468, Ann Arbor, Michigan 48106.

(52) Noncommunity water system--Any public water system which is not a community system.

(53) Nonhealth hazard--A cross-connection, potential contamination hazard, or other situation involving any substance that generally will not be a health hazard, but will constitute a nuisance, or be aesthetically objectionable, if introduced into the public water supply.

(54) Nontransient noncommunity water system--A public water system that is not a community water system and regularly serves at least 25 of the same persons at least six months out of the year.

(55) psi--Pounds per square inch.

(56) Peak hourly demand--In the absence of verified historical data, peak hourly demand means 1.25 times the maximum daily demand (prorated to an hourly rate) if a public water supply meets the commission's minimum requirements for elevated storage capacity and 1.85 times the maximum daily demand (prorated to an hourly rate) if the system uses pressure tanks or fails to meet the commission's minimum elevated storage capacity requirement.

(57) Plumbing inspector--Any person employed by a political subdivision for the purpose of inspecting plumbing work and installations in connection with health and safety laws and ordinances, who has no financial or advisory interest in any plumbing company, and who has successfully fulfilled the examinations and requirements of the Texas State Board of Plumbing Examiners.

(58) Plumbing ordinance--A set of rules governing plumbing practices which is at least as stringent and comprehensive as one of the following nationally recognized codes:

(A) the International Plumbing Code; or

(B) the Uniform Plumbing Code.

(59) Potable water customer service line--The sections of potable water pipe between the customer's meter and the customer's point of use.

(60) Potable water service line--The section of pipe between the potable water main to the customer's side of the water meter. In cases where no customer water meter exists, it is the section of pipe that is under the ownership and control of the public water system.

(61) Potable water main--A pipe or enclosed constructed conveyance operated by a public water system which is used for the transmission or distribution of drinking water to a potable water service line.

(62) Potential contamination hazard--A condition which, by its location, piping or configuration, has a reasonable probability of being used incorrectly, through carelessness, ignorance, or negligence, to create or cause to be created a backflow condition by which contamination can be introduced into the water supply. Examples of potential contamination hazards are:

(A) bypass arrangements;

(B) jumper connections;

(C) removable sections or spools; and

(D) swivel or changeover assemblies.

(63) Process control duties--Activities that directly affect the potability of public drinking water, including: making decisions regarding the day-to-day operations and maintenance of public water system production and distribution; maintaining system pressures; determining the adequacy of disinfection and disinfection procedures; taking routine microbiological samples; taking chlorine residuals and microbiological samples after repairs or installation of lines or appurtenances; and operating chemical feed systems, filtration, disinfection, or pressure maintenance equipment; or performing other duties approved by the executive director.

(64) Public drinking water program--Agency staff designated by the executive director to administer the Safe Drinking Water Act and state statutes related to the regulation of public drinking water. Any report required to be submitted in this chapter to the executive director must be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 155, P.O. Box 13087, Austin, Texas 78711-3087.

(65) Public health engineering practices--Requirements in this subchapter or guidelines promulgated by the executive director.

(66) Public water system--A system for the provision to the public of water for human consumption through pipes or other constructed conveyances, which includes all uses described under the definition for drinking water. Such a system must have at least 15 service connections or serve at least 25 individuals at least 60 days out of the year. This term includes; any collection, treatment, storage, and distribution facilities under the control of the operator of such system and used primarily in connection with such system, and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Two or more systems with each having a potential to serve less than 15 connections or less than 25 individuals but owned by the same person, firm, or corporation and located on adjacent land will be considered a public water system when the total potential service connections in the combined systems are 15 or greater or if the total number of individuals served by the combined systems total 25 or greater at least 60 days out of the year. Without excluding other meanings of the terms "individual" or "served," an individual shall be deemed to be served by a water system if he lives in,

uses as his place of employment, or works in a place to which drinking water is supplied from the system.

(67) Quality Control Release Value (QCRV)--A minimum quality standard of a non-destructive performance test (NDPT) established by the manufacturer for membrane module production that ensures that the module will attain the targeted log removal value (LRV) demonstrated during challenge testing.

(68) Reactor Validation Testing--A process by which a full-scale Ultraviolet (UV) [~~UV~~] reactor's disinfection performance is determined relative to operating parameters that can be monitored. These parameters include flow rate, UV intensity as measured by a UV sensor and the UV lamp status.

(69) Resolution--The size of the smallest integrity breach that contributes to a response from a direct integrity test in membranes used to treat surface water or groundwater under the direct influence of surface water.

(70) Sanitary control easement--A legally binding document securing all land, within 150 feet of a public water supply well location, from pollution hazards. This document must fully describe the location of the well and surrounding lands and must be filed in the county records to be legally binding.

(71) Sanitary survey--An onsite review of a public water system's adequacy for producing and distributing safe drinking water by evaluating the following elements: water source; treatment; distribution system; finished water storage; pump, pump facilities, and controls; monitoring, reporting, and data verification; system management, operation and maintenance; and operator compliance [~~An onsite review of the water source, facilities, equipment, operation and maintenance of a public water system, for the purpose of evaluating the adequacy for producing and distributing safe drinking water~~].

(72) Sensitivity--The maximum log removal value (LRV) that can be reliably verified by a direct integrity test in membranes used to treat surface water or groundwater under the direct influence of surface water; also applies to some continuous indirect integrity monitoring methods.

(73) Service line--A pipe connecting the utility service provider's main and the water meter, or for wastewater, connecting the main and the point at which the customer's service line is connected, generally at the customer's property line.

(74) Service pump--Any pump that takes treated water from storage and discharges to the distribution system.

(75) Significant deficiency--Significant deficiencies cause, or have the potential to cause, the introduction of contamination into water delivered to customers. This may include defects in design, operation, or maintenance of the source, treatment, storage, or distribution systems.

(76) [~~(75)~~] Transfer pump--Any pump which conveys water from one point to another within the treatment process or which conveys water to storage facilities prior to distribution.

(77) [~~(76)~~] Transient noncommunity water system--A public water system that is not a community water system and serves at least 25 persons at least 60 days out of the year, yet by its characteristics, does not meet the definition of a nontransient noncommunity water system.

(78) [~~(77)~~] Wastewater lateral--Any pipe or constructed conveyance carrying wastewater, running laterally down a street, alley, or easement, and receiving flow only from the abutting properties.

(79) [~~(78)~~] Wastewater main--Any pipe or constructed conveyance which receives flow from one or more wastewater laterals.

§290.39. General Provisions.

(a) Authority for requirements. Texas Health and Safety Code (THSC), Chapter 341, Subchapter C prescribes the duties of the commission relating to the regulation and control of public drinking water systems in the state. The statute requires that the commission ensure that public water systems: supply safe drinking water in adequate quantities, are financially stable and technically sound, promote use of regional and area-wide drinking water systems, and review completed plans and specifications and business plans for all contemplated public water systems not exempted by THSC, §341.035(d). The statute also requires the commission be notified of any subsequent material changes, improvements, additions, or alterations in existing systems and, consider compliance history in approving new or modified public water systems. Texas Water Code (TWC), Chapter 13, Subchapter E, §13.1395, prescribes the duties of the commission relating to standards for emergency operations of affected utilities. The statute requires that the commission ensure that affected utilities provide water service as soon as safe and practicable during an extended power outage following the occurrence of a natural disaster.

(b) Reason for this subchapter and minimum criteria. This subchapter has been adopted to ensure regionalization and area-wide options are fully considered, the inclusion of all data essential for comprehensive consideration of the contemplated project, or improvements, additions, alterations, or changes thereto and to establish minimum standardized public health design criteria in compliance with existing state statutes and in accordance with good public health engineering practices. In addition, minimum acceptable financial, managerial, technical, and operating practices must be specified to ensure that facilities are properly operated to produce and distribute safe, potable water.

(c) Required actions and approvals prior to construction. A person may not begin construction of a public drinking water supply system unless the executive director determines the following requirements have been satisfied and approves construction of the proposed system.

(1) A person proposing to install a public drinking water system within the extraterritorial jurisdiction of a municipality; or within 1/2-mile of the corporate boundaries of a district, or other political subdivision providing the same service; or within 1/2-mile of a certificated service area boundary of any other water service provider shall provide to the executive director evidence that:

(A) written application for service was made to that provider; and

(B) all application requirements of the service provider were satisfied, including the payment of related fees.

(2) A person may submit a request for an exception to the requirements of paragraph (1) of this subsection if the application fees will create a hardship on the person. The request must be accompanied by evidence documenting the financial hardship.

(3) A person who is not required to complete the steps in paragraph (1) of this subsection, or who completes the steps in paragraph (1) of this subsection and is denied service or determines that the existing provider's cost estimate is not feasible for the development to be served, shall submit to the executive director:

(A) plans and specifications for the system; and

(B) a business plan for the system.

(4) Emergency Preparedness Plan for Public Water Systems that are Affected Utilities.

(A) Each public water system that is also an affected utility, as defined by §290.38(1) of this title (relating to Definitions), is required to submit to the executive director, receive approval for, and adopt an emergency preparedness plan in accordance with §290.45 of this title (relating to Minimum Water System Capacity Requirements) using either the template in Appendix J of §290.47 of this title (relating to Appendices) or another emergency preparedness plan that meets the requirements of this section. Emergency preparedness plans are required to be prepared under the direction of a licensed professional engineer when an affected utility has been granted or is requesting an alternative capacity requirement in accordance with §290.45(g) of this title, or is requesting to meet the requirements of TWC, §13.1395, as an alternative to any rule requiring elevated storage, or as determined by the executive director on a case by case basis.

(B) Each affected utility that supplies, provides, or conveys surface water to wholesale customers shall include in its emergency preparedness plan under subparagraph (A) of this paragraph provision for the actual installation and maintenance of automatically starting auxiliary generators or distributive generation facilities for each raw water intake pump station, water treatment plant, pump station, and pressure facility necessary to provide water to its wholesale customers.

(C) The executive director shall review an emergency preparedness plan submitted under subparagraph (A) of this paragraph. If the executive director determines that the plan is not acceptable, the executive director shall recommend changes to the plan. The executive director must make its recommendations on or before the 90th day after the executive director receives the plan. In accordance with commission rules, an emergency preparedness plan must include one of the options listed in §290.45(h)(1)(A) - (H) of this title.

(D) Each affected utility shall install any required equipment to implement the emergency preparedness plan approved by the executive director immediately upon operation.

(E) The executive director may grant a waiver of the requirements for emergency preparedness plans to an affected utility if the executive director determines that compliance with this section will cause a significant financial burden on customers of the affected utility. The affected utility shall submit financial, managerial, and technical information as requested by the executive director to demonstrate the financial burden.

(d) Submission of plans.

(1) Plans, specifications, and related documents will not be considered unless they have been prepared under the direction of a licensed professional engineer. All engineering documents must have engineering seals, signatures, and dates affixed in accordance with the rules of the Texas Board of Professional Engineers.

(2) Detailed plans must be submitted for examination at least 30 days prior to the time that approval, comments or recommendations are desired. From this, it is not to be inferred that final action will be forthcoming within the time mentioned.

(3) The limits of approval are as follows.

(A) The commission's public drinking water program furnishes consultation services as a reviewing body only, and its licensed professional engineers may neither act as design engineers nor furnish detailed estimates.

(B) The commission's public drinking water program does not examine plans and specifications in regard to the structural features of design, such as strength of concrete or adequacy of reinforcing. Only the features covered by this subchapter will be reviewed.

(C) The consulting engineer and/or owner must provide surveillance adequate to assure that facilities will be constructed according to approved plans and must notify the executive director in writing upon completion of all work. Planning materials shall be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 153, P.O. Box 13087, Austin, Texas 78711-3087.

(e) Submission of planning material. In general, the planning material submitted shall conform to the following requirements.

(1) Engineering reports are required for new water systems and all surface water treatment plants. Engineering reports are also required when design or capacity deficiencies are identified in an existing system. The engineering report shall include, at least, coverage of the following items:

(A) statement of the problem or problems;

(B) present and future areas to be served, with population data;

(C) the source, with quantity and quality of water available;

(D) present and estimated future maximum and minimum water quantity demands;

(E) description of proposed site and surroundings for the water works facilities;

(F) type of treatment, equipment, and capacity of facilities;

(G) basic design data, including pumping capacities, water storage and flexibility of system operation under normal and emergency conditions; and

(H) the adequacy of the facilities with regard to delivery capacity and pressure throughout the system.

(2) All plans and drawings submitted may be printed on any of the various papers which give distinct lines. All prints must be clear, legible and assembled to facilitate review.

(A) The relative location of all facilities which are pertinent to the specific project shall be shown.

(B) The location of all abandoned or inactive wells within 1/4-mile of a proposed well site shall be shown or reported.

(C) If staged construction is anticipated, the overall plan shall be presented, even though a portion of the construction may be deferred.

(D) A general map or plan of the municipality, water district, or area to be served shall accompany each proposal for a new water supply system.

(3) Specifications for construction of facilities shall accompany all plans. If a process or equipment which may be subject to probationary acceptance because of limited application or use in Texas is proposed, the executive director may give limited approval. In such a case, the owner must be given a bonded guarantee from the manufacturer covering acceptable performance. The specifications shall include a statement that such a bonded guarantee will be provided to the owner and shall also specify those conditions under which the bond will be forfeited. Such a bond will be transferable. The bond shall be retained by the owner and transferred when a change in ownership occurs.

(4) A copy of each fully executed sanitary control easement and any other documentation demonstrating compliance with §290.41(c)(1)(F) of this title (relating to Water Sources) shall be provided to the executive director prior to placing the well into service. Each original easement document, if obtained, must be recorded in the deed records at the county courthouse. Section 290.47(c) of this title includes a suggested form.

(5) Construction features and siting of all facilities for new water systems and for major improvements to existing water systems must be in conformity with applicable commission rules.

(f) Submission of business plans. The prospective owner of the system or the person responsible for managing and operating the system must submit a business plan to the executive director that demonstrates that the owner or operator of the system has available the financial, managerial, and technical capability to ensure future operation of the system in accordance with applicable laws and rules. The executive director may order the prospective owner or operator to demonstrate financial assurance to operate the system in accordance with applicable laws and rules as specified in Chapter 37, Subchapter O of this title (relating to Financial Assurance for Public Drinking Water Systems and Utilities), or as specified by commission rule, unless the executive director finds that the business plan demonstrates adequate financial capability. A business plan shall include the information and be presented in a format prescribed by the executive director. For community water systems, the business plan shall contain, at a minimum, the following elements:

(1) description of areas and population to be served by the potential system;

(2) description of drinking water supply systems within a two-mile radius of the proposed system, copies of written requests seeking to obtain service from each of those drinking water supply systems, and copies of the responses to the written requests;

(3) time line for construction of the system and commencement of operations;

(4) identification of and costs of alternative sources of supply;

(5) selection of the alternative to be used and the basis for that selection;

(6) identification of the person or entity which owns or will own the drinking water system and any identifiable future owners of the drinking water system;

(7) identification of any other businesses and public drinking water system(s) owned or operated by the applicant, owner(s), parent organization, and affiliated organization(s);

(8) an operations and maintenance plan which includes sufficient detail to support the budget estimate for operation and maintenance of the facilities;

(9) assurances that the commitments and resources needed for proper operation and maintenance of the system are, and will continue to be, available, including the qualifications of the organization and each individual associated with the proposed system;

(10) for retail public utilities as defined by TWC, §13.002:

(A) projected rate revenue from residential, commercial, and industrial customers; and

(B) pro forma income, expense, and cash flow statements;

(11) identification of any appropriate financial assurance, including those being offered to capital providers;

(12) a notarized statement signed by the owner or responsible person that the business plan has been prepared under his direction and that he is responsible for the accuracy of the information; and

(13) other information required by the executive director to determine the adequacy of the business plan or financial assurance.

(g) Business plans not required. A person is not required to file a business plan if the person:

(1) is a county;

(2) is a retail public utility as defined by TWC, §13.002, unless that person is a utility as defined by that section;

(3) has executed an agreement with a political subdivision to transfer the ownership and operation of the water supply system to the political subdivision; or

(4) is a noncommunity nontransient water system and the person has demonstrated financial assurance under THSC, Chapter 361 or Chapter 382 or TWC, Chapter 26.

(h) Beginning and completion of work.

(1) No person may begin construction on a new public water system before receiving written approval of plans and specifications and, if required, approval of a business plan from the executive director. No person may begin construction of modifications to a public water system without providing notification to the executive director and submitting and receiving approval of plans and specifications if requested in accordance with subsection (j) of this section.

(2) The executive director shall be notified in writing by the design engineer or the owner before construction is started.

(3) Upon completion of the water works project, the engineer or owner shall notify the executive director in writing as to its completion and attest to the fact that the completed work is substantially in accordance with the plans and change orders on file with the commission.

(i) Changes in plans and specifications. Any addenda or change orders which may involve a health hazard or relocation of facilities, such as wells, treatment units, and storage tanks, shall be submitted to the executive director for review and approval.

(j) Changes in existing systems or supplies. Public water systems shall notify the executive director prior to making any significant change or addition to the system's production, treatment, storage, pressure maintenance, or distribution facilities. Public water systems shall submit plans and specifications for the proposed changes upon request. Changes to an existing disinfection process at a treatment plant that treats surface water or groundwater that is under the direct influence of surface water shall not be instituted without the prior approval of the executive director. Any long-term change in water treatment that will impact the corrosivity shall not be instituted without the prior approval of the executive director.

(1) The following changes are considered to be significant:

(A) proposed changes to existing systems which result in an increase or decrease in production, treatment, storage, or pressure maintenance capacity;

(B) proposed changes to the disinfection process used at plants that treat surface water or groundwater that is under the direct influence of surface water including changes involving the disinfectants

used, the disinfectant application points, or the disinfectant monitoring points;

(C) proposed changes to the type of disinfectant used to maintain a disinfectant residual in the distribution system;

(D) proposed changes in existing distribution systems when the change is greater than 10% of the existing distribution capacity or 250 connections, whichever is smaller, or results in the water system's inability to comply with any of the applicable capacity requirements of §290.45 of this title;

(E) proposed replacement or change of membranes modules;

(F) any other material changes specified by the executive director; and

(G) examples of long-term treatment changes that could impact the corrosivity of the water include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants, and switching corrosion inhibitor products. Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.

(2) The executive director shall determine whether engineering plans and specifications will be required after reviewing the initial notification regarding the nature and extent of the modifications.

(A) Upon request of the executive director, the water system shall submit plans and specifications in accordance with the requirements of subsection (d) of this section.

(B) Unless plans and specifications are required by Chapter 293 of this title (relating to Water Districts), the executive director will not require another state agency or a political subdivision to submit planning material on distribution line improvements if the entity has its own internal review staff and complies with all of the following criteria:

(i) the internal review staff includes one or more licensed professional engineers that are employed by the political subdivision and must be separate from, and not subject to the review or supervision of, the engineering staff or firm charged with the design of the distribution extension under review;

(ii) a licensed professional engineer on the internal review staff determines and certifies in writing that the proposed distribution system changes comply with the requirements of §290.44 of this title (relating to Water Distribution) and will not result in a violation of any provision of §290.45 of this title;

(iii) the state agency or political subdivision includes a copy of the written certification described in this subparagraph with the initial notice that is submitted to the executive director.

(C) Unless plans and specifications are required by Chapter 293 of this title, the executive director will not require planning material on distribution line improvements from any public water system that is required to submit planning material to another state agency or political subdivision that complies with the requirements of subparagraph (B) of this paragraph. The notice to the executive director must include a statement that a state statute or local ordinance requires the planning materials to be submitted to the other state agency or political subdivision and a copy of the written certification that is required in subparagraph (B) of this paragraph.

(3) If a certificate of convenience and necessity (CCN) is required or must be amended, the CCN application must be included with the notice to the executive director.

(k) Planning material acceptance. Planning material for improvements to an existing system which does not meet the requirements of all sections of this subchapter will not be considered unless the necessary modifications for correcting the deficiencies are included in the proposed improvements, or unless the executive director determines that reasonable progress is being made toward correcting the deficiencies and no immediate health hazard will be caused by the delay.

(l) Exceptions. Requests for exceptions to one or more of the requirements in this subchapter shall be considered on an individual basis. Any water system which requests an exception must demonstrate to the satisfaction of the executive director that the exception will not compromise the public health or result in a degradation of service or water quality.

(1) The exception must be requested in writing and must be substantiated by carefully documented data. The request for an exception shall precede the submission of engineering plans and specifications for a proposed project for which an exception is being requested.

(2) Any exception granted by the commission is subject to revocation.

(3) Any request for an exception which is not approved by the commission in writing is denied.

(4) The executive director may establish site specific design, operation, maintenance, and reporting requirements for systems that have been issued an exception to the subchapter.

(m) Notification of system startup or reactivation. The owner or responsible official must provide written notification to the commission of the startup of a new public water supply system or reactivation of an existing public water supply system. This notification must be made immediately upon meeting the definition of a public water system as defined in §290.38 of this title.

(n) The commission may require the owner or operator of a public drinking water supply system that was constructed without the approval required by THSC, §341.035, that has a history of noncompliance with THSC, Chapter 341, Subchapter C or commission rules, or that is subject to a commission enforcement action to take the following action:

(1) provide the executive director with a business plan that demonstrates that the system has available the financial, managerial, and technical resources adequate to ensure future operation of the system in accordance with applicable laws and rules. The business plan must fulfill all the requirements for a business plan as set forth in subsection (f) of this section;

(2) provide adequate financial assurance of the ability to operate the system in accordance with applicable laws and rules. The executive director will set the amount of the financial assurance, after the business plan has been reviewed and approved by the executive director.

(A) The amount of the financial assurance will equal the difference between the amount of projected system revenues and the projected cash needs for the period of time prescribed by the executive director.

(B) The form of the financial assurance will be as specified in Chapter 37, Subchapter O of this title and will be as specified by the executive director.

(C) If the executive director relies on rate increases or customer surcharges as the form of financial assurance, such funds shall be deposited in an escrow account as specified in Chapter 37, Subchapter O of this title and released only with the approval of the executive director.

(o) Emergency Preparedness Plans for Affected Utilities.

(1) Each public water system that is also an affected utility and that exists as of November 1, 2011 [~~December 1, 2009~~] is required to adopt and submit to the executive director an emergency preparedness plan in accordance with §290.45 of this title and using the template in Appendix J of §290.47 of this title or another emergency preparedness plan that meets the requirements of this subchapter no later than February 1, 2012 [~~March 1, 2010~~]. Emergency preparedness plans are required to be prepared under the direction of a licensed professional engineer when an affected utility has been granted or is requesting an alternative capacity requirement in accordance with §290.45(g) of this title, or is requesting to meet the requirements of TWC, §13.1395, as an alternative to any rule requiring elevated storage, or as determined by the executive director on a case by case basis.

(2) Each affected utility that supplies, provides, or conveys surface water to wholesale customers shall include in its emergency preparedness plan under this subsection provisions for the actual installation and maintenance of automatically starting auxiliary generators or distributive generation facilities for each raw water intake pump station, water treatment plant, pump station, and pressure facility necessary to provide water to its wholesale customers.

(3) The executive director shall review an emergency preparedness plan submitted under this subsection. If the executive director determines that the plan is not acceptable, the executive director shall recommend changes to the plan. The executive director must make its recommendations on or before the 90th day after the executive director receives the plan. In accordance with the commission rules, an emergency preparedness plan must include one of the options listed in §290.45(h)(1)(A) - (H) of this title.

(4) Not later than June 1, 2012 [~~July 1, 2010~~], each affected utility shall implement the emergency preparedness plan approved by the executive director.

(5) An affected utility may file with the executive director a written request for an extension not to exceed 90 days, of the date by which the affected utility is required under this subsection to submit the affected utility's emergency preparedness plan or of the date by which the affected utility is required under this subsection to implement the affected utility's emergency preparedness plan. The executive director may approve the requested extension for good cause shown.

(6) The executive director may grant a waiver of the requirements for emergency preparedness plans to an affected utility if the executive director determines that compliance with this section will cause a significant financial burden on customers of the affected utility. The affected utility shall submit financial, managerial, and technical information as requested by the executive director to demonstrate the financial burden.

§290.46. Minimum Acceptable Operating Practices for Public Drinking Water Systems.

(a) General. When a public drinking water supply system is to be established, plans shall be submitted to the executive director for review and approval prior to the construction of the system. All public water systems are to be constructed in conformance with the requirements of this subchapter and maintained and operated in accordance with the following minimum acceptable operating practices. Owners and operators shall allow entry to members of the commission and employees and agents of the commission onto any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to public water systems in the state including the required elements of a sanitary survey as defined in §290.38(71) of this title (relating to Definitions). Members, employees, or agents acting under this authority shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials.

(b) Microbiological. Submission of samples for microbiological analysis shall be as required by Subchapter F of this chapter (relating to Drinking Water Standards Governing Drinking Water Quality and Reporting Requirements for Public Water Systems). Microbiological samples may be required by the executive director for monitoring purposes in addition to the routine samples required by the drinking water standards. These samples shall be submitted to an accredited laboratory. (A list of the accredited laboratories can be obtained by contacting the executive director). The samples shall be submitted to the executive director in a manner prescribed by the executive director.

(c) Chemical. Samples for chemical analysis shall be submitted as directed by the executive director.

(d) Disinfectant residuals and monitoring. A disinfectant residual must be continuously maintained during the treatment process and throughout the distribution system.

(1) Disinfection equipment shall be operated and monitored in a manner that will assure compliance with the requirements of §290.110 of this title (relating to Disinfectant Residuals).

(2) The disinfection equipment shall be operated to maintain the following minimum disinfectant residuals in each finished water storage tank and throughout the distribution system at all times:

(A) a free chlorine residual of 0.2 milligrams per liter (mg/L); or

(B) a chloramine residual of 0.5 mg/L (measured as total chlorine) for those systems that feed ammonia.

(e) Operation by trained and licensed personnel. Except as provided in paragraph (1) of this subsection, the production, treatment, and distribution facilities at the public water system must be operated at all times under the direct supervision of a water works operator who holds an applicable, valid license issued by the executive director.

(1) Transient noncommunity public water systems are exempt from the requirements of this subsection if they use only groundwater or purchase treated water from another public water system.

(2) All public water systems that are subject to the provisions of this subsection shall meet the following requirements.

(A) Public water systems shall not allow new or repaired production, treatment, storage, pressure maintenance, or distribution facilities to be placed into service without the prior guidance and approval of a licensed water works operator.

(B) Public water systems shall ensure that their operators are trained regarding the use of all chemicals used in the water treatment plant. Training programs shall meet applicable standards established by the Occupational Safety and Health Administration (OSHA) or the Texas Hazard Communications Act, Texas Health and Safety Code, Title 6, Chapter 502.

(C) Public water systems using chlorine dioxide shall place the operation of the chlorine dioxide facilities under the direct

supervision of a licensed operator who has a Class "C" or higher license.

(3) Systems that only purchase treated water shall meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Purchased water systems serving no more than 250 connections must employ an operator who holds a Class "D" or higher license.

(B) Purchased water systems serving more than 250 connections, but no more than 1,000 connections, must employ an operator who holds a Class "C" or higher license.

(C) Purchased water systems serving more than 1,000 connections must employ at least two operators who hold a Class "C" or higher license and who each work at least 16 hours per month at the public water system's treatment or distribution facilities.

(4) Systems that treat groundwater and do not treat surface water or groundwater that is under the direct influence of surface water shall meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Groundwater systems serving no more than 250 connections must employ an operator with a Class "D" or higher license.

(B) Groundwater systems serving more than 250 connections, but no more than 1,000 connections, must employ an operator with a Class "C" or higher groundwater license.

(C) Groundwater systems serving more than 1,000 connections must employ at least two operators who hold a Class "C" or higher groundwater license and who each work at least 16 hours per month at the public water system's production, treatment, or distribution facilities.

(5) Systems that treat groundwater that is under the direct influence of surface water must meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Systems which serve no more than 1,000 connections and utilize cartridge or membrane filters must employ an operator who holds a Class "C" or higher groundwater license and has completed a four-hour training course on monitoring and reporting requirements or who holds a Class "C" or higher surface water license and has completed the Groundwater Production course.

(B) Systems which serve more than 1,000 connections and utilize cartridge or membrane filters must employ at least two operators who meet the requirements of subparagraph (A) of this paragraph and who each work at least 24 hours per month at the public water system's production, treatment, or distribution facilities.

(C) Systems which serve no more than 1,000 connections and utilize coagulant addition and direct filtration must employ an operator who holds a Class "C" or higher surface water license and has completed the Groundwater Production course or who holds a Class "C" or higher groundwater license and has completed a Surface Water Production course. Effective January 1, 2007, the public water system must employ at least one operator who has completed the Surface Water Unit I course and the Surface Water Unit II course.

(D) Systems which serve more than 1,000 connections and utilize coagulant addition and direct filtration must employ at least two operators who meet the requirements of subparagraph (C) of this paragraph and who each work at least 24 hours per month at the public water system's production, treatment, or distribution facilities. Effective January 1, 2007, the public water system must employ at least two operators who have completed the Surface Water Unit I course and the Surface Water Unit II course.

(E) Systems which utilize complete surface water treatment must comply with the requirements of paragraph (6) of this subsection.

(F) Each plant must have at least one Class "C" or higher operator on duty at the plant when it is in operation or the plant must be provided with continuous turbidity and disinfectant residual monitors with automatic plant shutdown and alarms to summon operators so as to ensure that the water produced continues to meet the commission's drinking water standards during periods when the plant is not staffed.

(6) Systems that treat surface water must meet the following requirements in addition to the requirements contained in paragraph (2) of this subsection.

(A) Surface water systems that serve no more than 1,000 connections must employ at least one operator who holds a Class "B" or higher surface water license. Part-time operators may be used to meet the requirements of this subparagraph if the operator is completely familiar with the design and operation of the plant and spends at least four consecutive hours at the plant at least once every 14 days and the system also employs an operator who holds a Class "C" or higher surface water license. Effective January 1, 2007, the public water system must employ at least one operator who has completed the Surface Water Unit I course and the Surface Water Unit II course.

(B) Surface water systems that serve more than 1,000 connections must employ at least two operators; one of the required operators must hold a Class "B" or higher surface water license and the other required operator must hold a Class "C" or higher surface water license. Each of the required operators must work at least 32 hours per month at the public water system's production, treatment, or distribution facilities. Effective January 1, 2007, the public water system must employ at least two operators who have completed the Surface Water Unit I course and the Surface Water Unit II course.

(C) Each surface water treatment plant must have at least one Class "C" or higher surface water operator on duty at the plant when it is in operation or the plant must be provided with continuous turbidity and disinfectant residual monitors with automatic plant shutdown and alarms to summon operators so as to ensure that the water produced continues to meet the commission's drinking water standards during periods when the plant is not staffed.

(D) Public water systems shall not allow Class "D" operators to adjust or modify the treatment processes at surface water treatment plant unless an operator who holds a Class "C" or higher surface license is present at the plant and has issued specific instructions regarding the proposed adjustment.

(f) Operating records and reports. Water systems must maintain a record of water works operation and maintenance activities and submit periodic operating reports.

(1) The public water system's operating records must be organized, and copies must be kept on file or stored electronically.

(2) The public water system's operating records must be accessible for review during inspections and be available to the executive director upon request.

(3) All public water systems shall maintain a record of operations.

(A) The following records shall be retained for at least two years:

(i) the amount of chemicals used:

(I) Systems that treat surface water or groundwater under the direct influence of surface water shall maintain a record of the amount of each chemical used each day.

(II) Systems that serve 250 or more connections or serve 750 or more people shall maintain a record of the amount of each chemical used each day.

(III) Systems that serve fewer than 250 connections, serve fewer than 750 people, and use only groundwater or purchased treated water shall maintain a record of the amount of each chemical used each week;

(ii) the volume of water treated:

(I) Systems that treat surface water or groundwater under the direct influence of surface water shall maintain a record of the amount of water treated each day.

(II) Systems that serve 250 or more connections or serve 750 or more people shall maintain a record of the amount of water treated each day.

(III) Systems that serve fewer than 250 connections, serve fewer than 750 people, and use only groundwater or purchase treated water shall maintain a record of the amount of water treated each week;

(iii) the date, location, and nature of water quality, pressure, or outage complaints received by the system and the results of any subsequent complaint investigation;

(iv) the dates that dead-end mains were flushed;

(v) the dates that storage tanks and other facilities were cleaned;

(vi) the maintenance records for water system equipment and facilities; and

(vii) for systems that do not employ full-time operators to meet the requirements of subsection (e) of this section, a daily record or a monthly summary of the work performed and the number of hours worked by each of the part-time operators used to meet the requirements of subsection (e) of this section.

(B) The following records shall be retained for at least three years:

(i) copies of notices of violation and any resulting corrective actions. The records of the actions taken to correct violations of primary drinking water regulations must be retained for at least three years after the last action taken with respect to the particular violation involved;

(ii) copies of any public notice issued by the water system;

(iii) the disinfectant residual monitoring results from the distribution system;

(iv) the calibration records for laboratory equipment, flow meters, rate-of-flow controllers, on-line turbidimeters, and on-line disinfectant residual analyzers;

(v) the records of backflow prevention device programs;

(vi) the raw surface water monitoring results and source water monitoring plans required by §290.111 of this title (relating to Surface Water Treatment) must be retained for three years after bin classification required by §290.111 of this title;

(vii) notification to the executive director that a system will provide 5.5-log *Cryptosporidium* treatment in lieu of raw surface water monitoring; and

(viii) except for those specified in subparagraphs [~~subparagraph~~] (C)(iv) and (E)(i) of this paragraph [~~and subparagraph (E)(i) of this paragraph~~], the results of all surface water treatment monitoring that are used to demonstrate log inactivation or removal.

(C) The following records shall be retained for a period of five years after they are no longer in effect:

(i) the records concerning a variance or exemption granted to the system;

(ii) Concentration Time (CT) studies for surface water treatment plants;

(iii) the Recycling Practices Report form and other records pertaining to site-specific recycle practices for treatment plants that recycle; and

(iv) the turbidity monitoring results and exception reports for individual filters as required by §290.111 of this title.

(D) The following records shall be retained for at least five years:

(i) the results of microbiological analyses;

(ii) the results of inspections (as required in subsection (m)(1) of this section) for all water storage and pressure maintenance facilities;

(iii) the results of inspections as required by subsection (m)(2) of this section for all pressure filters;

(iv) documentation of compliance with state approved corrective action plan and schedules required to be completed by groundwater systems that must take corrective actions;

(v) documentation of the reason for an invalidated fecal indicator source sample and documentation of a total coliform-positive sample collected at a location with conditions that could cause such positive samples in a distribution system;

(vi) notification to wholesale system(s) of a distribution coliform positive sample for consecutive systems using groundwater; [~~and~~]

(vii) Consumer Confidence Report compliance documentation; [~~.~~]

(viii) records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the executive director-approved minimum specified disinfectant residual for a period of more than four hours for groundwater systems providing 4-log treatment; and

(ix) records of executive director-specified compliance requirements for membrane filtration, records of parameters specified by the executive director for approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours for groundwater systems. Membrane filtration can only be used if it is approved by the executive director and if it can be properly validated.

(E) The following records shall be retained for at least ten years:

(i) copies of Monthly Operating Reports and any supporting documentation including turbidity monitoring results of the combined filter effluent;

(ii) the results of chemical analyses;

(iii) any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by the executive director shall be kept for a period not less than ten years after completion of the survey involved;

(iv) copies of the Customer Service Inspection reports required by subsection (j) of this section;

(v) copy of any Initial Distribution System Evaluation (IDSE) plan, report, approval letters, and other compliance documentation required by §290.115 of this title (relating to Stage 2 Disinfection Byproducts (TTHM and HAA5));

(vi) state notification of any modifications to an IDSE report;

(vii) copy of any 40/30 certification required by §290.115 of this title;

(viii) documentation of corrective actions taken by groundwater systems in accordance with §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques); [~~and~~]

(ix) any monitoring plans required by §290.121(b) of this title (relating to Monitoring Plans); and [~~.~~]

(x) records of the executive director-approved minimum specified disinfectant residual for groundwater systems providing 4-log treatment, including wholesale, consecutive, and mixed systems, regulated under §290.116(c) of this title.

(F) A public water system shall maintain records relating to lead and copper requirements under §290.117 of this title (relating to Regulation of Lead and Copper) for no less than 12 years. Any system subject to the requirements of §290.117 of this title shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, executive determinations, and any other information required by the executive director under §290.117 of this title. These records include, but are not limited to, the following items: tap water monitoring results including the location of each site and date of collection; certification of the volume and validity of first-draw-tap sample criteria via a copy of the laboratory analysis request form; where residents collected the sample; certification that the water system informed the resident of proper sampling procedures; the analytical results for lead and copper concentrations at each tap sample site; and designation of any substitute site not used in previous monitoring periods.

(G) A public water system shall maintain records relating to special studies and pilot projects, special monitoring, and other system-specific matters as directed by the executive director.

(4) Water systems shall submit routine reports and any additional documentation that the executive director may require to determine compliance with the requirements of this chapter.

(A) The reports must be submitted to the Texas Commission on Environmental Quality, Water Supply Division, MC 155, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(B) The reports must contain all the information required by the drinking water standards and the results of any special monitoring tests which have been required.

(C) The reports must be completed in ink, typed, or computer-printed and must be signed by the licensed water works operator.

(5) All public water systems that are affected utilities must maintain the following records for as long as they are applicable to the system:

(A) An emergency preparedness plan approved by the executive director and a copy of the approval letter.

(B) All required operating and maintenance records for auxiliary power equipment, including periodic testing of the auxiliary power equipment under load and any associated automatic switch over equipment.

(C) Copies of the manufacturer's specifications for all generators that are part of the approved emergency preparedness plan.

(g) Disinfection of new or repaired facilities. Disinfection by or under the direction of water system personnel must be performed when repairs are made to existing facilities and before new facilities are placed into service. Disinfection must be performed in accordance with American Water Works Association (AWWA) requirements and water samples must be submitted to a laboratory approved by the executive director. The sample results must indicate that the facility is free of microbiological contamination before it is placed into service. When it is necessary to return repaired mains to service as rapidly as possible, doses may be increased to 500 mg/L and the contact time reduced to 1/2 hour.

(h) Calcium hypochlorite. A supply of calcium hypochlorite disinfectant shall be kept on hand for use when making repairs, setting meters, and disinfecting new mains prior to placing them in service.

(i) Plumbing ordinance. Public water systems must adopt an adequate plumbing ordinance, regulations, or service agreement with provisions for proper enforcement to insure that neither cross-connections nor other unacceptable plumbing practices are permitted (See §290.47(b) of this title (relating to Appendices)). Should sanitary control of the distribution system not reside with the purveyor, the entity retaining sanitary control shall be responsible for establishing and enforcing adequate regulations in this regard. The use of pipes and pipe fittings that contain more than 8.0% lead or solders and flux that contain more than 0.2% lead is prohibited for installation or repair of any public water supply and for installation or repair of any plumbing in a residential or nonresidential facility providing water for human consumption and connected to a public drinking water supply system. This requirement may be waived for lead joints that are necessary for repairs to cast iron pipe.

(j) Customer service inspections. A customer service inspection certificate shall be completed prior to providing continuous water service to new construction, on any existing service either when the water purveyor has reason to believe that cross-connections or other potential contaminant hazards exist, or after any material improvement, correction, or addition to the private water distribution facilities. Any customer service inspection certificate form which varies from the format found in §290.47(d) of this title must be approved by the executive director prior to being placed in use.

(1) Individuals with the following credentials shall be recognized as capable of conducting a customer service inspection certification.

(A) Plumbing Inspectors and Water Supply Protection Specialists licensed by the Texas State Board of Plumbing Examiners (TSBPE).

(B) Customer service inspectors who have completed a commission-approved course, passed an examination administered by the executive director, and hold current professional license as a customer service inspector.

(2) As potential contaminant hazards are discovered, they shall be promptly eliminated to prevent possible contamination of the water supplied by the public water system. The existence of a health hazard, as identified in §290.47(i) of this title, shall be considered sufficient grounds for immediate termination of water service. Service can be restored only when the health hazard no longer exists, or until the health hazard has been isolated from the public water system in accordance with §290.44(h) of this title (relating to Water Distribution).

(3) These customer service inspection requirements are not considered acceptable substitutes for and shall not apply to the sanitary control requirements stated in §290.102(a)(5) of this title (relating to General Applicability).

(4) A customer service inspection is an examination of the private water distribution facilities for the purpose of providing or denying water service. This inspection is limited to the identification and prevention of cross-connections, potential contaminant hazards, and illegal lead materials. The customer service inspector has no authority or obligation beyond the scope of the commission's regulations. A customer service inspection is not a plumbing inspection as defined and regulated by the TSBPE. A customer service inspector is not permitted to perform plumbing inspections. State statutes and TSBPE adopted rules require that TSBPE licensed plumbing inspectors perform plumbing inspections of all new plumbing and alterations or additions to existing plumbing within the municipal limits of all cities, towns, and villages which have passed an ordinance adopting one of the plumbing codes recognized by TSBPE. Such entities may stipulate that the customer service inspection be performed by the plumbing inspector as a part of the more comprehensive plumbing inspection. Where such entities permit customer service inspectors to perform customer service inspections, the customer service inspector shall report any violations immediately to the local entity's plumbing inspection department.

(k) Interconnection. No physical connection between the distribution system of a public drinking water supply and that of any other water supply shall be permitted unless the other water supply is of a safe, sanitary quality and the interconnection is approved by the executive director.

(l) Flushing of mains. All dead-end mains must be flushed at monthly intervals. Dead-end lines and other mains shall be flushed as needed if water quality complaints are received from water customers or if disinfectant residuals fall below acceptable levels as specified in §290.110 of this title.

(m) Maintenance and housekeeping. The maintenance and housekeeping practices used by a public water system shall ensure the good working condition and general appearance of the system's facilities and equipment. The grounds and facilities shall be maintained in a manner so as to minimize the possibility of the harboring of rodents, insects, and other disease vectors, and in such a way as to prevent other conditions that might cause the contamination of the water.

(1) Each of the system's ground, elevated, and pressure tanks shall be inspected annually by water system personnel or a contracted inspection service.

(A) Ground and elevated storage tank inspections must determine that the vents are in place and properly screened, the roof hatches closed and locked, flap valves and gasketing provide adequate protection against insects, rodents, and other vermin, the interior and exterior coating systems are continuing to provide adequate protection to all metal surfaces, and the tank remains in a watertight condition.

(B) Pressure tank inspections must determine that the pressure release device and pressure gauge are working properly, the air-water ratio is being maintained at the proper level, the exterior coating systems are continuing to provide adequate protection to all metal surfaces, and the tank remains in watertight condition. Pressure tanks provided with an inspection port must have the interior surface inspected every five years.

(C) All tanks shall be inspected annually to determine that instrumentation and controls are working properly.

(2) When pressure filters are used, a visual inspection of the filter media and internal filter surfaces shall be conducted annually to ensure that the filter media is in good condition and the coating materials continue to provide adequate protection to internal surfaces.

(3) When cartridge filters are used, filter cartridges shall be changed at the frequency required by the manufacturer, or more frequently if needed.

(4) All water treatment units, storage and pressure maintenance facilities, distribution system lines, and related appurtenances shall be maintained in a watertight condition and be free of excessive solids.

(5) Basins used for water clarification shall be maintained free of excessive solids to prevent possible carryover of sludge and the formation of tastes and odors.

(6) Pumps, motors, valves, and other mechanical devices shall be maintained in good working condition.

(n) Engineering plans and maps. Plans, specifications, maps, and other pertinent information shall be maintained to facilitate the operation and maintenance of the system's facilities and equipment. The following records shall be maintained on file at the public water system and be available to the executive director upon request.

(1) Accurate and up-to-date detailed as-built plans or record drawings and specifications for each treatment plant, pump station, and storage tank shall be maintained at the public water system until the facility is decommissioned. As-built plans of individual projects may be used to fulfill this requirement if the plans are maintained in an organized manner.

(2) An accurate and up-to-date map of the distribution system shall be available so that valves and mains can be easily located during emergencies.

(3) Copies of well completion data such as well material setting data, geological log, sealing information (pressure cementing and surface protection), disinfection information, microbiological sample results, and a chemical analysis report of a representative sample of water from the well shall be kept on file for as long as the well remains in service.

(o) Filter backwashing at surface water treatment plants. Filters must be backwashed when a loss of head differential of six to ten feet is experienced between the influent and effluent loss of head gauges or when the turbidity level at the effluent of the filter reaches 1.0 nephelometric turbidity unit (NTU).

(p) Data on water system ownership and management. The agency shall be provided with information regarding water system ownership and management.

(1) When a water system changes ownership, a written notice of the transaction must be provided to the executive director. When

applicable, notification shall be in accordance with Chapter 291 of this title (relating to Utility Regulations). Those systems not subject to Chapter 291 of this title shall notify the executive director of changes in ownership by providing the name of the current and prospective owner or responsible official, the proposed date of the transaction, and the address and phone number of the new owner or responsible official. The information listed in this paragraph and the system's public drinking water supply identification number, and any other information necessary to identify the transaction shall be provided to the executive director 120 days before the date of the transaction.

(2) On an annual basis, the owner of a public water system shall provide the executive director with a written list of all the operators and operating companies that the public water system employs. The notice shall contain the name, license number, and license class of each employed operator and the name and registration number of each employed operating company (See §290.47(g) of this title).

(q) Special precautions. Special precautions must be instituted by the water system owner or responsible official in the event of low distribution pressures (below 20 pounds per square inch (psi)), water outages, microbiological samples found to contain *E. coli* or fecal coliform organisms, failure to maintain adequate chlorine residuals, elevated finished water turbidity levels, or other conditions which indicate that the potability of the drinking water supply has been compromised.

(1) Boil water notifications must be issued to the customers within 24 hours using the prescribed notification format as specified in §290.47(e) of this title. A copy of this notice shall be provided to the executive director. Bilingual notification may be appropriate based upon local demographics. Once the boil water notification is no longer in effect, the customers must be notified in a manner similar to the original notice.

(2) The flowchart found in §290.47(h) of this title shall be used to determine if a boil water notification must be issued in the event of a loss of distribution system pressure. If a boil water notice is issued under this section, it shall remain in effect until water distribution pressures in excess of 20 psi can consistently be maintained, a minimum of 0.2 mg/L free chlorine residual or 0.5 mg/L chloramine residual (measured as total chlorine) is present throughout the system, and water samples collected for microbiological analysis are found negative for coliform organisms.

(3) A boil water notification shall be issued if the turbidity of the finished water produced by a surface water treatment plant exceeds 5.0 NTU. The boil water notice shall remain in effect until the water entering the distribution system has a turbidity level below 1.0 NTU, the distribution system has been thoroughly flushed, a minimum of 0.2 mg/L free chlorine residual or 0.5 mg/L chloramine residual (measured as total chlorine) is present throughout the system, and water samples collected for microbiological analysis are found negative for coliform organisms.

(4) Other protective measures may be required at the discretion of the executive director.

(r) Minimum pressures. All public water systems shall be operated to provide a minimum pressure of 35 psi throughout the distribution system under normal operating conditions. The system shall also be operated to maintain a minimum pressure of 20 psi during emergencies such as fire fighting. As soon as safe and practicable following the occurrence of a natural disaster, a public water system that is an affected utility shall maintain a minimum of 35 psi throughout the distribution system during an extended power outage.

(s) Testing equipment. Accurate testing equipment or some other means of monitoring the effectiveness of any chemical treatment or pathogen inactivation or removal processes must be used by the system.

(1) Flow measuring devices and rate-of-flow controllers that are required by §290.42(d) of this title (relating to Water Treatment) shall be calibrated at least once every 12 months. Well meters required by §290.41(c)(3)(N) of this title (relating to Water Sources) shall be calibrated at least once every three years.

(2) Laboratory equipment used for compliance testing shall be properly calibrated.

(A) pH meters shall be properly calibrated.

(i) Benchtop pH meters shall be calibrated according to manufacturers specifications at least once each day.

(ii) The calibration of benchtop pH meters shall be checked with at least one buffer each time a series of samples is run, and if necessary, recalibrated according to manufacturers specifications.

(iii) On-line pH meters shall be calibrated according to manufacturer specifications at least once every 30 days.

(iv) The calibration of on-line pH meters shall be checked at least once each week with a primary standard or by comparing the results from the on-line unit with the results from a properly calibrated benchtop unit. If necessary, the on-line unit shall be recalibrated with primary standards.

(B) Turbidimeters shall be properly calibrated.

(i) Benchtop turbidimeters shall be calibrated with primary standards at least once every 90 days. Each time the turbidimeter is calibrated with primary standards, the secondary standards shall be restandardized.

(ii) The calibration of benchtop turbidimeters shall be checked with secondary standards each time a series of samples is tested, and if necessary, recalibrated with primary standards.

(iii) On-line turbidimeters shall be calibrated with primary standards at least once every 90 days.

(iv) The calibration of on-line turbidimeters shall be checked at least once each week with a primary standard, a secondary standard, or the manufacturer's proprietary calibration confirmation device or by comparing the results from the on-line unit with the results from a properly calibrated benchtop unit. If necessary, the on-line unit shall be recalibrated with primary standards.

(C) Chemical disinfectant residual analyzers shall be properly calibrated.

(i) The accuracy of manual disinfectant residual analyzers shall be verified at least once every 90 [~~30~~] days using chlorine solutions of known concentrations.

~~[*(ii)* Continuous disinfectant residual analyzers shall be calibrated at least once every 90 days using chlorine solutions of known concentrations.]~~

(ii) [~~(iii)~~] The accuracy [~~calibration~~] of continuous disinfectant residual analyzers shall be checked at least once every seven days [~~each month~~] with a chlorine solution of known concentration or by comparing the results from the on-line analyzer with the result of approved benchtop [~~amperometric, spectrophotometric, or titration~~] method in accordance with §290.119 of this title (relating to Analytical Procedures).

(iii) If a disinfectant residual analyzer produces a result which is not within 15% of the expected value, the cause of the

discrepancy must be determined and corrected and, if necessary, the instrument must be recalibrated.

(D) Ultraviolet (UV) light disinfection analyzers shall be properly calibrated.

(i) The accuracy of duty UV sensors shall be verified with a reference UV sensor monthly, according to the UV sensor manufacturer.

(ii) The reference UV sensor shall be calibrated by the UV sensor manufacturer on a yearly basis, or sooner if needed.

(iii) If used, the Ultraviolet Transmittance (UVT) analyzer shall be calibrated weekly according to the UVT analyzer manufacturer specifications.

(E) Systems must verify the performance of direct integrity testing equipment in a manner and schedule approved by the executive director.

(t) System ownership. All community water systems shall post a legible sign at each of its production, treatment, and storage facilities. The sign shall be located in plain view of the public and shall provide the name of the water supply and an emergency telephone number where a responsible official can be contacted.

(u) Abandoned wells. Abandoned public water supply wells owned by the system must be plugged with cement according to 16 TAC [~~Texas Administrative Code (TAC)~~] Chapter 76 (relating to Water Well Drillers and Water Well Pump Installers). Wells that are not in use and are non-deteriorated as defined in those rules must be tested every five years or as required by the executive director to prove that they are in a non-deteriorated condition. The test results shall be sent to the executive director for review and approval. Deteriorated wells must be either plugged with cement or repaired to a non-deteriorated condition.

(v) Electrical wiring. All water system electrical wiring must be securely installed in compliance with a local or national electrical code.

(w) Security. All systems shall maintain internal procedures to notify the executive director by a toll-free reporting phone number immediately of the following events, if the event may negatively impact the production or delivery of safe and adequate drinking water:

(1) an unusual or unexplained unauthorized entry at property of the public water system;

(2) an act of terrorism against the public water system;

(3) an unauthorized attempt to probe for or gain access to proprietary information that supports the key activities of the public water system;

(4) a theft of property that supports the key activities of the public water system; or

(5) a natural disaster, accident, or act that results in damage to the public water system.

(x) Public safety standards. This subsection only applies to a municipality with a population of 1,000,000 or more, with a public utility within its corporate limits.

(1) In this subsection:

(A) "Regulatory authority" means, in accordance with the context in which it is found, either the commission or the governing body of a municipality.

(B) "Public utility" means any person, corporation, cooperative corporation, affected county, or any combination of these persons or entities, other than a municipal corporation, water supply or sewer service corporation, or a political subdivision of the state, except an affected county, or their lessees, trustees, and receivers, owning or operating for compensation in this state equipment or facilities for the transmission, storage, distribution, sale, or provision of potable water to the public or for the resale of potable water to the public for any use or for the collection, transportation, treatment, or disposal of sewage or other operation of a sewage disposal service for the public, other than equipment or facilities owned and operated for either purpose by a municipality or other political subdivision of this state or a water supply or sewer service corporation, but does not include any person or corporation not otherwise a public utility that furnishes the services or commodity only to itself or its employees or tenants as an incident of that employee service or tenancy when that service or commodity is not resold to or used by others.

(C) "Residential area" means:

(i) an area designated as a residential zoning district by a governing ordinance or code or an area in which the principal land use is for private residences;

(ii) a subdivision for which a plat is recorded in the real property records of the county and that contains or is bounded by public streets or parts of public streets that are abutted by residential property occupying at least 75% of the front footage along the block face; or

(iii) a subdivision a majority of the lots of which are subject to deed restrictions limiting the lots to residential use.

(2) When the regulatory authority is a municipality, it shall by ordinance adopt standards for installing fire hydrants in residential areas in the municipality. These standards must, at a minimum, follow current AWWA standards pertaining to fire hydrants and the requirements of §290.44(e)(6) of this title.

(3) When the regulatory authority is a municipality, it shall by ordinance adopt standards for maintaining sufficient water pressure for service to fire hydrants adequate to protect public safety in residential areas in the municipality. The standards specified in paragraph (4) of this subsection are the minimum acceptable standards.

(4) A public utility shall deliver water to any fire hydrant connected to the public utility's water system located in a residential area so that the flow at the fire hydrant is at least 250 gallons per minute for a minimum period of two hours while maintaining a minimum pressure of 20 psi throughout the distribution system during emergencies such as fire fighting. That flow is in addition to the public utility's maximum daily demand for purposes other than firefighting.

(5) When the regulatory authority is a municipality, it shall adopt the standards required by this subsection within one year of the effective date of this subsection or within one year of the date this subsection first applies to the municipality, whichever occurs later.

(6) A public utility shall comply with the standards established by a municipality under both paragraphs (2) and (3) of this subsection within one year of the date the standards first apply to the public utility. If a municipality has failed to comply with the deadline required by paragraph (5) of this subsection, then a public utility shall comply with the standards specified in paragraphs (2) and (4) of this subsection within two years of the effective date of this subsection or within one year of the date this subsection first applies to the public utility, whichever occurs later.

This agency hereby certifies that the proposal has been reviewed by legal counsel and found to be within the agency's legal authority to adopt.

Filed with the Office of the Secretary of State on June 1, 2012.

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Robert Martinez
Director, Environmental Law Division
Texas Commission on Environmental Quality
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For further information, please call: (512) 239-2548

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SUBCHAPTER F. DRINKING WATER STANDARDS GOVERNING DRINKING WATER QUALITY AND REPORTING REQUIREMENTS FOR PUBLIC WATER SYSTEMS

30 TAC §§290.103, 290.109 - 290.112, 290.116, 290.119, 290.122

Statutory Authority

These amendments are proposed under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule; Texas Health and Safety Code (THSC), §341.031(a), which establishes the commission's authority to adopt and enforce rules to implement the federal Safe Drinking Water Act (42 United States Code, §§300f *et seq.);* and THSC, §341.0315, which requires public drinking water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

The proposed amendments implement the federal Ground Water Rule, Total Organic Carbon Rule, and the chlorine residual analyzer Method 334.0, which implement the federal Safe Drinking Water Act.

§290.103. Definitions.

The following definitions shall apply in the interpretation and enforcement of this subchapter. If a word or term used in this subchapter is not contained in the following list, its definition shall be as shown in §290.38 of this title (relating to Definitions) or in [~~Title~~] 40 Code of Federal Regulations (CFR) §141.2. Other technical terms used shall have the meanings or definitions listed in the latest edition of "Glossary, Water and Wastewater Control Engineering," prepared by a joint editorial board representing the American Public Health Association, American Society of Civil Engineers, American Water Works Association, and the Water Pollution Control Federation.

(1) Assessment source monitoring--Raw groundwater source monitoring required by the executive director based on groundwater source susceptibility to fecal contaminants.

(2) Combined distribution system (CDS)--The interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

(A) The executive director may determine that the CDS does not include certain systems based on factors such as providing or receiving a relatively small amount of water or only on an emergency basis.

(B) A public water system may be determined to be in a different CDS for the purposes of compliance with regulations based on the Stage 2 Disinfection Byproducts Rule (DBP2) and the Long Term Stage 2 Enhanced Surface Water Treatment Rule (LT2).

(i) For the purposes of raw water monitoring under LT2, the CDS shall be based on the retail and wholesale population served by each surface water treatment plant or plant treating groundwater under the direct influence of surface water.

(ii) For the purposes of DBP2, the CDS shall be determined based on the retail population served within each individual system's distribution system.

(3) Compliance cycle--The nine-year (calendar year) cycle during which public water systems must monitor. Each compliance cycle consists of three, three-year compliance periods. The first compliance cycle begins January 1, 1993, and ends December 31, 2001. The second begins January 1, 2002, and ends December 31, 2010. The third begins January 1, 2011, and ends December 31, 2019. The cycle continues thereafter in a similar pattern.

(4) Compliance period--A three-year (calendar year) period within a compliance cycle. Each compliance cycle has three, three-year compliance periods. Within the first compliance cycle, the first compliance period is called the initial compliance period and runs from January 1, 1993, to December 31, 1995. The second period from January 1, 1996, to December 31, 1998. The third period from January 1, 1999, to December 31, 2001. Compliance periods in subsequent compliance cycles follow the same pattern.

(5) Comprehensive performance evaluation (CPE)--A thorough review and analysis of a treatment plant's performance-based capabilities and the associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and to emphasize approaches that can be implemented without significant capital improvements. The comprehensive performance evaluation consists of the following components: assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

(6) Consecutive system--A public water system that receives some or all of its finished water from one or more other public water systems.

(7) Disinfection profile--A summary of daily *Cryptosporidium, Giardia lamblia* and viral inactivation obtained through disinfection at the treatment plant.

(8) Disinfection by-products (DBP)--Chemical compounds formed by the reaction of a disinfectant with the natural organic matter present in water.

(9) DPD--Abbreviation for N,N-diethyl-p-phenylenediamine, a reagent used in the determination of several residuals. DPD methods are available for both volumetric (titration) and colorimetric determinations, and are commonly used in the field as part of a colorimetric test kit.

(10) Dual sample set--A set of two samples collected at the same time and same location, with one sample analyzed for total trihalomethanes (TTHM) and the other sample analyzed for haloacetic acids-group of five (HAA5). Dual sample sets are collected for the purposes of conducting an initial distribution system evaluation and determining compliance with the TTHM and HAA5 maximum contaminant levels.

(11) Enhanced coagulation--The removal of disinfection by-product precursors to a specified level by conventional coagulation and sedimentation.

(12) Enhanced softening--The removal of disinfection by-product precursors to a specified level by softening.

(13) Entry point--Any point where a source of treated water first enters the distribution system. Entry points to the distribution system may include points where chlorinated well water, treated surface water, rechlorinated water from storage, or water purchased from another supplier enters the distribution system.

(14) Entry point sampling site--A sampling site representing the quality of the water entering the distribution system at each designated entry point.

(15) Fecal indicators--Microbiological organisms used to indicate the presence of fecal contamination. Examples include; fecal coliform, *E. coli,* enterococci, and coliphage.

(16) Filter assessment--An in-depth evaluation of an individual filter, including the analysis of historical filtered water turbidity from the filter, development of a filter profile, evaluation of media condition, identification and prioritization of factors limiting filter performance, appraisal of the applicability of corrections, and preparation of a filter self-assessment report.

(17) Filter profile--A graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run. The filter profile must include all the data collected from the time that the filter placed into service until the time that the backwash cycle is complete and the filter is restarted. The filter profile must also include data collected as another filter is being backwashed.

(18) Finished water--Water that is introduced into the distribution system of a public water system and intended for distribution and consumption without further treatment, except as necessary to maintain water quality within the distribution system (e.g., booster disinfection, addition of corrosion control chemicals).

(19) Groundwater corrective action--Action required when a raw groundwater source sample is found to be positive for *E. coli* or other fecal indicators as described under §290.116(b) of this title (relating to Groundwater Corrective Actions and Treatment Techniques).

(20) Groundwater corrective action plan--A plan approved by the executive director documenting the steps to be taken to address fecal contamination of a groundwater source as described under §290.116(b) of this title (relating to Groundwater Corrective Actions and Treatment Techniques). The groundwater corrective action plan must be approved within 30 days of being notified of the fecal contamination.

(21) Groundwater system--For the purposes of compliance with §290.109 of this title (relating to Microbial Contaminants) and with §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques), a public water system that provides, uses, or distributes any groundwater except if the groundwater is combined with surface water (or with groundwater under the direct influence of surface water) prior to treatment.

(22) Haloacetic acids (five) (HAA5)--The sum of the monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid concentrations in milligrams per liter, rounded to two significant figures after adding the sum.

(23) Halogen--One of the chemical elements chlorine, bromine, or iodine.

(24) Hydrogeologic sensitivity assessment--A determination of whether groundwater systems obtain water from hydrogeologically sensitive sources.

(25) Locational running annual average (LRAA)--The average of analytical results for samples taken at a specific monitoring location during the previous four calendar quarters.

(26) Maximum contaminant level (MCL)--The maximum concentration of a regulated contaminant that is allowed in drinking water before the public water system is cited for a violation. Maximum contaminant levels for regulated contaminants are defined in the applicable sections of this subchapter.

(27) Maximum residual disinfectant level (MRDL)--The disinfectant concentration that may not be exceeded in the distribution system. There is convincing evidence that addition of a disinfectant is necessary for control of waterborne microbial contaminants.

(28) Minimum acceptable disinfectant residual--The lowest disinfectant concentration allowed in the distribution system for microbial control.

(29) Operational evaluation level (OEL)--Calculated level of TTHM or HAA5, an exceedance of which requires a system to perform an evaluation of factors in the distribution system contributing to disinfection by-product formation and submit an operation evaluation report as described in §290.115(e)(2) of this title (relating to Stage 2 Disinfection Byproducts [~~By-products~~] (TTHM and HAA5)). The OEL at any monitoring location is the sum of the two previous quarters' results plus twice the current quarter's result, divided by 4 to determine an average.

(30) Raw water--Water prior to any treatment including disinfection that is intended to be used, after treatment, as drinking water.

(A) Raw groundwater is water from a groundwater source.

(B) Raw surface water is any water from a surface water source or from a groundwater under the direct influence of surface water source.

(31) Raw groundwater source monitoring [~~sampling~~]--Fecal indicator sampling at untreated groundwater sources including triggered source water and assessment source monitoring.

(32) Significant deficiency--Significant deficiencies cause, or have the potential to cause, the introduction of contamination into water delivered to customers. This could include defects in design, operation, or maintenance of the source, treatment, storage, or distribution systems.

(33) [~~(32)~~] Specific ultraviolet absorption at 254 nanometers (nm) (SUVA)--An indirect indicator of whether the organic carbon in water is humic or non-humic. It is calculated by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV254) (in inverse meters) by its concentration of dissolved organic carbon (DOC) (in milligrams per liter).

(34) [~~(33)~~] Total organic carbon (TOC)--The concentration of total organic carbon, in milligrams per liter, measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures. TOC is a surrogate measure for precursors to formation of disinfection by-products.

(35) [~~(34)~~] Total trihalomethanes (TTHM)--The sum of the chloroform, dibromochloromethane, bromodichloromethane, and bromoform concentrations in milligrams per liter, rounded to two significant figures after summing.

(36) [~~(35)~~] Triggered source water monitoring--Raw groundwater source monitoring required for systems not providing at least 4-log treatment of viruses when a routine distribution coliform sample is positive.

(37) [~~(36)~~] Trihalomethane (THM)--One of the family of organic compounds named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

(38) [~~(37)~~] Wholesale system--A public water system that delivers water to another public water system.

(39) 4-log treatment--At least 99.99% (4-log) treatment of viruses using inactivation, removal, or a executive director-approved combination of 4-log virus inactivation and removal. The 4-log treatment must be able to be properly validated and achieved before the first connection of the specified water source.

§290.109. Microbial Contaminants.

(a) Applicability. All public water systems must produce and distribute water that meets the provisions of this section regarding microbial contaminants.

(b) Maximum contaminant levels (MCL) for microbial contaminants. Treatment techniques and MCL requirements for microbial contaminants are based on detection of those contaminants or fecal indicator organisms.

(1) The MCL for microbial contaminants in the distribution system is based on the presence of total or fecal coliform bacteria in routine, repeat, and increased monitoring distribution samples.

(A) For a system which collects at least 40 routine distribution samples per month, the MCL is defined as when more than 5.0% of samples collected in a month are coliform positive.

(B) For a system which collects fewer than 40 routine distribution samples per month, the MCL is defined as when more than one sample is coliform positive.

(C) The acute MCL is defined as when a repeat sample is fecal coliform or *E. coli* positive; or a total coliform positive repeat sample follows a fecal coliform or *E. coli* positive routine sample.

(2) For systems required to collect raw groundwater samples, the standard is no detection of fecal indicators in a raw groundwater samples.

(c) Monitoring requirements for microbial contaminants. Public water systems shall collect samples for total coliform, fecal coliform, *E. coli,* or other fecal indicator organisms at locations and frequency as directed by the executive director. All compliance samples must be collected during normal operating conditions.

(1) Routine microbial sampling locations. Public water systems shall routinely monitor for microbial contaminants at the following locations.

(A) Public water systems must collect routine distribution coliform samples at active service connections which are representative of water quality throughout the distribution system. Other sampling sites may be used if located adjacent to active service connections.

(B) Public water systems shall collect distribution coliform samples at locations specified in the system's monitoring plan.

(2) Routine distribution coliform sampling frequency. Public water systems must sample for distribution coliform at the following frequency:

(A) Community and noncommunity public water systems must collect routine distribution coliform samples at a frequency based on the population served by the system.

(i) the population for noncommunity systems will be based on the maximum number of persons served on any given day during the month;

(ii) the population of community systems will be based on the data reported during the most recent sanitary survey of the public water system; and

(iii) the minimum sampling frequency for public water systems is shown in the following table.

Figure: 30 TAC §290.109(c)(2)(A)(iii) (No change.)

(B) A public water system which uses surface water or groundwater under the direct influence of surface water must collect routine distribution coliform samples at regular time intervals throughout the month.

(C) A public water system which uses only uses only purchased water or groundwater not under the direct influence of surface water and serves more than 4,900 persons must collect routine distribution coliform samples at regular time intervals throughout the month.

(D) A public water system which uses only purchased water or groundwater not under the direct influence of surface water and serves 4,900 persons or fewer may collect all required routine distribution coliform samples on a single day if they are taken from different sites.

(E) A total coliform-positive sample invalidated under this subsection does not count towards meeting the minimum routine monitoring requirements of this subsection.

(F) If a system collecting fewer than five routine distribution coliform samples per month has one or more total coliform-positive samples and the executive director does not invalidate the sample(s) in accordance with subsection (d)(1) [~~(c)(4)~~] of this section, it must collect at least five routine distribution coliform samples during the next month the system provides water to the public.

(3) Repeat distribution coliform sampling requirements. Systems shall conduct repeat monitoring if one or more of the routine samples is found to contain coliform organisms.

(A) If a routine distribution coliform sample is coliform-positive, the public water system must collect a set of repeat distribution coliform samples within 24 hours of being notified of the positive result, or as soon as possible if the local laboratory is closed.

(i) A system which collects more than one routine distribution coliform sample per month must collect no fewer than three repeat samples for each coliform-positive sample found.

(ii) A system which collects one routine distribution coliform sample per month must collect no fewer than four repeat samples for each coliform-positive sample found.

(B) The system must collect all repeat samples on the same day, except a system with a single service connection may collect daily repeat samples until the required number of repeat samples has been collected.

(C) The system must collect at least one repeat sample from the sampling tap where the original 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 fourth repeat sample is required, it must be collected within five service connections upstream or downstream. If the positive routine sample was collected at the end of the distribution line, one repeat sample must be collected at that point and all other samples must be collected within five connections upstream of that point.

(D) If one or more repeat samples in the set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in subparagraphs (A) - (C) of this paragraph. The additional samples must be collected within 24 hours of being notified of the positive result or as soon as possible if the local laboratory is closed. 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 MCL for total coliforms has been exceeded.

(E) 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 is found to contain total coliform bacteria, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.

(4) Raw groundwater source monitoring. Groundwater systems must comply, unless otherwise noted, with the requirements of this section. Any raw groundwater source sample required under this paragraph must be collected at a location prior to any treatment of the groundwater source and use analytical procedures and methods described in §290.119(b)(10) of this title (relating to Analytical Procedures).

(A) General requirements. A groundwater system must conduct triggered source water monitoring for *E. coli* or other fecal indicators, if both of the following conditions exist.

(i) The system does not provide at least 4-log treatment of viruses (as defined in §290.103(39) of this title (relating to Definitions) before [~~or at~~] the first customer for each groundwater source; and

(ii) The system is notified that a routine distribution coliform sample is positive and the sample is not invalidated under subsection (d)(1) of this section [~~paragraph (5) of this subsection~~].

(B) Sampling requirements. A groundwater system must collect, within 24 hours of notification of the routine distribution total coliform-positive [~~coliform positive~~] sample, at least one raw groundwater source *E. coli* (or other approved fecal indicator) sample from each groundwater source in use at the time the distribution coliform-positive sample was collected.

(i) The executive director may extend the 24-hour time limit on a case-by case basis if the system cannot collect the raw groundwater source sample within 24 hours due to circumstances beyond its control.

(ii) If approved by the executive director and documented in the system's monitoring plan, systems with more than one groundwater source may be allowed to sample a representative groundwater source or sources. Systems must modify their current monitoring plan to identify one or more groundwater sources that are representative of each distribution coliform sampling site and is intended to be used for representative source sampling.

(iii) A groundwater system serving 1,000 people or fewer may use one of the four required repeat samples collected from a raw groundwater source to meet both the repeat requirements of subparagraph (A)(ii) of this paragraph and the triggered raw source monitoring requirements in this paragraph. If a required repeat sample is used to meet both requirements and found to be *E. coli* positive, the system will have achieved an acute MCL as defined in subsection (b)(1)(C) of this section and corrective action will be required for the groundwater source were the sample was found to be *E. coli* positive.

(C) Consecutive and wholesale systems. Consecutive groundwater systems receiving drinking water from a wholesaler must notify the wholesale system(s) within 24 hours of being notified of the positive coliform distribution sample. The wholesale groundwater system(s) must comply with the following:

(i) A wholesale groundwater system that receives notice of a distribution coliform sample positive from a consecutive system it serves must collect a sample from each of its groundwater sources within 24 hours of the notification and analyze each sample for the presence of *E. coli.*

(ii) If any raw source sample is *E. coli* positive, the wholesale groundwater system must notify all consecutive systems served by that groundwater source of the fecal indicator positive within 24 hours of being notified. The wholesale system and all consecutive systems served by that groundwater source must notify their water system customers in accordance with subsection (g)(2) of this section.

(D) Exceptions to the triggered source monitoring requirements. A groundwater system is not required to comply with the triggered source monitoring requirements if any of the following conditions exist.

(i) The executive director determines and documents in writing, that the distribution coliform positive sample is caused by a distribution system deficiency; or

(ii) The distribution coliform positive sample is collected at a location that meets the distribution coliform sample invalidation criteria as specified in subsection (d)(1) of this section and the replacement sample is negative for coliforms [~~paragraph (5) of this subsection~~].

(E) Assessment source monitoring. The executive director may require monthly source assessment raw monitoring without the presence of a positive total coliform distribution sample if well conditions exist that indicate the groundwater may be susceptible to fecal contamination. The executive director may conduct a hydrogeological sensitivity assessment to determine if the source is susceptible to fecal contamination. If requested by the executive director, groundwater systems must provide the executive director with any existing information that will enable the executive director to perform a hydrogeological sensitivity assessment. A groundwater system conducting assessment source monitoring may use a triggered source sample collected under subparagraph (B) of this paragraph to meet the assessment source monitoring requirement. Additionally, an assessment source monitoring sample may be used as a triggered source monitoring sample if collected within 24 hours of notification of the coliform-positive distribution sample. Assessment source monitoring requirements may include:

(i) Source monitoring, collected in a manner described in §290.119(b)(10) of this title, for a period of 12 months that represents each month that the system provides groundwater to the public from the raw groundwater source or such time period as specified by the executive director.

(ii) Collection of samples from each well unless the system has an approved triggered source monitoring plan under subparagraph (B)(ii) of this paragraph.

(5) Culture analysis. If any routine or repeat sample is total coliform-positive, that total coliform-positive culture medium will be analyzed to determine if fecal coliforms or bacteria are present. If fecal coliforms or *E. coli* are present, the system must notify the executive director by the end of the day in accordance with subsection (g) of this section.

(d) Analytical and invalidation requirements for microbial contaminants. Analytical procedures shall be performed in accordance with §290.119 of this title [~~(relating to Analytical Procedures)~~]. Testing for microbial contaminants shall be performed at a laboratory certified by the executive director.

(1) Distribution coliform sample invalidation. The executive director may invalidate a distribution total coliform-positive sample if one of the following conditions is met.

(A) The executive director may invalidate a sample if the laboratory provides written notice that improper sample analysis caused the total coliform-positive result.

(B) The executive director may invalidate a sample if the results of repeat samples collected as required by this section determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The executive director 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. Under those circumstances, the system may cease resampling and request that the executive director invalidate the sample. The system must provide copies of the routine positive and all repeat samples.

(C) The executive director may invalidate a sample if there are substantial grounds to believe that the total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system must still collect all repeat samples required by this section, and use them to determine compliance with the MCL for total coliforms in subsection (f) of this section. The system must provide written documentation which must state the specific cause of the total coliform-positive sample, and the action the system has taken, or will take, to correct this problem. The executive director may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

(D) The executive director may invalidate a sample if the laboratory provides written notice that the sample was unsuitable for analysis.

(E) If a sample is invalidated by the laboratory, the system must collect another sample from the same location as the original sample within 24 hours of being notified, or as soon as possible if the laboratory is closed, and have it analyzed for the presence of total coliform. The system must continue to resample within 24 hours and have the samples analyzed until it obtains a valid result.

(2) A groundwater system may obtain invalidation of a fecal indicator positive groundwater source sample if the conditions of subparagraphs (A) and (B) of this paragraph apply. If the executive director invalidates a fecal indicator positive groundwater source sample, the system must collect another source sample as specified in subsection (c)(4) of this section within 24 hours of being notified of the invalidation.

(A) Notice from the laboratory must document that improper sample analysis occurred. If a laboratory invalidates a sample, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the invalidated sample, and have it analyzed for the presence of *E. coli.* The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. If approved by the executive director, the 24-hour time limit may be extended.

(B) The executive director may invalidate the sample if the system provides written documentation that there is substantial evidence that a fecal indicator positive groundwater source sample is not related to source water quality. If the executive director invalidates a sample, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the invalidated sample, and have it analyzed for the presence of *E. coli.*

(e) Reporting requirements for microbial contaminants. Upon the request of the executive director, the owner or operator of a public water system must provide the executive director with a copy of the results of any test, measurement, or analysis required by this subsection. The copies must be submitted within ten days of the request or within ten days of their receipt by the public water system, whichever is later. The copies must be mailed to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087.

(f) Compliance determination for microbial contaminants. Compliance with the requirements of this section shall be determined using the following criteria each month that the system is in operation.

(1) A system commits an acute MCL violation if:

(A) A repeat distribution system sample is fecal coliform-positive or *E. coli*-positive; or

(B) A total coliform-positive repeat distribution system sample follows a fecal coliform-positive or *E. coli*-positive routine distribution system sample.

(2) A system that collects at least 40 routine distribution coliform samples per month commits a nonacute MCL violation if more than 5.0% of the samples collected during a month are total coliform-positive, but none of the initial or repeat samples are fecal coliform-positive or *E. coli*-positive.

(3) A system that collects fewer than 40 routine distribution coliform samples per month commits a nonacute MCL violation if more than one sample collected during a month is total coliform-positive, but none of the initial or repeat samples are fecal coliform-positive or *E. coli*-positive.

(4) A public groundwater system that is required to collect raw source samples[~~, commits a treatment technique violation if any source sample is found to be positive for *E. coli* or other approved fecal indicator. A public groundwater system~~] is required to conduct corrective action as described in §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques) and is required to provide public notification in accordance with §209.122(a) of this title (relating to Public Notification) if a source sample is confirmed positive for *E. coli* or other approved fecal indicators.

(5) A public water system that fails to provide the required number of suitable distribution coliform samples commits a monitoring violation.

(6) A public water system that fails to monitor in accordance with the requirements of subsection (c)(4) of this section commits a monitoring violation and must provide public notification in accordance to §290.122 of this title [~~provide the required number of suitable raw source samples commits a monitoring violation~~].

(7) A public water system that fails to report the results of the monitoring tests required by this section commits a reporting violation.

(8) A public water system that fails to do a required public notice or certify that notification has been performed commits a public notice reporting violation.

(9) Results of all routine and repeat distribution coliform samples not invalidated by the executive director must be included in determining compliance with the MCL for total coliforms.

(10) Distribution coliform samples invalidated by the executive director shall not be included in determining compliance with the MCL for total coliforms.

(11) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for microbiological contaminants.

(g) Public notification for microbial contaminants. A system that is out of compliance with the requirements described in this section must notify the public using the procedures described in §290.122 of this title [~~(relating to Public Notification)~~] for microbial contamination.

(1) A public water system that commits an acute MCL violation for microbial contaminants must notify the water system customers in accordance with the boil water notice requirements of §290.46(q) of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems) and the public notice requirements of §290.122(a) of this title.

(2) A public groundwater system that receives an [a] *E. coli* or other fecal indicator positive source sample that has not been invalidated by the executive director, or a notice of an *E. coli* or other fecal indicator positive source sample from a wholesale system, including consecutive systems, must notify the water system customers within 24-hours in accordance with the requirements of §290.122(a) [~~§290.122(a)(1)(F)~~] of this title and include notice in the next Consumer Confidence Report for community systems or provide as a special notice for noncommunity systems in accordance with §290.272(g)(7) of this title (relating to Content of the Report) for community water systems and §290.116(f)(2) of this title for noncommunity systems. Consecutive systems must issue public notice in accordance with §290.122(g) of this title. The system must continue to notify the public annually until the fecal contamination in the source water is determined by the executive director to be corrected as specified under §290.116 of this title.

(3) A public water system that has fecal coliforms or *E. coli* present must notify the executive director 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 commission's office is closed, in which case the system must notify the executive director before the end of the next business day.

(4) A public water system which commits an MCL violation must report the violation to the executive director immediately after it learns of the violation, but no later than the end of the next business day, and notify the public in accordance with §290.122(b) of this title.

(5) A public water system which has failed to comply with a coliform monitoring requirement must report the monitoring violation to the executive director within ten days after the system discovers the violation and notify the public in accordance with §290.122(c) of this title.

§290.110. Disinfectant Residuals.

(a) Applicability. All public water systems shall properly disinfect water before it is distributed to any customer and shall maintain acceptable disinfectant residuals within the distribution system.

(b) Minimum and maximum acceptable disinfectant concentrations. Public water systems shall provide the minimum levels of disinfectants in accordance with the provisions of this section. Public water systems shall not exceed the maximum residual disinfectant levels (MRDLs) provided in this section.

(1) The disinfection process used by public water systems must ensure that water has been adequately disinfected before it enters the distribution system.

(A) The disinfection process used by public water systems treating surface water sources or groundwater sources that are under the direct influence of surface water must meet the requirements of §290.111(d) of this title (relating to Surface Water Treatment).

(B) The executive director may require the disinfection process used by public water systems treating groundwater sources that are not under the direct influence of surface water to meet the requirements of §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques).

(C) The disinfection process at other types of treatment plants shall provide the level of disinfection required by the executive director.

(2) The residual disinfectant concentration in the water entering the distribution system shall be at least 0.2 milligram per liter (mg/L) free chlorine or 0.5 mg/L chloramine.

(3) The chlorine dioxide residual of the water entering the distribution system shall not exceed an MRDL of 0.8 mg/L.

(4) The residual disinfectant concentration in the water within the distribution system shall be at least 0.2 mg/L free chlorine or 0.5 mg/L chloramine.

(5) The running annual average of the free chlorine or chloramine residual of the water within the distribution system shall not exceed an MRDL of 4.0 mg/L.

(c) Monitoring requirements. Public water systems shall monitor the performance of the disinfection facilities to ensure that appropriate disinfectant levels are maintained. All monitoring conducted pursuant to the requirements of this section must be conducted at sites designated in the public water system's monitoring plan.

(1) Public water systems that treat surface water or groundwater under the direct influence of surface water must verify that they meet the disinfection requirements of subsection (b)(2) of this section.

(A) Public water systems that treat surface water or groundwater under the direct influence of surface water and sell treated water on a wholesale basis or serve more than 3,300 people must continuously monitor and record the disinfectant residual of the water entering the distribution system. If there is a failure in the continuous monitoring equipment, grab sampling every four hours may be conducted in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(B) Public water systems that treat surface water or groundwater under the direct influence of surface water, serve 3,300 or fewer people and do not sell treated water on a wholesale basis must monitor and record the disinfectant residual of the water entering the distribution system with either continuous monitors or grab samples.

(i) If a system uses grab samples, the samples must be collected on an ongoing basis at the frequency prescribed in the following table.

Figure: 30 TAC §290.110(c)(1)(B)(i) (No change.)

(ii) The grab samples cannot be taken at the same time and the sampling interval is subject to the executive director's review and approval.

(iii) Treatment plants that use grab samples and fail to detect an appropriate disinfectant residual must repeat the test at four-hour or shorter intervals until compliance has been reestablished.

(2) Public water systems that treat groundwater or that purchase and resell treated water must, upon the request of the executive director, verify that they meet the disinfection requirements of subsection (b)(2) of this section.

(3) Each treatment plant using chlorine dioxide must monitor and record the chlorine dioxide residual of the water entering the distribution system at least once each day. If the chlorine dioxide residual in the water entering the distribution system exceeds the MRDL contained in subsection (b)(3) of this section, the treatment plant must conduct additional tests.

(A) If the public water system does not have additional chlorination facilities in the distribution system, it must conduct three additional tests at the service connection nearest the treatment plant where an elevated chlorine dioxide residual was detected. The first additional test must be conducted within two hours after detecting an elevated chlorine dioxide residual at the entry point to the distribution system. The two subsequent tests must be conducted at six-hour to eight-hour intervals thereafter.

(B) If the public water system has additional chlorination facilities in the distribution system, it must conduct an additional test at the service connection nearest the treatment plant where an elevated chlorine dioxide residual was detected, an additional test at the first service connection after the point where the water is rechlorinated, and an additional test at a location in the far reaches of the distribution system. The additional test at the location nearest the treatment plant must be conducted within two hours after detecting an elevated chlorine dioxide residual at the entry point to the distribution system. The two other tests must be conducted at six-hour to eight-hour intervals thereafter.

(4) Public water systems shall monitor the disinfectant residual at various locations throughout the distribution system.

(A) Public water systems that use groundwater or purchased water sources only and serve fewer than 250 connections and fewer than 750 people daily, must monitor the disinfectant residual at representative locations in the distribution system at least once every seven days.

(B) Public water systems that serve at least 250 connections or at least 750 people daily, and use only groundwater or purchased water sources must monitor the disinfectant residual at representative locations in the distribution system at least once per day.

(C) Public water systems using surface water sources or groundwater under the direct influence of surface water must monitor the disinfectant residual tests at least once per day at representative locations in the distribution system.

(D) All public water systems must monitor the residual disinfectant concentration each time that a bacteriological sample is collected, as specified in §290.109 of this title (relating to Microbial Contaminants).

(d) Analytical requirements. All monitoring required by this section must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(1) The free chlorine or chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L. Samples tested using a colorimetric method must be analyzed using a colorimeter; spectrophotometer; or, with the written permission of the executive director, a color comparator. [~~using one of the following methods:~~]

[~~(A) Amperometric titration;~~]

[~~(B) N,N-diethyl-p-phenylenediamine (DPD) Ferrous titration;~~]

[~~(C) DPD colorimetric; or~~]

~~*[(i)* The free chlorine residual within the treatment plant and at the point where the treated water enters the distribution system must be measured with a colorimeter or spectrophotometer.]~~

~~*[(ii)* The free chlorine residual within the distribution system must be measured with a colorimeter, spectrophotometer, or color comparator test kit.]~~

[~~(D) Springaldizine (FACTS).~~]

[~~(2) The chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L using one of the following methods:~~]

[~~(A) Amperometric titration;~~]

[~~(B) DPD Ferrous titration; or~~]

[~~(C) DPD colorimetric.~~]

~~*[(i)* The chloramine residual within the treatment plant and at the point where the treated water enters the distribution system must be measured with a colorimeter or spectrophotometer.]~~

~~*[(ii)* The chloramine residual within the distribution system must be measured with a colorimeter, spectrophotometer, or color comparator test kit.]~~

(2) [~~(3)~~] The chlorine dioxide residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using one of the following methods:

(A) the amperometric titration method using a titrator with platinum-platinum electrodes;

(B) the spectrophotometric Lissamine Green B method, or

(C) with the written permission of the executive director, the DPD-glycine method using a colorimeter or spectrophotometer.

(e) Reporting requirements. Any owner or operator of a public water system subject to the provisions of this section is required to report to the executive director the results of any test, measurement, or analysis required by this section.

(1) Systems exceeding the MRDL for chlorine dioxide in subsection (b)(3) of this section must report the exceedance to the executive director within 24 hours of the event.

(2) Public water systems that use surface water sources or groundwater sources under the direct influence of surface water must submit a Surface Water Monthly Operating Report (commission Form 0102C) or a Surface Water Monthly Operating Report for 2-Filter Plants (commission Form 0103) each month.

(3) Public water systems that use chlorine dioxide must submit a Chlorine Dioxide Monthly Operating Report (commission Form 0690) each month.

(4) Public water systems that use purchased water or groundwater sources only must complete a Disinfection Level Quarterly Operating Report (DLQOR, commission Form 20067) each quarter.

(A) Community and nontransient noncommunity public water systems must submit the Disinfection Level Quarterly Operating Report each quarter, by the tenth day of the month following the end of the quarter.

(B) Transient noncommunity public water systems must retain the Disinfection Level Quarterly Operating Reports and must provide a copy if requested by the executive director.

(5) Monthly and quarterly reports required by this section must be submitted to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(f) Compliance determinations. Compliance with the requirements of this section shall be determined using the following criteria.

(1) All samples used for compliance must be obtained at sampling sites designated in the monitoring plan.

(A) All samples collected at sites designated in the monitoring plan as microbiological and disinfectant residual monitoring sites shall be included in the compliance determination calculations.

(B) Samples collected at sites in the distribution system not designated in the monitoring plan shall not be included in the compliance determination calculations.

(2) A public water system that fails to conduct the monitoring tests required by this section commits a monitoring violation.

(3) A public water system that fails to report the results of the monitoring tests required by this section commits a reporting violation.

(4) A public water system that uses surface water sources or groundwater sources under the direct influence of surface water and fails to meet the requirements of subsection (b)(2) of this section for a period longer than four consecutive hours commits a nonacute treatment technique violation. A public water system that fails to conduct the additional testing required by subsection (c)(1)(B)(iii) of this section also commits a nonacute treatment technique violation.

(5) A public water system that uses chlorine dioxide and exceeds the level specified in subsection (b)(3) of this section violates the MRDL for chlorine dioxide.

(A) If a public water system violates the MRDL for chlorine dioxide and any of the three additional distribution samples exceeds the MRDL, the system commits an acute MRDL violation for chlorine dioxide.

(B) If a public water system violates the MRDL for chlorine dioxide and fails to collect each of the three additional distribution samples required by subsection (c)(3) of this section, the system commits an acute MRDL violation for chlorine dioxide.

(C) If a public water system violates the MRDL for chlorine dioxide but none of the three additional distribution samples violates the MRDL, the system commits a nonacute MRDL violation for chlorine dioxide.

(6) A public water system that fails to meet the requirements of subsection (b)(4) of this section, in more than 5.0% of the samples collected each month, for any two consecutive months, commits a nonacute treatment technique violation. Specifically, the system commits a nonacute violation if the value "V" in the following formula exceeds 5.0% per month for any two consecutive months:
Figure: 30 TAC §290.110(f)(6) (No change.)

(7) A public water system violates the MRDL for chlorine or chloramine if, at the end of any quarter, the running annual average of monthly averages exceeds the level specified in subsection (b)(5) of this section.

(8) Notwithstanding the MRDLs listed in subsection (b) of this section, operators shall increase residual disinfectant levels of chlorine or chloramines (but not chlorine dioxide) in the distribution system to a level and for a time necessary to protect public health to address specific microbiological contamination problems caused by circumstances such as distribution line breaks, storm runoff events, source water contamination, or cross-connections.

(9) If a public water system's failure to monitor makes it impossible to determine compliance with the MRDL for chlorine or chloramines, the system commits an MRDL violation for the entire period covered by the annual average.

(10) A public water system that fails to issue a required public notice or certify that it has issued that notice commits a violation.

(g) Public notification requirements. The owner or operator of a public water system that violates the requirements of this section must notify the executive director and the people served by the system.

(1) A public water system that fails to meet the requirements of subsection (b)(3) of this section, shall notify the executive director within 24 hours of the event and the customers in accordance with the requirements of §290.122 of this title (relating to Public Notification).

(A) A public water system that has an acute violation of the MRDL for chlorine dioxide must notify the customers in accordance with the requirements of §290.122(a) of this title.

(B) A public water system that has a non-acute violation of the MRDL for chlorine dioxide must notify the customers in accordance with the requirements of §290.122(b) of this title.

(2) A public water system that uses surface water sources or groundwater sources under the direct influence of surface water and fails to meet the minimum disinfection requirements of subsection (b)(2) of this section shall notify the executive director by the end of the next business day and the customers in accordance with the requirements of §290.122(b) of this title.

(3) A public water system that fails to meet the requirements of subsection (b)(4) of this section in more than 5.0% of the samples collected each month for two consecutive months must notify its customers.

(A) A public water system that uses surface water or groundwater under the direct influence of surface water must notify its customers in accordance with the requirements of §290.122(b) of this title.

(B) A public water system that uses only groundwater or purchased water must notify its customers when it issues its annual consumer confidence report.

(4) A public water system that fails to meet the requirements of subsection (b)(5) of this section shall notify the executive di-

rector by the end of the next business day and the customers in accordance with the requirements of §290.122(b) of this title.

(5) A public water system which fails to conduct the monitoring required by this section must notify its customers of the violation in accordance with the requirements of §290.122(c) of this title.

§290.111. Surface Water Treatment.

(a) Applicability. A public water system that treats surface water or groundwater under the direct influence of surface water must comply with the requirements of this section.

(1) A public water system that treats surface water must comply with the requirements of this section beginning on the effective date of the rule.

(2) A public water system that treats groundwater under the direct influence of surface water must comply with the requirements of this section beginning on a date specified by the executive director. This compliance date shall not exceed 18 months from the date that the executive director first notifies the system that the groundwater source is under the direct influence of surface water.

(3) A public water system that treats both surface water and groundwater under the direct influence of surface water must meet the compliance date in paragraph (1) of this subsection at plants that treat any surface water and must meet the compliance date in paragraph (2) of this subsection at plants that treat only groundwater under the direct influence of surface water.

(b) Raw surface water monitoring. A public water system that treats surface water or groundwater under the direct influence of surface water must conduct at least two rounds of special raw surface water monitoring at each surface water intake and at each well producing groundwater under the direct influence of surface water for the purpose of establishing minimum treatment technique requirements for *Cryptosporidium* and other pathogens. The executive director may waive the raw surface water monitoring requirements for an intake or a well if the combination of pathogen removal and disinfection processes used to treat the raw water achieves at least a 5.5-log total removal and inactivation of *Cryptosporidium parvum.*

(1) Raw water monitoring plans. A system must submit a proposed raw surface water monitoring plan when requested by the executive director. The proposed plan must identify all of the system's intakes and wells; provide the location of each raw water sampling point; include the parameters that will be monitored and the frequency and dates that samples will be collected; and specify the laboratories that will perform the analyses. Raw surface water monitoring must be conducted in accordance with a monitoring plan that has been approved by the executive director. The executive director shall not approve a raw surface water monitoring plan unless it indicates that the system will meet the requirements of 40 Code of Federal Regulations (CFR) §§141.701 - 141.707.

(2) Sampling location. A system must collect each raw water sample at a location approved by the executive director. Samples must be collected from the raw water line prior to any treatment and before the first point where a recycled stream is returned to the treatment process.

(3) Sampling parameters and frequency. A system must collect raw water samples at a frequency approved by the executive director.

(A) Unless the executive director approves an alternate sampling regimen, a system must monitor turbidity, *E. coli,* and *Cryptosporidium* levels in the raw water at least once each month for a period of not less than 24 consecutive months if the system:

(i) serves at least 10,000 people; or

(ii) is part of combined distribution system in which one or more systems serve at least 10,000 people and the system with the well or intake regularly provides water to another public water supply.

(B) A system that is not required to monitor under subparagraph (A) of this paragraph must either monitor in accordance with the requirements of subparagraph (A) of this paragraph or monitor *E. coli* levels in their raw water at least once every two weeks for a period of not less than 12 consecutive months. A system that does not initially monitor for *Cryptosporidium* and has elevated *E. coli* levels must conduct additional raw water monitoring.

(i) A system must conduct additional monitoring if the average *E. coli* level exceeds 50 colony-forming units per 100 milliliters in the raw water produced by a surface water intake located on a river or flowing stream or the raw water from a well producing groundwater under the direct influence of surface water located closest to a river or flowing stream.

(ii) A system must conduct additional monitoring if the average *E. coli* level exceeds 10 colony-forming units per 100 milliliters in the raw water from a surface water intake not located on a river or flowing stream or the raw water produced by a well producing groundwater under the direct influence of surface water not located on a river or flowing stream.

(iii) A system that must conduct additional monitoring must monitor *Cryptosporidium* levels in the raw water at least twice each month for a period of not less than 12 consecutive months, or at least once each month for a period of not less than 24 consecutive months.

(C) The executive director may approve an alternate sampling frequency for intakes and wells that operate only part of the year.

(4) Sampling schedule and dates. A system must collect raw water samples in accordance with a schedule approved by the executive director.

(A) Except as provided in subparagraph (B) of this paragraph, a system must begin each round of raw source water monitoring no later than the date shown in the following table titled "Raw Source Water Monitoring Schedule."
Figure: 30 TAC §290.111(b)(4)(A) (No change.)

(B) If a system installs a new well or intake after the date the first round of raw source water monitoring must begin, the system must:

(i) submit a proposed monitoring schedule for the first round of special raw surface water monitoring no later than three months after first placing the new source in operation; and

(ii) begin the second round of special raw surface water monitoring no later than six years after initial bin classification.

(C) A system must collect a raw water sample no sooner than two days before the date approved by the executive director and no later than two days after the approved date, unless an extreme condition or situation exists that poses a danger to the sample collector.

(D) A system which is unable to collect a sample within this five-day period must collect the sample as close as possible to the approved date and must notify the executive director in writing why the sample was not collected on the approved date.

(5) Replacement samples. If, for any reason, the laboratory is unable to report a valid analytical result for a scheduled sample, the system must submit a replacement sample on a date approved by the executive director.

(6) Analytical requirements. Raw water samples collected pursuant to this subsection must be analyzed at an approved or accredited laboratory.

(A) *Cryptosporidium* samples must be analyzed using one of the methods approved in 40 CFR §141.704(a) and by a laboratory that is approved under United States Environmental Protection Agency's (EPA) Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water.

(B) *E. coli* samples must be analyzed using one of the methods approved in 40 CFR §136.3(a) for the enumeration of *E. coli* in source water and by a laboratory that is certified or accredited by the executive director.

(i) Systems must ensure that samples are maintained between 0 degrees C and 10 degrees C [~~0° C and 10° C~~] during storage and transportation to the laboratory.

(ii) The time between sample collection and the initiation of the analysis may not exceed 30 hours without the prior approval of the executive director.

(iii) The executive director may allow up to 48 hours between sample collection and the initiation of the analysis if the analysis is conducted by the Colilert reagent version of Standard Method 9223B.

(C) Turbidity samples must be analyzed using a method and at a laboratory approved by the executive director.

(7) Reporting requirements for raw surface water sample results. The owner or operator of a public water system must provide to the executive director with a copy of the results of any test, measurement, or analysis required by this subsection.

(A) Results must be submitted using the Raw Surface Water Sampling Report (commission Form 20358) or in another format that is approved by the executive director and contains the information required by 40 CFR §141.706(e).

(i) If the sample was not collected within the five-day window described in paragraph (4)(C) of this subsection, the result must be accompanied by the information required in paragraph (4)(D) of this subsection.

(ii) If the laboratory report indicates that a valid analytical result could not be reported, the laboratory report must be accompanied by a request to collect a replacement sample.

(B) The results must be submitted within ten days of their receipt by the public water system and no later than 10 days after the end of the first month following the month that the sample was collected.

(C) The results and any additional information must be mailed to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087.

(c) Treatment technique requirements. A system that treats surface water or groundwater under the direct influence of surface water must meet minimum treatment technique requirements before the water reaches the entry point to the distribution system.

(1) The combination of pathogen removal and disinfection processes used by a public water system must achieve at least a 4.0-log removal/inactivation of viruses.

(2) The combination of pathogen removal and disinfection processes used by a public water system must achieve at least a 3.0-log removal/inactivation of *Giardia lamblia.*

(3) A public water system that is required by subsection (b) of this section to conduct raw surface water monitoring must comply with the requirements of this paragraph.

(A) The average *Cryptosporidium* level and Bin Classification shall be determined in accordance with the requirements established by 40 CFR §141.710.

(i) For systems that collect a total of at least 48 *Cryptosporidium* samples, the average concentration is equal to the arithmetic mean of all sample concentrations.

(ii) For systems that collect a total of at least 24 samples, but not more than 47 *Cryptosporidium* samples, the average concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

(iii) For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the average concentration is equal to the arithmetic mean of all sample concentrations.

(iv) For systems with plants operating only part of the year that monitor fewer than 12 months per year under 40 CFR §141.701(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

(v) If the monthly *Cryptosporidium* sampling frequency varies, systems must first calculate a monthly average for each month of monitoring. Systems must then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs.

(B) Unless otherwise specified in this paragraph, the combination of pathogen removal and disinfection processes must achieve the removal/inactivation of *Cryptosporidium parvum* specified in the following table titled "Treatment Technique Requirements for *Cryptosporidium,"* beginning 36 months after being assigned a Bin Classification by the executive director.
Figure: 30 TAC §290.111(c)(3)(B) (No change.)

(i) A system that conducts the first round of special raw surface water monitoring according to the schedule contained in subsection (b)(4)(A) of this section must comply with the requirements of this paragraph no later than the date shown in the following table, titled "Compliance Date for Existing Sources."
Figure: 30 TAC §290.111(c)(3)(B)(i) (No change.)

(ii) A system that conducts the first round of special raw surface water monitoring according to the schedule contained in subsection (b)(4)(B)(i) of this section must comply with the requirements of this paragraph no later than six years after beginning the first round of monitoring on the new source.

(iii) The executive director may allow a system making capital improvements an additional two years to comply with the treatment requirement of this paragraph.

(C) A system that has been assigned to Bin 3 or Bin 4 must achieve at least 1.0-log removal/inactivation of *Cryptosporidium* using one or a combination of the following: bag filters, cartridge filters, chlorine dioxide, membranes, ozone, or ultraviolet light (UV).

(D) Prior to the effective date of subparagraph (B) of this paragraph, the combination of disinfection and filtration processes

used by a public water system to treat for *Cryptosporidium* must achieve at least a 2.0-log removal/inactivation of *Cryptosporidium parvum.*

(4) The combination of disinfection and filtration processes at plants that do not monitor each source in accordance with the requirements of subsection (b) of this section must achieve at least a 5.5-log removal/inactivation of *Cryptosporidium parvum.*

(5) The executive director may require additional levels of treatment in cases of poor source water quality.

(6) The executive director may establish minimum design, operational, and reporting requirements for watershed control programs and treatment processes used to meet the treatment technique requirements of this subsection.

(d) Microbial inactivation requirements. A system that treats surface water or groundwater under the direct influence of surface water must meet minimum disinfection requirements before the water is supplied to any consumer.

(1) Inactivation table. The disinfection process must achieve the minimum microbial inactivation levels shown in the following table.
Figure: 30 TAC §290.111(d)(1) (No change.)

(A) The disinfection process at treatment plants not described in the Microbial Inactivation Requirements table must provide the level of disinfection required by the executive director.

(B) The executive director may require additional levels of treatment in cases of poor source water quality.

(C) The executive director may reduce the inactivation requirement for plants that meet the individual filter effluent performance criteria contained in subsection (g)(1) of this section and have been assigned a Bin 1 classification under the provisions of subsection (c)(3) of this section.

(D) A system that fails to meet the inactivation requirements of this section for a period of longer than four consecutive hours commits a nonacute treatment technique violation. A system that fails to conduct the additional testing required by paragraph (2)(C) of this subsection also commits a nonacute treatment technique violation.

(E) A system that has a plant assigned a Bin 2, 3, or 4 classification under the provisions of subsection (c)(3) of this section and uses UV disinfection facilities to meet the treatment technique requirements for *Cryptosporidium* must meet the inactivation requirements of this subsection in at least 95% of the water treated each month.

(2) Monitoring requirements for chemical disinfectants. Public water systems must monitor the performance of the disinfection facilities to ensure that appropriate disinfectant levels are maintained. All monitoring conducted pursuant to the requirements of this subsection must be conducted at sites designated in the public water system's monitoring plan.

(A) The disinfectant residual, pH, temperature, and flow rate of the water in each disinfection zone must be measured at least once each day during a time when peak hourly raw water flow rates are occurring.

(B) Disinfection contact time will be based on tracer study data or a theoretical analysis submitted by the system owner or their designated agent and approved by the executive director and the actual flow rate that is occurring at the time that monitoring occurs.

(C) Treatment plants that fail to demonstrate an appropriate level of treatment must repeat these tests at four-hour or shorter intervals until compliance has been reestablished.

(3) Monitoring requirements for UV disinfection facilities. Public water systems must monitor the performance of the UV disinfection facilities.

(A) A system must continuously monitor and record UV intensity as measured by a UV sensor, lamp status, the flow rate through the unit, and other parameters prescribed by the executive director to ensure that the units are operating within validated conditions.

(B) A system with a plant that has been assigned a Bin 2, 3, or 4 classification under the provisions of subsection (c)(3) of this section must also monitor and record the amount of water treated by each UV unit each month and the amount of water produced each month when the unit was not operating within validated conditions.

(4) Analytical requirements. All monitoring required by this subsection must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(A) The pH analysis must be conducted using a pH meter with a minimum accuracy of plus or minus 0.1 pH units.

(B) The temperature of the water must be measured using a thermometer or thermocouple with a minimum accuracy of plus or minus 0.5 degrees Celsius.

(C) The free chlorine or chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 milligrams per liter (mg/L). Samples tested using a colorimetric method must be analyzed using a colorimeter; spectrophotometer; or, with the written permission of the executive director, a color comparator. [~~using one of the following methods:~~]

~~*[(i)* Amperometric titration;]~~

~~*[(ii)* DPD Ferrous titration;]~~

~~*[(iii)* a DPD method that uses a colorimeter or spectrophotometer; or]~~

~~*[(iv)* Springaldizine (FACTS).]~~

~~[(D) The chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L using one of the following methods:]~~

~~*[(i)* Amperometric titration;]~~

~~*[(ii)* DPD Ferrous titration; or]~~

~~*[(iii)* a DPD method that uses a colorimeter or spectrophotometer.]~~

(D) [~~(E)~~] The chlorine dioxide residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using one of the following methods:

(i) Amperometric titrator with platinum-platinum electrodes; or

(ii) Lissamine Green B.

(E) [~~(F)~~] The ozone residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using the Indigo Method and using a colorimeter or spectrophotometer.

(F) [~~(G)~~] The UV dose must be measured by a calibrated sensor approved by the executive director.

(e) Filtration requirements for conventional filters. A system that uses granular media filters to treat surface water or groundwater under the direct influence of surface water must meet minimum filtration requirements before the water is supplied to any consumer.

(1) Treatment technique requirements for combined filter effluent. Treatment plants using conventional media filtration must meet the following turbidity requirements.

(A) The turbidity level of the combined filter effluent must never exceed 1.0 nephelometric turbidity unit (NTU).

(B) The turbidity level of the combined filter effluent must be 0.3 NTU or less in at least 95% of the samples tested each month.

(2) Performance criteria for individual filter effluent. The filtration techniques must ensure the public water system meets the following performance criteria.

(A) The turbidity from each individual filter effluent should never exceed 1.0 NTU.

(B) At a public water system that serves 10,000 people or more, the turbidity from each individual filter effluent should not exceed 0.5 NTU at four hours after the individual filter is returned to service after backwash or shutdown.

(3) Routine turbidity monitoring requirements. A system must monitor the performance of its filtration facilities.

(A) A system that serves fewer than 500 people and continuously monitors the turbidity level of each individual filter must measure and record the turbidity level of the combined filter effluent at least once each day that the plant is in operation.

(B) A system that serves at least 500 people and continuously monitors the turbidity level of each individual filter must measure and record the turbidity level of the combined filter effluent at least every four hours that the system serves water to the public.

(C) Except as provided in subparagraph (D) of this paragraph, a system must continuously monitor the filtered water turbidity at the effluent of each individual filter and record the turbidity value every 15 minutes.

(D) A system that serves fewer than 10,000 people and monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity under the provisions of §290.42(d)(11)(E)(ii) of this title (relating to Water Treatment) must:

(i) continuously monitor the turbidity of the combined filter effluent and record the turbidity value every 15 minutes; and

(ii) measure and record the turbidity level at the effluent of each filter at least once each day the plant is in operation.

(4) Special investigation requirements. A system which fails to produce water with acceptable turbidity levels must investigate the cause of the problem and take appropriate corrective action. The executive director can waive these special monitoring requirements for systems that have a corrective action schedule approved by the executive director.

(A) A public water system that fails to meet the turbidity criteria specified in paragraph (2) of this subsection must conduct additional monitoring.

(i) Each time a filter exceeds an applicable filtered water turbidity level specified in paragraph (2) of this subsection for two consecutive 15-minute readings, the public water system must either identify the cause of the exceedance or produce a filter profile on the filter within seven days of the exceedance.

(ii) Each time a filter exceeds the filtered turbidity level specified in paragraph (2)(A) of this subsection for two consecutive 15-minute readings on three separate occasions during any consecutive three-month period, the public water system must conduct a filter assessment on the filter within 14 days of the third exceedance.

(iii) Each time the filtered water turbidity level for a specific filter or any combination of individual filters exceeds 2.0 NTU on two consecutive 15-minute readings during two consecutive months, the public water system must participate in a third-party comprehensive performance evaluation (CPE). If the system serves at least 10,000 people, the CPE must be conducted within 90 days of the first exceedance in the second month. If the system serves fewer than 10,000 people, the CPE must be conducted within 120 days of the first exceedance in the second month.

(B) A system that serves fewer than 10,000 people, monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity, and fails to meet the turbidity criteria in paragraph (1)(A) of this subsection must conduct additional monitoring. The executive director may waive these special monitoring requirements for systems that have a corrective action schedule approved by the executive director.

(i) Each time the combined filter effluent turbidity level exceeds 1.0 NTU for two consecutive 15-minute readings, the public water system must either identify the cause of the exceedance or complete a filter profile on the combined filter effluent within seven days of the exceedance.

(ii) Each time the combined filter effluent turbidity level exceeds 1.0 NTU for two consecutive 15-minute readings on three separate occasions during any consecutive three-month period, the public water system must conduct a filter assessment on each filter within 14 days of the third exceedance.

(iii) Each time the combined filter effluent turbidity level exceeds 2.0 NTU on two consecutive 15-minute readings during two consecutive months, the public water system must participate in a third-party comprehensive performance evaluation within 120 days of the first exceedance in the second month.

(5) Analytical requirements for turbidity. All monitoring required by this subsection must be conducted by a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title. Equipment used for compliance measurements must be maintained and calibrated in accordance with §290.46(s) of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems).

(A) Turbidity must be measured with turbidimeters that use one of the following methods:

(i) EPA Method 180.1 and Standard Method 2130B;

(ii) Great Lakes Instruments Method 2; or

(iii) Hach FilterTrak Method 10133.

(B) A system monitoring the performance of individual filters with on-line turbidimeters and recorders may monitor combined filter effluent turbidity levels by either continuously monitoring turbidity levels with an on-line turbidimeter or measuring the turbidity level in grab samples with a bench-top turbidimeter.

(C) Continuous turbidity monitoring must be conducted using a continuous, on-line turbidimeter and a device that records the turbidity level reading at least once every 15 minutes.

(i) Turbidity data may be recorded electronically by a supervisory control and data acquisition system (SCADA) or on a strip chart. The recorder must be designed so that the operator can accurately determine the turbidity level readings at 15-minute intervals.

(ii) If there is a failure in the continuous turbidity monitoring equipment at a system serving 10,000 people or more, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(iii) If the continuous turbidity monitoring equipment at a system serving fewer than 10,000 people malfunctions, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than 14 working days following the failure of the equipment.

(D) A system that monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity under §290.42(d)(11)(E)(ii) of this title must monitor the performance of individual filters using a bench-top turbidimeter.

(f) Filtration requirements for other filters. A system that uses cartridge filters, membrane filters, or other unconventional filtration systems to treat surface water or groundwater under the direct influence of surface water must meet minimum filtration requirements before the water is supplied to any consumer.

(1) Treatment technique requirements. A system that uses unconventional filtration technologies such as membrane filters or cartridge filters must meet treatment technique requirements prescribed by the executive director.

(A) The filtration facilities must meet combined filter effluent and individual filter effluent turbidity limits established by the executive director.

(B) The filtration facilities must be operated and maintained in accordance with requirements that the executive director determines are needed to demonstrate the amount of *Giardia* and *Cryptosporidium* removal achieved.

(2) Monitoring requirements. A system must monitor the performance of its filtration facilities.

(A) A system that serves fewer than 500 people and continuously monitors the turbidity level of each individual cartridge or membrane unit must measure and record the turbidity level of the combined effluent at least once each day that the plant is in operation.

(B) A system that serves at least 500 people and continuously monitors the turbidity level of each individual cartridge or membrane unit must measure and record the turbidity level of the combined effluent at least every four hours that the system serves water to the public.

(C) A system using membranes must use a method approved by the executive director to continuously monitor the quality of the water produced by each membrane unit and record the monitoring results at least once every five minutes. The executive director may approve monitoring parameters other than turbidity and decrease the frequency to once every 15 minutes if the approved operating parameters will allow consecutive readings to be obtained between backwash or backflush cycles.

(D) A system using membranes must conduct direct integrity testing on each membrane unit using a procedure approved by the executive director.

(i) Direct integrity tests must be conducted in a manner that will detect a membrane defect of 3 microns or smaller and demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process by the executive director.

(ii) Direct integrity test method must calculate the log removal value for a 3-micron size particle and establish an upper control limit which assures that the unit is capable of meeting the removal credit approved by the executive director.

(iii) A system that has been assigned a Bin 1 classification under the provisions of subsection (c)(3)(B) of this section must conduct direct integrity tests at least once every seven days. The executive directed may reduce the testing requirements for other membrane units.

(iv) A system that has been assigned a Bin 2, 3, or 4 classification under the provisions of subsection (c)(3)(B) of this section must conduct direct integrity tests at least once each day that the membrane unit is used for filtration. The executive director may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium* removal or inactivation, or reliable process safeguards.

(v) A system must immediately conduct a direct integrity test on any membrane unit that produces filtered water with turbidity level above 0.15 NTU on two consecutive readings. The executive director must establish alternate site-specific control limits for systems that use other approved technology in lieu of turbidimeters to continuously monitor the performance of membrane units.

(vi) A system must immediately remove any membrane unit that fails a direct integrity test from service until the membrane modules in that unit are inspected and, if necessary, repaired. A membrane unit that has been removed from service may not be returned to service until it has passed a direct integrity test.

(E) A system that uses cartridge filters must continuously monitor the performance of the filtration process in a manner approved by the executive director.

(3) Analytical requirements. All monitoring required by this subsection must be conducted by a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title. Equipment used for compliance measurements must be maintained and calibrated in accordance with §290.46(s) of this title.

(A) Turbidity of the combined effluent must be measured with turbidimeters that meet the requirements of subsection (e)(5)(A) of this section.

(B) The turbidity of the water produced by each membrane unit must be measured using the Hach FilterTrak Method 10133. The executive director may approve the use of alternative technology to monitor the quality of the water produced by each membrane unit.

(C) A system continuously monitoring the performance of individual cartridges or membrane units may monitor combined effluent turbidity levels by either continuously monitoring turbidity levels with an on-line turbidimeter, or by measuring the turbidity level in grab samples with a bench-top turbidimeter.

(D) Data collected from on-line instruments may be recorded electronically by a SCADA system or on a strip chart recorder. The recorder must be designed so that the operator can accurately determine the value of readings at the monitoring interval approved by the executive director.

(i) If there is a failure in the continuous monitoring equipment at a system serving 10,000 people or more, the system must

conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

(ii) If there is a failure in the continuous monitoring equipment at a system serving fewer than 10,000 people, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than 14 working days following the failure of the equipment.

(E) A system that uses cartridge filters and does not continuously monitor the turbidity of each filter unit must monitor the performance of individual filters at least once each day using a bench-top turbidimeter.

(g) Other treatment credits for systems in Bins 2 through 4. The executive director may grant additional pathogen removal and inactivation credit to systems that meet enhanced design, operational, maintenance, and reporting requirements.

(1) Individual filter effluent. The executive director may approve an additional 1.0-log removal credit for *Giardia* and *Cryptosporidium* to a treatment plant that uses conventional granular media filters.

(A) The executive director will approve the additional credit for a plant if:

(i) the system continuously monitored the filtered water turbidity at the effluent of each individual filter and recorded the turbidity value every 15 minutes that the filter was sending water to the clearwell;

(ii) the turbidity level at each individual filter effluent is less than or equal to 0.15 NTU in at least 95% of the measurements recorded during the month; and

(iii) no individual filter produced water with turbidity level above 0.3 NTU in two consecutive 15-minute readings.

(B) The executive director may also approve the additional credit for a plant that does not meet the requirements of subparagraph (A) of this paragraph if:

(i) the executive director determines that the failure to meet the requirements of subparagraph (A) of this paragraph could not have been prevented through optimizing plant operations, design, or maintenance; and

(ii) the system has experienced no more than two such failures within the most recent 12 months.

(2) Combined filter effluent. The executive director may approve an additional 0.5-log removal credit for *Cryptosporidium* to a treatment plant that uses conventional granular media filters if:

(A) the system continuously monitored the filtered water turbidity at the effluent of each individual filter and recorded the turbidity value every 15 minutes that the filter was sending water to the clearwell;

(B) the turbidity level at the combined filter effluent is less than or equal to 0.15 NTU in at least 95% of the measurements recorded during the month; and

(C) the plant does not receive additional treatment credit under paragraph (1) of this subsection.

(3) Second stage filtration. The executive director will approve an additional 0.5-log removal credit for *Giardia* and *Cryptosporidium* to a treatment plant that uses a second, separate stage of conventional granular media filters if:

(A) the filters in both stages meet minimum design criteria approved by the executive director;

(B) all of the water produced by the plant passes through both stages of filtration;

(C) the system continuously monitored the filtered water turbidity at the effluent of each individual filter in the first stage of filtration and recorded the turbidity value every 15 minutes that the filter was sending water to the clearwell; and

(D) no individual filter in the first stage of filtration produced water with turbidity level above 1.0 NTU in two consecutive 15-minute readings.

(4) Other pathogen control strategies. The executive director may approve an additional removal or inactivation credit for other pre-filtration, filtration, or post-filtration strategies that can demonstrate effective, consistent levels of enhanced pathogen control.

(A) The alternative strategy must achieve a quantifiable reduction in the risk of waterborne disease in all of the treated water produced by the plant.

(B) The alternative strategy must conform to any applicable requirement of 40 CFR §§141.715 - 141.720.

(C) The executive director may establish minimum site-specific design, operational, maintenance, and reporting requirements for any alternative strategy used to meet minimum treatment technique requirements of subsection (c) of this section.

(D) The executive director may not approve additional removal credit under the provisions of this paragraph to any strategy that includes a treatment process has been assigned additional removal or inactivation credit under any other provision of this subsection.

(h) Reporting requirements. Public water systems must properly complete and submit periodic reports to demonstrate compliance with this section.

(1) A system that has a turbidity level exceeding 1.0 NTU in the combined filter effluent must consult with the executive director within 24 hours.

(2) A system that continuously monitors the performance of individual filters must submit a Surface Water Monthly Operating Report (commission Form 0102C) each month for each plant that treats surface water sources or groundwater sources under the direct influence of surface water.

(3) A system that monitors combined filter effluent turbidity in lieu of individual filter effluent turbidity under §290.42(d)(11)(E)(ii) of this title must submit a Surface Water Monthly Operating Report for 2-Filter Plants (commission Form 0103) each month for each plant that treats surface water or groundwater under the direct influence of surface water.

(4) A system that must complete the additional monitoring required by subsection (e)(4)(A)(i) or (B)(i) of this section must submit a Filter Profile Report for Individual Filters (commission Form 10276) with its Surface Water Monthly Operating Report.

(5) A system that must complete the additional monitoring required by subsection (e)(4)(A)(ii) or (B)(ii) of this section must submit a Filter Assessment Report for Individual Filters (commission Form 10277) with its Surface Water Monthly Operating Report.

(6) A system that must complete the additional monitoring required by subsection (e)(4)(A)(iii) or (B)(iii) of this section must submit a Comprehensive Performance Evaluation Request Form (commission Form 10278) with its Surface Water Monthly Operating Report.

(7) A system that uses membranes must submit a Membrane Monthly Operating Report (commission Form 20356) for each plant that treats surface water or groundwater under the direct influence of surface water. The report must accompany the plant's Surface Water Monthly Operating Report.

(8) A system that uses UV disinfection to meet the minimum treatment technique requirements for surface water or groundwater under the direct influence of surface water must submit a UV Monthly Operating Report (commission Form 20357) with its Surface Water Monthly Operating Report. The report must accompany the plant's Surface Water Monthly Operating Report.

(9) A system must submit any additional reports required by the executive director to verify the level of pathogen removal or inactivation achieved by the system's treatment plants.

(10) A system must submit its *Cryptosporidium* bin classification.

(11) A system must submit reports required by subsection (b)(7) of this section.

(12) Periodic reports required by this section must be submitted to the Water Supply Division, Texas Commission on Environmental Quality, MC 155, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(i) Compliance determination. Compliance with the requirements of this section must be determined using the criteria of this subsection.

(1) A public water system that fails to complete source water monitoring or conduct the routine monitoring tests and any applicable special investigations required by this section commits a monitoring violation.

(2) A public water system that fails to submit a report required by subsection (h) of this section commits a reporting violation.

(3) A public water system using conventional filters that has a turbidity level exceeding 5.0 NTU in the combined filter effluent commits an acute treatment technique violation.

(4) A public water system using membrane filters that has a turbidity level exceeding 1.0 NTU in the combined filter effluent commits an acute treatment technique violation.

(5) Except as provided in paragraphs (3) and (4) of this subsection, a public water system that violates the requirements of subsections (c), (d)(1), (e)(1), and (f)(1) of this section commits a nonacute treatment technique violation.

(6) A system that fails to request a Bin Classification within six months of completing a round of source water monitoring commits a treatment technique violation.

(7) A system that fails to correct the performance-limiting factors identified in a comprehensive performance evaluation conducted under the requirements of subsection (e)(4)(A)(iii) or (B)(iii) of this section commits a violation.

(8) A system that fails to properly issue a public notice required by subsection (j) of this section commits a violation.

(j) Public notification. The owner or operator of a public water system that violates the requirements of this section must notify the executive director and the people served by the system.

(1) A public water system that commits an acute treatment technique violation must notify the executive director and the water system customers of the acute violation within 24 hours in accordance with the requirements of §290.46(q) of this title and §290.122(a) of this title (relating to Public Notification).

(2) A public water system that has a turbidity level exceeding 1.0 NTU in the combined filter effluent must consult with the executive director within 24 hours of the violation.

(A) Based on the results of the consultation, the executive director will determine whether the water system must notify its customers in accordance with the requirements of §290.122(a) or (b) of this title.

(B) A water system that fails to consult with the executive director as required by this paragraph must notify its customers in accordance with the requirements of §290.122(a) of this title.

(3) Except as provided in paragraphs (1) and (2) of this subsection, a public water system that fails to meet the treatment technique requirements of subsections (c), (d)(1), (e)(1), or (f)(1) of this section must notify the executive director by the end of the next business day and the water system customers in accordance with the requirements of §290.122(b) of this title.

(4) A public water system that fails to conduct the monitoring required by this section must notify its customers of the violation in accordance with the requirements of §290.122(c) of this title.

§290.112. Total Organic Carbon (TOC).

(a) Applicability. A water treatment plant must meet the provisions of this section if the plant: [~~All community and nontransient, noncommunity public water systems that treat surface water or groundwater under the direct influence of surface water and use coagulation or flocculation or sedimentation or clarification facilities as part of the treatment process must meet the provisions of this section.~~]

(1) serves a community or nontransient noncommunity public water system;

(2) treats surface water or groundwater under the direct influence of surface water; and

(3) uses a series of treatment processes that includes coagulation, flocculation, sedimentation or clarification, and filtration as part of the overall treatment protocol.

(b) Treatment technique. Systems must achieve the Step 1 removal requirements in paragraph (1) of this subsection, meet one of the alternative compliance criteria described in paragraph (2) of this subsection, or apply for the alternative Step 2 removal requirements described in paragraph (3) of this subsection.

(1) Systems must determine their ability to meet the Step 1 removal requirements given in the following table. A water treatment plant's Step 1 total organic carbon (TOC) required percent removal is based upon plant's source water TOC and alkalinity. Step 1 TOC percent removal requirements are indicated in the following table. Systems practicing softening are evaluated based on the Step 1 TOC removal in the far-right column (Source water alkalinity >120 milligrams per liter (mg/L)) for the specified source water TOC.
Figure: 30 TAC §290.112(b)(1) (No change.)

(2) Systems may determine their ability to meet one of the eight alternative compliance criteria listed in this paragraph.

(A) A system meets alternative compliance criteria Number 1 if the system's source water TOC level is less than 2.0 mg/L, calculated quarterly as a running annual average.

(B) A system meets alternative compliance criteria Number 2 if the system's treated water TOC level is less than 2.0 mg/L, calculated quarterly as a running annual average.

(C) A system meets alternative compliance criteria Number 3 if: the system's source water TOC level is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity is greater than 60 mg/L (as calcium carbonate (CaCO3), calculated quarterly as a running annual average; and the total trihalomethanes (TTHM) and haloacetic acid-group of five (HAA5) running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively.

(D) The system meets alternative compliance criteria Number 4 if the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

(E) The system meets alternative compliance criteria Number 5 if the system's source water specific ultraviolet absorbance (SUVA), prior to any treatment, measured monthly, is less than or equal to 2.0 liters per milligram-meter (L/mg-m), calculated quarterly as a running annual average.

(F) The system meets alternative compliance criteria Number 6 if the system's finished water SUVA, measured monthly at a point prior to any disinfection, is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(G) The system meets alternative compliance criteria Number 7 if the system practices softening, cannot achieve the Step 1 TOC removals required by paragraph (1) of this subsection, and has treated water alkalinity less than 60 mg/L (as CaCO3) and calculated quarterly as a running annual average.

(H) The system meets alternative compliance criteria Number 8 if the system practices softening, cannot achieve the Step 1 TOC removals required by paragraph (1) of this subsection, and has magnesium hardness removal greater than or equal to 10 mg/L (as CaCO3), measured monthly calculated quarterly as a running annual average.

(3) If a system fails to meet the Step 1 TOC removal requirement required by paragraph (1) of this subsection and does not meet one of eight alternative compliance criteria described in paragraph (2) of this subsection, the system must apply to the executive director for approval of Step 2 removal requirements.

(A) The plant must perform Step 2 jar testing to determine the coagulant dose at which the removal of TOC is less than 0.3 mg/L for an increase in coagulant of 10 mg/L alum or its equivalent. This dose is referred to as the point of diminishing returns (PODR).

(B) The system must submit the results of the Step 2 jar testing to the executive director for approval of the alternative removal requirements at least 15 days before the end of the applicable quarter.

(C) The executive director may approve Step 2 alternative removal requirements.

(i) If approved, the removal achieved at the PODR becomes the alternative full-scale TOC removal requirement for the plant.

(ii) The alternate removal requirements may be applied to the quarter in which the jar test results are received and for the following quarter.

(c) TOC monitoring requirements. Systems must conduct required TOC monitoring during normal operating conditions at sites and at the frequency designated in the system's monitoring plan.

(1) Systems must monitor for TOC and alkalinity in the source water prior to any treatment. Between one and eight hours after taking the source water sample, systems must measure each treatment plant TOC after filtration in the combined filter effluent stream. These samples (source water alkalinity, source water TOC, and treated water TOC) are referred to as a TOC sample set.

(2) Systems must take one TOC sample set monthly (every 30 days) at a time representative of normal operating conditions and influent water quality. With the executive director's approval, a system may reduce monitoring according to subparagraphs (A) - (C) of this paragraph.

(A) Systems with a running annual average treated water TOC of less than 2.0 mg/L for two consecutive years may reduce monitoring to one TOC sample set per plant per quarter (every 90 days). The system must revert to routine monitoring in the month following the quarter when the running annual average treated water TOC is greater than or equal to 2.0 mg/L.

(B) Systems with a running annual average treated water TOC of less than 1.0 mg/L for one year may reduce monitoring to one TOC sample set per plant per quarter (every 90 days). The system must revert to routine monitoring in the month following the quarter when the running annual average treated water TOC is greater than or equal to 2.0 mg/L.

(C) Systems with a running annual average source water TOC at each plant of less than or equal to 4.0 mg/L based on the running annual average of the most recent four quarters of monitoring may reduce source TOC monitoring to one source TOC sample per quarter (every 90 days) if they also meet criteria for reduced disinfection byproduct monitoring. In order to remain on quarterly source TOC monitoring, the system must also meet the criteria for reduced trihalomethane and haloacetic acid monitoring given in §290.113(c)(4) of this title (relating to Stage 1 Disinfection Byproducts (TTHM and HAA5)) until the date shown in table §290.113(a)(2) of this title. After the date shown in §290.115(a)(2) of this title (relating to Stage 2 Disinfection Byproducts (TTHM and HAA5)), the system must also meet the criteria for reduced trihalomethane and haloacetic acid monitoring in §290.115(c)(3) of this title in order to remain on quarterly source TOC monitoring. The system must revert to routine monitoring in the first month following the quarter when the running annual average source water TOC is greater than 4.0 mg/L, or the system no longer meets the reduced monitoring criteria for disinfection byproducts.

(3) A public water system attempting to meet the treatment technique requirements for TOC using alternative compliance criteria Number 5 (as defined in subsection (b)(2)(E) of this section) must monitor for SUVA in the source water prior to any treatment at least once each month.

(4) A public water system attempting to meet the treatment technique requirements for TOC using alternative compliance criteria Number 7 (as defined in subsection (b)(2)(G) of this section) must monitor for alkalinity in the treated water at any point prior to distribution system at least once each month.

(5) A public water system attempting to meet the treatment technique requirements for TOC using alternative compliance criteria Number 8 (as defined in subsection (b)(2)(H) of this section) must monitor for magnesium in both the source water prior to any treatment at and the treated water at any point prior to the distribution system least once each month.

(d) Analytical requirements for TOC treatment. Analytical procedures required by this section must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(e) Reporting requirements for TOC. Systems treating surface water or groundwater under the direct influence of surface water shall properly complete and submit periodic reports to demonstrate compliance with this section.

(1) The reports must be submitted to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087 by the tenth day of the month following the end of the reporting period.

(2) Public water systems must submit a Monthly Operational Report for Total Organic Carbon (commission Form 0879) each month.

(3) A system that does not meet the Step 1 removal requirements must submit a Request for Alternate TOC Requirements at least 15 days before the end of the quarter.

(A) If the system meets alternative compliance criterion Number 3, subsection (b)(2)(C) of this section, the system must report the running annual average TTHM and HAA5 concentrations as determined under the requirements of §290.113 of this title.

(B) If the system meets alternative compliance criterion Number 4, subsection (b)(2)(D) of this section, the system must report the running annual average TTHM and HAA5 concentrations as determined under the requirements of §290.113 [~~of this title~~] or §290.115 of this title, and report all disinfectants used by the system during last 12 months.

(C) If the system meets alternative compliance criterion Number 5, subsection (b)(2)(E) of this section, the system must report the average source water SUVA for each of the preceding 12 months.

(D) If the system meets alternative compliance criterion Number 6, subsection (b)(2)(F) of this section, the system must report the average treated water SUVA for each of the preceding 12 months.

(E) If the system practices softening and meets alternative compliance criterion Number 8, subsection (b)(2)(H) of this section, the system must report the source water and treated water magnesium concentrations and the average percent removal of magnesium obtained during each of the preceding 12 months.

(F) A system that does not meet any of the alternative compliance criteria must apply for the Step 2 alternative removal requirements and must submit the results of Step 2 jar testing.

(f) Compliance determination. Compliance with the requirements of this section shall be based on the following criteria:

(1) A system that fails to conduct the monitoring tests required by this section commits a monitoring violation. Failure to monitor will be treated as a violation for the entire period covered by the annual average.

(2) A system that fails to report the results of monitoring tests required by this section commits a reporting violation. Systems may use only data collected under the provisions of this section to qualify for reduced monitoring.

(3) A system that does not meet any of the alternative compliance criteria and does not achieve the required TOC removal commits a treatment technique violation. Compliance shall be determined quarterly by determining an annual average removal ratio using the following method:

(A) The actual monthly TOC percent removal must be determined for each month. The actual removal for a TOC sample set is equal to (1 - treated water TOC/source water TOC). The actual monthly percent removal is calculated by taking average removal for all TOC sample sets collected in the month, and expressing that value as a percent.

(B) The required monthly Step 1 or Step 2 TOC percent removal must be determined as provided in subsection (b) of this section. The executive director will approve or disapprove Step 2 requirements based on jar or pilot data. Until the executive director approves the Step 2 TOC removal requirements, the system must meet the Step 1 TOC removals contained in subsection (b)(1) of this section.

(C) The monthly removal ratio must be determined. The monthly removal ratio is determined by dividing the actual monthly TOC percent removal for each month by the required monthly Step 1 or approved Step 2 TOC percent removal for the month. The alternative compliance criteria may be used on a monthly basis as described in clauses (i) - (iv) of this subparagraph.

(i) If the monthly average source or treated water TOC is less than 2.0 mg/L, a monthly removal ratio value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(ii) If the monthly average water source or treated SUVA level is less than 2.0 L/mg-m, a monthly removal ratio value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(iii) In any month that a softening system lowers alkalinity below 60 mg/L (as CaCO3), a monthly removal ratio value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(iv) In any month that a softening system removes at least 10 mg/L of magnesium hardness (as CaCO3) a monthly value of 1.0 may be assigned (in lieu of the value calculated in subparagraph (C) of this paragraph) when calculating compliance under the provisions of this section.

(D) The yearly removal ratio must be determined. The yearly removal ratio is the running annual average of the quarterly averages of the monthly averages. To determine this value, for each quarter in the compliance year, determine the monthly removal ratio, add the removal ratios and divide by three. Then, add the quarterly removal ratio and divide by four.

(E) If the yearly removal ratio is less than 1.00, the system commits a treatment technique violation.

(4) A public water system that fails to do a required public notice or certify that the public notice has been performed commits a public notice violation.

(g) Public Notification. A public water system that violates the treatment technique requirements of this section must notify the executive director and the system's customers.

(1) A public water system that commits a TOC treatment technique violation shall notify the executive director and the water system customers in accordance with the requirements of §290.122(b) of this title (relating to Public Notification).

(2) A public water system which fails to conduct the monitoring required by this section must notify its customers of the violation in accordance with the requirements of §290.122(c) of this title.

§290.116. Groundwater Corrective Actions and Treatment Techniques.

(a) Applicability. All groundwater public water systems, including such systems that use surface water or groundwater under the direct influence of surface water (mixed systems), must comply with one or more of the treatment techniques and corrective actions of this section if a raw groundwater source sample was positive for fecal indicators, if a significant deficiency was identified, or if the system is not required to conduct raw groundwater source monitoring because it provides at least 4-log treatment of viruses at each groundwater source.

(1) A groundwater system must provide written notification to the executive director [~~before December 1, 2009,~~] that it is not required to meet the raw groundwater source monitoring requirements under §290.109(c)(4) of this title (relating to Microbial Contaminants) because it provides at least 4-log treatment of viruses for the specified groundwater source and begin compliance monitoring in accordance with subsection (c) this section. The notification must include engineering, operational, and other information required by the executive director to evaluate the submission. If the executive director determines and documents in writing that 4-log treatment of viruses is no longer necessary for a specified groundwater source or if the system discontinues 4-log treatment of viruses before the first connection [~~customer~~] for any groundwater source, the system must document this in writing and conduct raw groundwater source sampling as required under §290.109(c)(4) of this title.

(2) A groundwater system that places a groundwater source in service after November 30, 2009, that is not required to meet the raw source monitoring requirements under §290.109(c)(4) of this title because the system provides at least 4-log treatment of viruses for a specified groundwater source must begin compliance monitoring within 30 days of placing the source in service in accordance with subsection (c) of this section. The system must provide written notification to the executive director that it provides at least 4-log treatment of viruses [~~at or~~] before the first connection for the specified groundwater source [~~customer~~]. The notification must include engineering, operational, and other information required by the executive director to evaluate the submission. The system must conduct triggered source monitoring under §290.109(c)(4) of this title until the executive director provides written approval of the system's request to provide the 4-log treatment. If the system discontinues 4-log treatment of viruses before [~~or at~~] the first connection [~~customer~~] for a groundwater source, the system must conduct raw groundwater source sampling as required under §290.109(c)(4) [~~subsection (c)(4)~~] of this title [~~section~~].

(b) Groundwater corrective action plan. All public water systems using groundwater must submit a corrective action plan and implement corrective action if a raw groundwater source sample was positive for fecal indicators or if a significant deficiency was identified.

(1) If a groundwater source sample was found to be fecal indicator positive or if a significant deficiency was identified, the system must consult with the executive director regarding appropriate corrective action and have an approved corrective action plan in place within 30 days of receiving written notification from a laboratory of the fecal indicator positive source sample collected under §290.109(c)(4) [~~subsection (c)(4)~~] of this title or within 30 days of receiving written notification from the executive director of the identification of a significant deficiency [~~section~~].

(2) Within 120 days of receiving written notification from a laboratory of the fecal indicator positive source sample or receiving written notification from the executive director of a significant deficiency, the system must have completed corrective action or be in compliance with an approved corrective action plan and schedule.

(3) Any changes to the approved corrective action plan or schedule must be approved by the executive director.

(4) The executive director may require interim measures for the protection of public health pending approval of the corrective action plan. The system must comply with these interim measures as well as with any schedules specified by the executive director.

(5) Systems that are required to complete corrective action must implement one or more of the procedures in this paragraph and the details of the implementation must be specified in the approved corrective action plan.

(A) The system may disinfect the groundwater source where the fecal indicator positive source sample was collected following the American Water Works Association (AWWA) standards for well disinfection and start monthly fecal indicator sampling at that source within 30 days after well disinfection. The executive director may discontinue the monthly source sampling requirement if corrective action is sufficient.

(B) The system may eliminate the groundwater source that was found to be fecal indicator positive and provide an alternate groundwater source if necessary. Eliminated groundwater sources must be disconnected from the distribution system until the contamination is corrected and the executive director approves it for use.

(C) The system may identify and eliminate the source of fecal contamination followed by well disinfection according to AWWA well disinfection standards and begin monthly fecal indicator sampling within 30 days after well disinfection. The executive director may allow the system to discontinue the monthly source sampling requirement after making a determination that corrective action is sufficient.

(D) The system may provide treatment that reliably achieves at least 4-log treatment of viruses using inactivation, removal or an executive director-approved combination of inactivation and removal before the first connection [~~customer~~] of the groundwater source.

(E) Correct all significant deficiencies.

(F) Assessment source monitoring for a period of 12 months or a time period specified by the executive director from the raw groundwater source in accordance with §290.109(c)(4)(E) of this title.

(c) Microbial inactivation requirements. A system that treats groundwater in response to a fecal indicator positive source sample, significant deficiency, or in lieu of the raw groundwater source monitoring shall meet minimum disinfection requirements demonstrating at least 4-log treatment of viruses before the water is distributed to the first connection of the specified groundwater source.

(1) Monitoring requirements for chemical disinfectants. Groundwater systems shall monitor the performance of the disinfection facilities to ensure that appropriate disinfectant levels are maintained every day the specified source serves the public. All monitoring conducted pursuant to the requirements of this section must be conducted at sites designated in the system's monitoring plan in accordance with §290.121 of this title (relating to Monitoring Plans).

(A) Groundwater systems serving a population greater than 3,300 must continuously monitor the residual disinfectant concentration in accordance with the analytical methods specified in 40 Code of Federal Regulations (CFR) §141.74(a)(2) at a location approved by the executive director and must record the lowest residual disinfectant concentration every day the groundwater source serves the public.

(i) The groundwater system must maintain the executive director-approved minimum specified disinfectant residual every day the groundwater system serves water from the specified groundwater source to the public. If there is a failure in the continuous moni-

toring equipment, the groundwater system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service.

(ii) The system must resume continuous residual disinfectant monitoring within 14 days.

(B) Groundwater systems serving a population of [less than] 3,300 or fewer must monitor the disinfectant residual in accordance with the analytical methods specified in 40 CFR §141.74(a)(2) in each disinfection zone at least once each day that water from the specified groundwater source is served to the public during either a time when peak hourly raw water flow rates are occurring or at another time specified by the executive director. The system must record and maintain the disinfectant residual every day the system serves water from the groundwater source to the public. The system must collect a daily grab sample during the hour of peak flow or at another time specified by the executive director. If any daily grab sample measurement falls below the executive director-approved minimum specified disinfectant residual, the groundwater system must collect follow-up samples every four hours until the residual disinfectant concentration is restored to the executive director-approved level. Alternatively, a groundwater system that serves 3,300 or fewer people may monitor the residual disinfectant concentration continuously and meet the requirements of subparagraph (A) of this paragraph.

(C) Disinfection contact time will be based on tracer study data or a theoretical analysis submitted by the system owner or their designated agent and approved by the executive director.

(D) Groundwater treatment plants that fail to demonstrate an appropriate level of treatment must repeat these tests at four-hour or shorter intervals until compliance has been reestablished.

(2) Monitoring and operating requirements for commission-approved alternative treatment, including ultraviolet light (UV) disinfection facilities and other methods that can obtain 4-log inactivation of viruses and can be properly validated. Public water systems shall monitor the UV intensity as measured by a UV sensor, lamp status, the flow rate through the unit, and other parameters prescribed by the executive director as specified in §290.42(g)(5) of this title (relating to Water Treatment) to ensure that the units are operating within validated conditions.

(3) Analytical requirements. All monitoring required by this section must be conducted at a facility approved by the executive director and using methods that conform to the requirements of §290.119 of this title (relating to Analytical Procedures).

(A) The pH analysis must be conducted using a pH meter with a minimum accuracy of plus or minus 0.1 pH units.

(B) The temperature of the water must be measured using a thermometer or thermocouple with a minimum accuracy of plus or minus 0.5 degrees Celsius.

(C) The free chlorine or chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L. Samples tested using a colorimetric method must be analyzed using a colorimeter; spectrophotometer; or, with the written permission of the executive director, a color comparator. [using one of the following methods:]

[(i) Amperometric titration;]

[(ii) DPD Ferrous titration;]

[(iii) a DPD method that uses a colorimeter or spectrophotometer; or]

[(iv) Springaldizine (FACTS)]

[(D) The chloramine residual must be measured to a minimum accuracy of plus or minus 0.1 mg/L using one of the following methods:]

[(i) Amperometric titration;]

[(ii) DPD Ferrous titration; or]

[(iii) a DPD method that uses a colorimeter or spectrophotometer.]

(D) [(E)] The chlorine dioxide residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using one of the following methods:

(i) Amperometric titrator with platinum-platinum electrodes; or

(ii) Lissamine Green B.

(E) [(F)] The ozone residual must be measured to a minimum accuracy of plus or minus 0.05 mg/L using an indigo method that uses a colorimeter or spectrophotometer.

(4) Recordkeeping requirements for microbial inactivation treatment. Groundwater systems, including wholesale, consecutive, and mixed systems, regulated under this subsection must comply with §290.46 of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems).

(d) Reporting requirements. Groundwater systems conducting 4-log treatment in lieu of the raw groundwater source monitoring or required to conduct corrective action in response to a fecal indicator positive source sample, or a significant deficiency, [or in lieu of the raw groundwater source monitoring] must report to the executive director in accordance with this subsection.

(1) A groundwater system required to conduct compliance monitoring for chemical disinfectants must complete [submit] a Groundwater Treatment Monthly Operating Report (commission Form 20362) for groundwater disinfection facilities monthly. Groundwater systems must maintain the reports on site and make them available to the executive director upon request. [submit the first form starting before the month of December 2009, to avoid raw groundwater source monitoring.]

(2) A groundwater system must provide written notification to the executive director [before December 1, 2009,] that it is not required to meet the raw groundwater source monitoring requirements under [paragraph] §290.109(c)(4) of this title [(relating to Microbial Contaminants)] because it provides at least 4-log treatment of viruses for a specified groundwater source and begin compliance monitoring in accordance with subsection (c) [§290.116(c)] of this section. The notification must include engineering, operational, and other information required by the executive director to evaluate the submission.

(3) A groundwater system required to complete corrective action under subsection (b) of this section must notify the executive director within 30 days of completing the corrective action.

(4) If a groundwater system is subject to the triggered source monitoring requirements of §290.109(c)(4)(A) of this title and does not conduct source monitoring, the system must provide written documentation that it was providing 4-log treatment of viruses for the specified groundwater source or that it met the criteria set out in §290.109(c)(4)(D) of this title within 30 days of the positive distribution coliform sample.

(5) A groundwater system conducting compliance monitoring under subsection (a) of this section must notify the executive director any time the system fails to meet any executive director-speci-

fied requirements (including, but not limited to, minimum residual disinfectant concentration, and alternative treatment operating criteria) if the operation in accordance with the criteria or requirements is not restored within four hours. The system must notify the executive director as soon as possible, but no later than the end of the next business day.

(e) Compliance determination. In accordance with this subsection, the [~~The~~] executive director shall determine compliance for groundwater systems required to conduct corrective action within 120 days, or pursuant to a groundwater corrective action plan [~~in response to a fecal indicator positive source sample or in lieu of the raw groundwater source monitoring in accordance with this subsection~~].

(1) A groundwater system is in violation of the treatment technique requirement if it does not complete corrective action in accordance with the executive director-approved corrective action plan or any interim measures required by the executive director.

(2) A groundwater system is in violation of the treatment technique requirement if it is not in compliance with the executive director-approved corrective action plan and schedule.

(3) A groundwater system subject to the requirements of subsection [~~§290.116~~](c) of this section [~~title~~] that fails to maintain at least 4-log treatment of viruses is in violation of the treatment technique requirement if the failure is not corrected within four hours. The groundwater system must notify the executive director as soon as possible but no later than the next business day if there is a failure in maintaining the 4-log treatment for more than four hours.

(4) A groundwater system that fails to conduct the disinfectant monitoring required under subsection (c) of this section commits a monitoring violation.

(5) A groundwater system that fails to report the results of the disinfectant monitoring required under subsection (c) of this section commits a reporting violation.

(6) A groundwater system that fails to issue a required public notice or certify that the public notice has been performed commits a public notice violation.

(f) Public notification. A groundwater system that commits a treatment technique, monitoring, or reporting violation or situation as identified in this section must notify its customers of the violation in accordance with the requirements of §290.122 of this title (relating to Public Notification).

(1) Special notice to the public of significant deficiencies or source water fecal contamination for community systems. In addition to the applicable public notice requirements of §290.122(a) of this title, a community groundwater system that receives notice from the executive director of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated under §290.109(d)(2) of this title must inform the public served by the water system of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected in its Consumer Confidence Report as specified in §290.272(g)(7) and (8) of this title (relating to Content of the Report).

(2) Special notice to the public of significant deficiencies or source water fecal contamination for noncommunity systems. In addition to the applicable public notice requirements of §290.122(a) of this title, a noncommunity groundwater system that receives notice from the executive director of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated under §290.109(d)(2) of this title must inform the public served by the water system of any significant deficiency that has not been corrected within 12 months of being notified by the executive director, or earlier if directed by the executive director. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:

(A) posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection; and

(B) any other method reasonably calculated to notify other persons served by the system, if they would not normally be notified by the methods set out in subparagraph (A) of this paragraph. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely frequent. Other methods may include publication in a local newspaper, newsletter, or e-mail; or, delivery of multiple copies in central locations (e.g., community centers).

(C) If directed by the executive director, a noncommunity groundwater system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how deficiencies were corrected, and the dates of correction.

§290.119. Analytical Procedures.

(a) Acceptable laboratories. Samples collected to determine compliance with the requirements of this chapter shall be analyzed at accredited or approved laboratories.

(1) Samples used to determine compliance with the maximum contaminant levels, samples used to determine compliance with action level, and raw groundwater source monitoring requirements of this subchapter, and samples for microbial contaminants must be analyzed by a laboratory accredited by the executive director in accordance with Chapter 25 of this title (relating to Environmental Testing Laboratory Accreditation and Certification). These samples include:

(A) compliance samples for synthetic organic chemicals;

(B) compliance samples for volatile organic chemicals;

(C) compliance samples for inorganic contaminants;

(D) compliance samples for radiological contaminants;

(E) compliance samples for microbial contaminants;

(F) compliance samples for total trihalomethanes (TTHM);

(G) compliance samples for haloacetic acid-group of five (HAA5);

(H) compliance samples for chlorite;

(I) compliance samples for bromate; and

(J) compliance samples for lead and copper.

(2) Samples used to determine compliance with the treatment technique requirements and maximum residual disinfectant levels (MRDLs) of this subchapter must be analyzed by a laboratory approved by the executive director. These samples include:

(A) compliance samples for turbidity treatment technique requirements;

(B) compliance samples for the chlorine MRDL;

(C) compliance samples for the chlorine dioxide MRDL;

(D) compliance samples for the combined chlorine (chloramine) MRDL;

(E) compliance samples for the disinfection byproduct precursor treatment technique requirements, including alkalinity, total organic carbon, dissolved organic carbon analyses, and specific ultraviolet absorbance;

(F) samples used to monitor chlorite levels at the point of entry to the distribution system; and

(G) samples used to determine pH.

(3) Non-compliance tests, such as control tests taken to operate the system, may be run in the plant or at a laboratory of the system's choice.

(b) Acceptable analytical methods. Methods of analysis shall be as specified in 40 Code of Federal Regulations (CFR) or by any alternative analytical technique as specified by the executive director and approved by the Administrator under 40 CFR §141.27. Copies are available for review in the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. The following National Primary Drinking Water Regulations set forth in Title 40 CFR are adopted by reference:

(1) section 141.21(f) for microbiological analyses;

(2) section 141.74(a)(1) for turbidity analyses;

(3) section 141.23(k) for inorganic analyses;

(4) section 141.24(e), (f), and (g) for organic analyses;

(5) section 141.25 for radionuclide analyses;

(6) section 141.131(a) and (b) for disinfection byproduct methods and analyses;

(7) section 141.131(c) for disinfectant analyses other than ozone, and 141.74(b) for ozone disinfectant;

(8) section 141.131(d) for alkalinity analyses, bromide and magnesium, total organic carbon analyses, dissolved organic carbon analyses, specific ultraviolet absorbance analyses, and pH analyses; [~~and~~]

(9) section 141.89 for lead and copper analyses and for water quality parameter analyses that are performed as part of the requirements for lead and copper; [~~and~~]

(10) section 141.402(c) for groundwater source microbiological analyses; and

(11) [~~(10)~~] if a method is not contained in this section, a drinking water quality method can be approved for analysis if it is listed in 40 CFR Part 141, Subpart C, Appendix A.

(c) The definition of detection contained in 40 CFR §141.151(d) is adopted by reference.

§290.122. Public Notification.

(a) Public notification requirements for acute violations or situations. The owner or operator of a public water system must notify persons served by their system of any maximum contaminant limit (MCL), maximum residual disinfectant level (MRDL), treatment technique violation, or other situation that poses an acute threat to public health. Each notice required by this section must meet the requirements of subsection (d) of this section.

(1) Situations that pose an acute threat to public health include:

(A) a violation of the acute MCL for microbial contaminants as defined in §290.109(f)(1) of this title (relating to Microbial Contaminants);

(B) an acute turbidity issue at a treatment plant that is treating surface water or groundwater under the direct influence of surface water, specifically:

(i) a combined filter effluent turbidity level above 5.0 nephelometric turbidity units (NTU);

(ii) a combined filter effluent turbidity level above 1.0 NTU at a treatment plant using membrane filters; or

(iii) a combined filter effluent turbidity level above 1.0 NTU at a plant using other than membrane filters at the discretion of the executive director after consultation with the system; or

(iv) failure of a system with treatment other than membrane filters to consult with the executive director within 24 hours after a combined filter effluent reading of 1.0 NTU;

(C) a violation of the MCL for nitrate or nitrite as defined in §290.106(f)(2) of this title (relating to Inorganic Contaminants);

(D) a violation of the acute MRDL for chlorine dioxide as defined in §290.110(f)(5)(A) or (B) of this title (relating to Disinfectant Residuals);

(E) occurrence of a waterborne disease outbreak;

(F) Detection of *E. coli* or other fecal indicators in source water samples as specified in §290.109(b)(2) of this title, which requires a public notice to be issued within 24 hours of notification of the positive sample; and

(G) other situations deemed by the executive director to pose an acute risk to human health.

(2) The initial acute public notice and/or [~~and~~] boil water notice required by this subsection shall be issued as soon as possible, but in no case later than 24 hours after the violation or situation is identified. The initial public notice for an acute violation or situation shall be issued in the following manner.

(A) The owner or operator of a water system with an acute microbiological or turbidity violation as described in paragraph (1)(A) or (B) of this subsection shall include a boil water notice issued in accordance with the requirements of §290.46(q) of this title (relating to Minimum Acceptable Operating Practices for Public Drinking Water Systems).

(B) The owner or operator of a community water system shall furnish a copy of the notice to the radio and television stations serving the area served by the public water system.

(C) The owner or operator of a community water system shall publish the notice in a daily newspaper of general circulation in the area served by the system. If the area is not served by a daily newspaper of general circulation, notice shall instead be issued by direct delivery or by continuous posting in conspicuous places within the area served by the system. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(D) The owner or operator of a noncommunity water system shall issue the notice [~~violation~~] by direct delivery or by continuously posting the notice in conspicuous places within the area served by the water system. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(E) If notice is provided by posting, the posting must remain in place for as long as the violation or situation exists or seven days, whichever is longer.

(3) The owner or operator of a water system required to issue an initial notice for an acute MCL or treatment technique violation shall issue additional notices. The additional public notices for acute violations shall be issued in the following manner.

(A) Not later than 45 days after the violation, the owner or operator of a community water system shall notify persons served by the system using mail (by direct mail or with the water bill) or hand delivery. The executive director may waive mail or hand delivery if it is determined that the violation was corrected within the 45-day period. The executive director must make the waiver in writing and within the 45-day period.

(B) The owner or operator of a community water system must issue a notice at least once every three months by mail delivery (by direct mail or with the water bill) or by hand delivery, for as long as the violation exists.

(C) If the owner or operator of a noncommunity water system issued the initial notice by continuous posting, posting must continue for as long as the violation exists and in no case less than seven days. If the owner or operator of a noncommunity water system issued the initial notice by direct delivery, notice by direct delivery must be repeated at least every three months for as long as the violation exists.

(4) The owner or operator of the public water system must issue a notice when the public water system has corrected the acute violation or situation. This notice must be issued in the same manner as the original notice was issued.

(5) Copies of all notifications required under this subsection must be submitted to the executive director within ten days of its distribution.

(b) Public notification requirements for other MCL, MRDL, or treatment technique violations and for variance and exemption violations. The owner or operator of a public water system must notify persons served by their system of any MCL, MRDL, or treatment technique violation other than those described in subsection (a)(1) of this section and of any violation involving a variance or exemption requirement. Each notice required by this section must meet the requirements of subsection (d) of this section.

(1) Violations that require notification under this subsection include:

(A) any violation of an MCL, MRDL, or treatment technique not listed under subsection (a) of this section;

(B) failure to comply with the requirements of any variance or exemption granted under §290.102(d) of this title (relating to General Applicability);

(C) failure for a groundwater system to take corrective action, including uncorrected significant deficiencies, or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a combination of 4-log virus inactivation and removal approved by the executive director) before or at the first customer under §290.116 of this title (relating to Groundwater Corrective Actions and Treatment Techniques); or

(D) failure to perform any 3 months of raw surface water monitoring as required by §290.111(b) of this title (relating to Surface Water Treatment) or request bin classification from the executive director under §290.111(c)(3)(A) of this title; or

(E) other violations or situations deemed appropriate by the executive director that pose a non-acute risk to human health.

(2) The initial public notice for any violation, situation, or significant deficiency identified in this subsection must be issued as soon as possible, but in no case later than 30 days after the violation is identified. The initial public notice shall be issued in the following manner.

(A) The owner or operator of a community water system shall issue the notice by:

(i) mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system; and

(ii) any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in clause (i) of this subparagraph. Such persons may include those who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.) Other methods may include: publication in a local newspaper; delivery of multiple copies for distribution by customers that provide drinking water to others (e.g., apartment building owners or large private employers); continuous posting in conspicuous public places within the area served by the system or on the Internet; electronic delivery or alert systems (e.g. reverse 911); or delivery to community organizations.

(B) The owner or operator of a noncommunity water system shall issue the notice by:

(i) posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection (where known); and

(ii) any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. Other methods may include: publication in a local newspaper or newsletter distributed to customers; use of e-mail to notify employees or students; electronic delivery or alert systems (e.g. reverse 911); or, delivery of multiple copies in central locations (e.g., community centers).

(C) If notice is provided by posting, the posting must remain in place for as long as the violation exists or seven days, whichever is longer.

(3) The owner or operator of a system required to issue an initial violation notice shall issue additional notices. The additional notices shall be issued in the following manner.

(A) The owner or operator of a community water system must issue a notice at least once every three months by mail delivery (by direct mail or with the water bill) or by direct delivery, for as long as the violation exists.

(B) If the owner or operator of a noncommunity water system issued the initial notice by continuously posting the notice, the posting must continue for as long as the violation exists, and in no case less than seven days. If the owner or operator of a noncommunity water system issued the initial notice by direct delivery, notice by direct delivery must be repeated at least every three months for as long as the violation exists.

(4) The owner or operator of the public water system must issue a notice when the public water system has corrected the violation. This notice must be issued in the same manner as the original notice was issued.

(c) Public notification requirements for other violations, situations, variances, exemptions. The owner or operator of a public water system who fails to perform monitoring required by this chapter, fails to comply with a testing procedure established by this chapter, or is subject to a variance or exemption granted under §290.102(b) of this title shall notify persons served by the system. Each notice required by this section must meet the requirements of subsection (d) of this section.

(1) Violations that require notification as described in this section include:

(A) exceedance of the secondary constituent levels (SCL) for fluoride;

(B) failure to perform monitoring or reporting required by this subchapter;

(C) failure to comply with the analytical requirements or testing procedures required by this subchapter;

(D) operating under a variance or exemption granted under §290.102(b) of this title; and

(E) failure to maintain records on recycle practices as required by §290.46(f)(3)(C)(iii) of this title.

(2) The initial public notice issued pursuant to this section shall be issued within three months of the violation or the granting of a variance or exemption. The initial public notice shall be issued in the following manner.

(A) The owner or operator of a community water system shall issue the notice by mail or other direct delivery to each customer receiving a bill and to other service connections. The owner or operator of a noncommunity water system shall issue the notice by either posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(B) The owner or operator of any public water system shall also notify the public using another method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subparagraph (A) of this paragraph. Such persons may include people who do not pay water bills or do not have service connection addresses (e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc.). These other methods may include publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations. Other methods of delivery may include electronic delivery or alert systems (e.g. reverse 911).

(C) If notice is provided by posting, the posting must remain in place for as long as the violation exists or seven days, whichever is longer.

(3) The owner or operator of a system required to issue an initial violation notice shall issue additional notices. The additional notices shall be issued in the following manner.

(A) The owner or operator of a community water system shall issue repeat notices at least once every 12 months by mail delivery (by direct mail or with the water bill) or by hand delivery, for as long as the violation exists or variance or exemption remains in effect. Repeat public notice may be included as part of the Consumer Confidence Report.

(B) If the owner or operator of a noncommunity water system issued the initial notice by continuously posting the notice, the posting must continue for as long as the violation exists, and in no case less than seven days. If the owner or operator of a noncommunity water system issued the initial notice by direct delivery, notice by direct delivery must be repeated at least every 12 months for as long as the violation exists.

(4) The owner or operator of the public water system must issue a notice when the public water system has corrected the violation. This notice must be issued in the same manner as the original notice was issued.

(d) Each public notice must conform to the following general requirements.

(1) The notice must contain a clear and readily understandable explanation of the violation, significant deficiency, or situation that led [~~lead~~] to the notification. The notice must not contain very small print, unduly technical language, formatting, or other items that frustrate or defeat the purpose of the notice.

(2) If the notice is required for a specific event or significant deficiency, it must state when the event occurred or the date the significant deficiency was identified by the executive director.

(3) For notices required under subsections (a), (b), or (c)(1)(A) of this section, the notice must describe potential adverse health effects.

(A) For MCL, MRDL, or treatment technique violations or situations (including uncorrected significant deficiencies), the notice must contain the mandatory federal contaminant-specific language contained in 40 Code of Federal Regulations (CFR) Subpart Q, Appendix B, in addition to any language required by the executive director.

(B) For fluoride SCL violations, the notice must contain the mandatory federal contaminant-specific language contained in 40 CFR §141.208, in addition to any language required by the executive director.

(C) For failure to perform any 3 months of raw surface water monitoring or request bin classification from the executive director, the notice must contain the mandatory federal contaminant specific language contained in 40 CFR §141.211(d)(1) and [~~40 CFR §141.211(d)~~](2), respectively, in addition to any language required by the executive director.

(D) The notice must describe the population at risk, especially subpopulations particularly vulnerable if exposed to the given contaminant.

(4) The notice must state what actions the water system is taking to correct the violation or situation, and when the water system expects to return to compliance. For groundwater systems with significant deficiencies, the notice must contain the executive director-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed.

(5) The notice must state whether alternative drinking water sources should be used, and what other actions consumers should take, including when they should seek medical help, if known.

(6) Each notice must contain the name, business address and telephone number at which consumers may contact the owner, op-

erator, or designee of the public water system for additional information concerning the notice.

(7) Where appropriate, the notice must be multilingual. The multilingual notice must explain the importance of the notice or provide a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

(8) The notice shall include a statement to encourage the notice recipient to distribute the public notice to the other persons served.

(9) Systems with variances or exemptions must notify in accordance with 40 CFR §141.205(b).

(10) Systems must notify customers at sampled taps of the results of any required lead or copper analyses and certify completion of the notification to the executive director.

(e) Notice to new billing units. The owner or operator of a community water system must give a copy of the most recent public notice for any outstanding violation of any MCL, or any treatment technique requirement, or any variance or exemption schedule to all new billing units or new hookups prior to or at the time service begins. The owner or operator of a noncommunity water system must continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

(f) Proof of public notification. A copy of any public notice required under this section must be submitted to the executive director within ten days of its distribution as proof of public notification. The copies must be mailed to the Water Supply Division, MC 155, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. Each proof of public notification must be accompanied with a signed Certificate of Delivery.

(g) Notice to consecutive systems. A public water system that is required to notify its customers must also provide a copy of the notification to the owner or operator of any public water systems that purchase or otherwise receive water from it in the same manner in which they inform their customers. Each public water system that is affected by the subject of the notification is responsible for notification to its own customers.

(h) Notices given by the executive director. The executive director may give the notice required by this section on behalf of the owner and operator of the public water system following the requirements of this section. The owner or operator of the public water system remains responsible for ensuring that the requirements of this section are met.

(i) If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the executive director may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the executive director for limiting distribution of the notice must be granted in writing.

This agency hereby certifies that the proposal has been reviewed by legal counsel and found to be within the agency's legal authority to adopt.

Filed with the Office of the Secretary of State on June 1, 2012.

TRD-201202798

Robert Martinez
Director, Environmental Law Division
Texas Commission on Environmental Quality
Earliest possible date of adoption: July 15, 2012
For further information, please call: (512) 239-2548

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SUBCHAPTER H. CONSUMER CONFIDENCE REPORTS

30 TAC §290.275

Statutory Authority

The amendment is proposed under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule; Texas Health and Safety Code (THSC), §341.031(a), which establishes the commission's authority to adopt and enforce rules to implement the federal Safe Drinking Water Act (42 United States Code, §§300f *et seq.);* THSC, §341.0315, which requires public drinking water systems to comply with commission rules adopted to ensure the supply of safe drinking water.

The proposed amendment implements the federal Ground Water Rule, which implements the federal Safe Drinking Water Act.

§290.275. Appendices A - D.

The following appendices are integral components of the subchapter.

(1) Appendix A--Converting MCL Compliance Values for Consumer Confidence Reports.
Figure: 30 TAC §290.275(1)
[~~Figure: 30 TAC §290.275(1)~~]

(2) Appendix B--Sources of Regulated Contaminants.
Figure: 30 TAC §290.275(2)
[~~Figure: 30 TAC §290.275(2)~~]

(3) Appendix C--Health Effects Language.
Figure: 30 TAC §290.275(3) (No change.)

(4) Appendix D--Unregulated Contaminants.
Figure: 30 TAC §290.275(4) (No change.)

This agency hereby certifies that the proposal has been reviewed by legal counsel and found to be within the agency's legal authority to adopt.

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CHAPTER 291. UTILITY REGULATIONS

SUBCHAPTER L. STANDARDS OF EMERGENCY OPERATIONS

30 TAC §291.161, §291.162

The Texas Commission on Environmental Quality (TCEQ or commission) proposes amendments to §291.161 and §291.162.

Background and Summary of the Factual Basis for the Proposed Rules

This rulemaking is proposed to amend Chapter 291 to incorporate the requirements of House Bill (HB) 805 from the 82nd Legislature, 2011.

Senate Bill (SB) 361, 81st Legislature, 2009, was incorporated into the TCEQ rules in 2009. SB 361 required a retail public utility, exempt utility, or provider or conveyor of potable or raw water in a county with a population of 3.3 million or in an adjacent county with a population of 400,000 or more that furnishes water service to more than one customer to: ensure the emergency operation of its water system during an extended power outage, as soon as safe and practicable following the occurrence of a natural disaster; adopt an emergency preparedness plan (EPP) that demonstrates the affected utility's ability to provide emergency operations; and, submit the plan to the commission for approval.

SB 361 required TCEQ to adopt rules implementing Texas Water Code (TWC), §13.1395, that required affected utilities ensure emergency operation at 35 pounds per square inch (psi) through the adoption of an EPP. Currently, affected utilities with customers in Harris County are required to submit and implement an EPP. Based on HB 805, affected utilities in Harris and Fort Bend Counties will be required by the proposed rules to prepare and submit an EPP for TCEQ review and approval by February 1, 2012, and to begin implementing the plan by June 1, 2012.

In a corresponding rulemaking published in this issue of the *Texas Register,* the commission also proposes revisions to 30 TAC Chapter 290, Public Drinking Water.

Section by Section Discussion

§291.161, Definitions

The commission proposes to amend §290.161(1)(B), the definition of "Affected utility," to change the population threshold from 400,000 to 550,000 as required by HB 805.

§291.162, Emergency Operation of an Affected Utility

The commission proposes to amend §291.162(j) to update the due dates for submitting the EPP. The current rule requires systems that exist as of December 1, 2009, to submit an EPP by March 1, 2010. The proposed changes require a system that exists as of November 1, 2011, to submit an EPP by February 1, 2012. The updated dates were included in HB 805. The commission proposes to add §291.162(k) to include the due date for implementing an EPP as June 1, 2012, as required by HB 805. The commission proposes to renumber existing §291.162(k) - (m) to accommodate the addition of proposed §291.162(k).

Fiscal Note: Costs to State and Local Government

Jeffrey Horvath, Strategic Planning and Assessment Section Analyst, has determined that for the first five-year period the proposed rules are in effect, in general no significant fiscal implications are anticipated for the agency or for other units of state or local government as a result of administration or enforcement of the proposed rules. The proposed rules will affect certain water utilities in Harris and Fort Bend Counties and may result in fiscal implications for these utilities as they may choose to purchase backup power generators.

The proposed rulemaking implements the requirements of HB 805 from the 82nd Legislature, 2011. In 2009, the 81st Legislature enacted SB 361 to require that certain water utilities located in Harris County ensure the emergency operation of their water systems during an extended power outage after a natural disaster. The requirements of the bill did not include utilities in Fort Bend County. HB 805 amended the TWC by changing the population threshold of an affected county from 400,000 to 550,000. This statutory change mandates that the water utility EPP requirements apply to Fort Bend County as well as to Harris County. HB 805 also specifies that the newly affected utilities in Fort Bend and Harris Counties are required to submit an EPP to the TCEQ for review and approval by February 1, 2012.

The newly affected utilities include those that furnish potable or raw water to more than one customer, as well as cities, water districts, river authorities, non-profit water supply corporations, and investor owned utilities. The proposed rules are anticipated to affect approximately 161 water systems in Harris and Fort Bend Counties. These 161 systems include all affected utilities in Fort Bend County and the utilities in Harris County that began operation after the deadlines set forth in SB 361. Of the 161 systems, the proposed rules are anticipated to affect approximately 121 water systems owned by local governments, four state-owned water systems, and 36 privately owned systems.

In a corresponding rulemaking, the commission also proposes revisions to Chapter 290, which will also incorporate changes required by the passage of HB 805. Of the 161 newly affected utilities, 157 meet the definition of a public water system applicable to Chapter 290 (public water systems with at least 15 connections or 25 people). Because the proposed rulemaking affects facilities regulated under the public drinking water requirements in Chapter 290 and the utility regulation requirements under Chapter 291, this fiscal note will include all 161 systems because the proposed amendments will apply to facilities regulated under both chapters.

Affected water utilities will have to prepare an EPP that will ensure the operation of its water system at 35 psi during an extended power outage by one or more of the following options: automatically starting auxiliary generators, sharing of auxiliary generator capacity, negotiation of leasing and contracting agreements (mutual aid agreements), use of portable generators, on-site electrical generation, hardening of the electric transmission and distribution system, or direct engine or right angle drives. Even though affected utilities have these options, agency experience with utilities in Harris County already subject to the EPP requirements has shown that utilities have chosen to either purchase a generator or enter into a mutual aid agreement with another utility. In fact, based upon this experience, staff estimates that 80% of the newly affected utilities will choose to purchase a generator rather than enter into a mutual aid agreement even though a mutual aid agreement that complies with the requirements of the proposed rules is not expected to result in additional costs for the affected utilities. This fiscal note assumes that utility costs will be based upon whether they purchase a generator or enter into a mutual aid agreement.

Systems serving 250 or more connections that do not have elevated storage were already required to have emergency power before the passage of SB 361. Therefore, it is assumed that entities with less than 250 connections will need to either enter into

a mutual aid agreement or purchase a generator (typically a 150 kilowatt diesel generator is adequate to power their facilities). There are approximately 34 systems with fewer than 250 connections that are owned by units of state or local government. Staff estimates that the cost of a new 150 kilowatt generator including installation is approximately $55,000. Staff also estimates that 80% of the newly affected utilities will choose to purchase a generator rather than enter into a mutual aid agreement. Therefore, the total estimated costs to purchase generators for approximately 27 water utilities owned by units of state or local government is estimated to be $1,485,000. Maintenance costs are estimated to be approximately $1,000 each year per generator or $27,000 each year for all 27 utilities. Individuals served by these systems can expect to pay more for their water services if the utility purchases a generator. The cost increase will depend upon the number of connections serviced by the utility and the number of facilities owned by the local government. Individuals would also be expected to benefit from the continued function of their water service during and after a natural disaster.

One affected utility that is owned by a local government pumps raw surface water to other systems that use the surface water to produce drinking water. The cost of a generator for the raw water pumps would be more expensive because raw water pumps require more power. A 500 kilowatt generator for this utility is expected to cost approximately $106,750.

The TCEQ will be required to review and respond to EPP submittals from the newly affected utilities. The agency will also be required to inspect the newly affected utilities to ensure compliance with the approved EPP. The Water Supply Division will use currently available resources to contract for the review of the EPP submittals in Fiscal Year 2012. The agency will also be required to inspect the newly affected utilities for compliance and may need to expend additional resources in Fiscal Year 2013, depending on compliance rates and whether follow up enforcement activities will be required.

Public Benefits and Costs

Mr. Horvath also determined that for each year of the first five years the proposed rules are in effect, the public benefit anticipated from the changes seen in the proposed rules will be the additional protection of human health and safety by ensuring the continued operation of water utilities following a natural disaster.

In general, the proposed rules are not anticipated to have significant fiscal implications for businesses or individuals. However, the proposed rules will affect approximately 36 private or investor owned water utilities in Harris and Fort Bend Counties. Individual customers of these newly affected utilities may be required to pay higher water rates if these utilities purchase and maintain generators. Of the 36 identified water utilities, some have more than 100 connections and therefore will have to spend more for larger generators than those utilities with 100 or less connections. Staff estimates that a privately owned utility with 100 connections or less will need to purchase a 50 kilowatt generator that is estimated to cost $31,900 (about $6.00 per connection per month including maintenance costs). However, these costs are highly dependent of the number of facilities the utility has and the number of customers. Maintenance costs are estimated to be approximately $1,000 each year. If all 36 utilities purchase a 50 kilowatt generator, costs could total approximately $1,148,400 in the first year the rules become effective.

Small Business and Micro-Business Assessment

In general, no adverse fiscal implications are anticipated for small or micro-businesses as a result of the administration or implementation of the proposed rules. However, the proposed rules will affect approximately 36 private or investor owned water utilities in Harris and Fort Bend Counties. These privately owned utilities are thought to be either a small or micro-business. Individuals who are customers of these affected utilities may be required to pay higher water rates if these utilities choose to purchase generators. Of the 36 identified water utilities, some have more than 100 connections and therefore will have to spend more for larger generators than those utilities with 100 or less connections. Staff estimates that a 50 kilowatt generator would cost approximately $31,900 and that consumers may see a cost increase of about $6.00 per connection per month. However, these costs are highly dependent on the number of utility facilities and the number of customers. If all 36 utilities purchase a 50 kilowatt generator, costs could total approximately $1,148,400 in the first year the rules become effective.

Small Business Regulatory Flexibility Analysis

The commission has reviewed this proposed rulemaking and determined that a small business regulatory flexibility analysis is not required because the proposed rules are required in order to implement state law and are necessary to protect public health and safety in the event of a natural disaster.

Local Employment Impact Statement

The commission has reviewed this proposed rulemaking and determined that a local employment impact statement is not required because the proposed rules do not adversely affect a local economy in a material way for the first five years that the proposed rules are in effect.

Draft Regulatory Impact Analysis Determination

The commission reviewed the proposed rules in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking does not meet the definition of a "major environmental rule" as defined by that statute. A "major environmental rule" means a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state, Texas Government Code, §2001.0225(g)(3).

This rulemaking does not meet the statutory definition of a "major environmental rule" because it is not the specific intent of these rules to protect the environment or reduce risks to human health from environmental exposure. The specific intent of the proposed rules are to require certain water utilities, providers, and conveyors, to have EPPs for maintaining water pressure following a disruption in service caused by a natural disaster. These rules are not required by federal regulations.

The proposed amendments to Chapter 291 made in response to HB 805 change the county population threshold from 400,000 to 550,000 for identifying affected utilities, as well as providing time tables for newly affected utilities to comply with the requirements of TWC, §13.1395.

Further, this rulemaking does not meet the statutory definition of a "major environmental rule" because the proposed amendments would not adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector

of the state. The specific intent of the proposed rules is to bring Chapter 291 into conformity with HB 805. The proposed amendments expand the counties to which the EPP requirement applies and provides a timeline for newly affected utilities to comply. It is not anticipated that the cost of complying with the proposed amendments will be significant with respect to the economy as a whole; therefore, the proposed amendments will not adversely affect in a material way the economy, a sector of the economy, competition, or jobs.

Additionally, the rulemaking does not meet any of the four applicability criteria for requiring a regulatory impact analysis for a major environmental rule, which are listed in Texas Government Code, §2001.0225(a). This section only applies to a major environmental rule, the result of which is to: 1) exceed a standard set by federal law, unless the rule is specifically required by state law; 2) exceed an express requirement of state law, unless the rule is specifically required by federal law; 3) exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement a state and federal program; or 4) adopt a rule solely under the general powers of the agency instead of under a specific state law.

This rulemaking does not meet any of these four applicability requirements because this rulemaking: 1) does not exceed any standard set by federal law; 2) does not exceed an express requirement of state law; 3) does not exceed a requirement of a delegation agreement or contract between the state and an agency or representative of the federal government to implement any state and federal program on treatment of water used in public water systems, but rather is proposed to be consistent with state law, to ensure the emergency operation of water systems following a natural disaster; and 4) is not adopted solely under the general powers of the agency, but rather specifically under TWC, §13.041, which allows the commission to adopt and enforce rules reasonably required in the exercise of its powers and jurisdiction, including rules governing practice and procedure before the commission.

The commission invites public comment regarding the draft regulatory impact analysis determination during the public comment period. Written comments on the draft regulatory impact analysis determination may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Takings Impact Assessment

The commission evaluated these proposed rules and performed an analysis of whether these proposed rules constitute a taking under Texas Government Code, Chapter 2007. The specific purpose of these proposed rules is to implement certain recently enacted legislation relating to the emergency preparedness of affected utilities. The proposed rules change the number of counties in which "affected utility" will be required to have EPPs. This rulemaking substantially advances this stated purpose by making the commission's rules consistent with HB 805. The commission's analysis indicates that Texas Government Code, Chapter 2007 does not apply to these proposed rules because this action does not affect private real property.

Promulgation and enforcement of these proposed rules will constitute neither a statutory nor a constitutional taking of private real property. The proposed regulations do not adversely affect a landowner's rights in private real property, in whole or in part, temporarily or permanently, because this rulemaking does not burden nor restrict the owner's right to property. More specifically, these rules implement legislation addressing the adoption of EPPs by "affected utilities." These provisions do not impose any burdens or restrictions on private real property. Therefore, the proposed amendments do not constitute a taking under Texas Government Code, Chapter 2007.

Consistency with the Coastal Management Program

The commission reviewed the proposed rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor will they affect any action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the proposed rules are not subject to the Texas Coastal Management Program.

Written comments on the consistency of this rulemaking may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Announcement of Hearing

The commission will hold a public hearing on this proposal in Austin on July 10, 2012, at 10:00 a.m. in Building E, Room 201S, at the commission's central office located at 12100 Park 35 Circle. The hearing is structured for the receipt of oral or written comments by interested persons. Individuals may present oral statements when called upon in order of registration. Open discussion will not be permitted during the hearing; however, commission staff members will be available to discuss the proposal 30 minutes prior to the hearing.

Persons who have special communication or other accommodation needs who are planning to attend the hearing should contact Sandy Wong, Office of Legal Services, at (512) 239-1802. Requests should be made as far in advance as possible.

Submittal of Comments

Written comments may be submitted to Michael Parrish, MC 205, Office of Legal Services, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087, or faxed to (512) 239-4808. Electronic comments may be submitted at: *http://www5.tceq.texas.gov/rules/ecomments/*. File size restrictions may apply to comments being submitted via the eComments system. All comments should reference Rule Project Number 2011-056-290-OW. The comment period closes July 16, 2012. Copies of the proposed rulemaking can be obtained from the commission's Web site at *http://www.tceq.texas.gov/nav/rules/propose_adopt.html.* For further information, please contact Matt Court, Public Drinking Water Section, (512) 239-5844.

Statutory Authority

These amendments are proposed under Texas Water Code (TWC), §5.013, which establishes the general jurisdiction of the commission; TWC, §5.102, which establishes the commission's general authority to perform any act necessary to carry out its jurisdiction; TWC, §5.103, which establishes the commission's authority to adopt any rules necessary to carry out its powers and duties; TWC, §5.105, which establishes the commission's authority to set policy by rule. In addition, TWC, §13.041 states that the commission may regulate and supervise the business of every water and sewer utility within its jurisdiction and may do all things, whether specifically designated or implied by TWC, Chapter 13, necessary and convenient to the exercise of this power and jurisdiction. Further, TWC, §13.041 states that the

commission shall adopt and enforce rules reasonably required in the exercise of its powers and jurisdiction, including rules governing practice and procedure before the commission.

The proposed amendments implement TWC, §13.1395 as amended by HB 805.

§291.161. Definitions.

For the purposes of this subchapter, the following definitions apply.

(1) Affected utility--Any retail public utility, exempt utility, or provider or conveyor of potable or raw water service that furnishes water service to more than one customer:

(A) In a county with a population of 3.3 million or more; or

(B) In a county with a population of 550,000 [~~400,000~~] or more adjacent to a county with a population of 3.3 million or more.

(2) Emergency operations--The operation of a water system during an extended power outage at a minimum water pressure of 35 pounds per square inch.

(3) Extended power outage--A power outage lasting for more than 24 hours.

(4) Population--The population shown by the most recent federal decennial census.

§291.162. Emergency Operation of an Affected Utility.

(a) An affected utility shall adopt and submit to the executive director for its approval an emergency preparedness plan that demonstrates the utility's ability to provide emergency operations.

(b) The executive director shall review an emergency preparedness plan submitted by an affected utility. If the executive director determines that the plan is not acceptable, the executive director shall recommend changes to the plan. The executive director must make its recommendations on or before the 90th day after the executive director receives the plan.

(c) An emergency preparedness plan shall provide for one of the following:

(1) the maintenance of automatically starting auxiliary generators;

(2) the sharing of auxiliary generator capacity with one or more affected utilities;

(3) the negotiation of leasing and contracting agreements, including emergency mutual aid agreements with other retail public utilities, exempt utilities, or providers or conveyors of potable or raw water service, if the agreements provide for coordination with the division of emergency management in the governor's office;

(4) the use of portable generators capable of serving multiple facilities equipped with quick-connect systems;

(5) the use of on-site electrical generation or distributed generation facilities;

(6) hardening the electric transmission and distribution system serving the water system;

(7) for existing facilities, the maintenance of direct engine or right angle drives; or

(8) any other alternative determined by the executive director to be acceptable.

(d) Each affected utility that supplies, provides, or conveys surface water to wholesale customers shall include in its emergency preparedness plan provisions for the actual installation and maintenance of automatically starting auxiliary generators or distributive generation facilities for each raw water intake pump station, water treatment plant, pump station, and pressure facility necessary to provide water to its wholesale customers.

(e) The affected utility may use the template in Appendix J of §290.47 of this title (relating to Appendices) to assist in preparation of the plan.

(f) An emergency generator used as part of an approved emergency preparedness plan must be operated and maintained according to the manufacturer's specifications.

(g) The executive director may grant a waiver of the requirements of this section to an affected utility if the executive director determines that compliance with this section will cause a significant financial burden on customers of the affected utility. The affected utility shall submit financial, managerial, and technical information as requested by the executive director to demonstrate the financial burden.

(h) An affected utility may adopt and is encouraged to enforce limitations on water use while the utility is providing emergency operations.

(i) Information provided by an affected utility under this subchapter is confidential and is not subject to disclosure under Texas Government Code, Chapter 552.

(j) Affected utilities that are existing as of November 1, 2011 [~~December 1, 2009~~], shall submit the emergency preparedness plan to the executive director no later than February 1, 2012 [~~March 1, 2010~~].

(k) Affected utilities that are existing as of November 1, 2011, shall implement the emergency preparedness plan approved by the executive director no later than June 1, 2012.

(l) [~~(k)~~] Affected utilities which are established after the effective date of this rule must have emergency preparedness plans approved and implemented prior to providing water to customers.

(m) [~~(l)~~] An affected utility may file with the executive director a written request for an extension, not to exceed 90 days, of the date by which the affected utility is required under this subchapter to submit the affected utility's emergency preparedness plan or the date the affected utility is required to implement the plan.

(n) [~~(m)~~] If an affected utility fails to provide a minimum of 35 pounds per square inch throughout the distribution system during emergency operations as soon as it is safe and practicable following the occurrence of a natural disaster, a revised emergency preparedness plan shall be submitted for review and approval within 180 days of the date normal power is restored. Based on the review of the revised emergency preparedness plan, the executive director may require additional or alternative auxiliary emergency facilities.

This agency hereby certifies that the proposal has been reviewed by legal counsel and found to be within the agency's legal authority to adopt.

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TRD-201202800
Robert Martinez
Director, Environmental Law Division
Texas Commission on Environmental Quality
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Figure: 30 TAC §290.275(1)

Appendix A - Converting Maximum Contaminant Level Compliance Values for Consumer Confidence Reports (CCR)

Key	
AL	Action Level
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MFL	million fibers per liter
mrem/year	millirems per year (a measure of radiation absorbed by the body)
n/a	Not Applicable
NTU	Nephelometric Turbidity Units
pCi/L	picocuries per liter (a measure of radioactivity)
ppm	parts per million, or milligrams per liter (mg/L)
ppb	parts per billion, or micrograms per liter (µg/L)
ppt	parts per trillion, or nanograms per liter
ppq	parts per quadrillion, or picograms per liter
TT	Treatment Technique

Contaminant	**MCL in compliance units (mg/L)**	**multiply by...**	**MCL in CCR units**	**MCLG in CCR units**
Microbiological Contaminants				
1. Total Coliform Bacteria			For systems that collect 40 or more samples per month - Presence of coliform bacteria in more than 5% of monthly samples. For systems that collect fewer than 40 samples per month - Presence of coliform bacteria in more than 1 sample per month.	0
2. Fecal coliform and *E. coli*			A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or *E. coli* positive. An uncorrected *E. coli*-positive sample at the raw groundwater source is a TT for the Ground Water Rule (GWR).	0

3. Fecal indicators (enterococci or coliphage)			TT. An uncorrected fecal indicator-positive sample at the raw groundwater source is a TT for the GWR.	n/a
4. Total organic carbon			TT (ppm)	n/a
5. Turbidity			TT (NTU)	n/a
Radioactive Contaminants				
6. Beta/photon emitters	4 mrem/yr		4 mrem/yr	0
7. Alpha emitters	15 pCi/L		15 pCi/L	0
8. Combined radium	5 pCi/L		5 pCi/L	0
9. Uranium	30 µg/L		30 µg/L	0
Inorganic Contaminants				
10. Antimony	.006	1000	6 ppb	6
11. Arsenic	.010	1000	10 ppb	n/a
12. Asbestos	7 MFL		7 MFL	7
13. Barium	2		2 ppm	2
14. Beryllium	.004	1000	4 ppb	4
15. Bromate	.010	1000	10 ppb	0
16. Cadmium	.005	1000	5 ppb	5
17. Chloramines	MRDL=4		MRDL=4 ppm	4
18. Chlorine	MRDL=4		MRDL=4 ppm	4
19. Chlorine Dioxide	MRDL=.8	1000	MRDL=800 ppb	800
20. Chlorite	1.0		1 ppm	0.8
21. Chromium	.1	1000	100 ppb	100
22. Copper	AL=1.3		AL=1.3 ppm	1.3
23. Cyanide	.2	1000	200 ppb	200
24. Fluoride	4		4 ppm	4
25. Lead	AL=.015	1000	AL=15 ppb	0
26. Mercury (inorganic)	.002	1000	2 ppb	2
27. Nitrate (as Nitrogen)	10		10 ppm	10
28. Nitrite (as Nitrogen)	1		1 ppm	1
29. Selenium	.05	1000	50 ppb	50
30. Thallium	.002	1000	2 ppb	0.5
Synthetic Organic Contaminants including Pesticides and Herbicides				
31. 2,4-D	.07	1000	70 ppb	70
32. 2,4,5-TP (Silvex)	.05	1000	50 ppb	50
33. Acrylamide			TT	0
34. Alachlor	.002	1000	2 ppb	0
35. Atrazine	.003	1000	3 ppb	3
36. Benzo(a)pyrene (PAH)	.0002	1,000,000	200 ppt	0
37. Carbofuran	.04	1000	40 ppb	40
38. Chlordane	.002	1000	2 ppb	0
39. Dalapon	.2	1000	200 ppb	200
40. Di(2-ethylhexyl) adipate	.4	1000	400 ppb	400
41. Di(2-ethylhexyl) phthalate	.006	1000	6 ppb	0
42. Dibromochloropropane	.0002	1,000,000	200 ppt	0
43. Dinoseb	.007	1000	7 ppb	7
44. Diquat	.02	1000	20 ppb	20

45. Dioxin (2,3,7,8-TCDD)	.00000003	1,000,000,000	30 ppq	0
46. Endothall	.1	1000	100 ppb	100
47. Endrin	.002	1000	2 ppb	2
48. Epichlorohydrin			TT	0
49. Ethylene dibromide	.00005	1,000,000	50 ppt	0
50. Glyphosate	.7	1000	700 ppb	700
51. Heptachlor	.0004	1,000,000	400 ppt	0
52. Heptachlor epoxide	.0002	1,000,000	200 ppt	0
53. Hexachlorobenzene	.001	1000	1 ppb	0
54. Hexachloro-cyclopentadiene	.05	1000	50 ppb	50
55. Lindane	.0002	1,000,000	200 ppt	200
56. Methoxychlor	.04	1000	40 ppb	40
57. Oxamyl (Vydate)	.2	1000	200 ppb	200
58. PCBs (Polychlorinated biphenyls)	.0005	1,000,000	500 ppt	0
59. Pentachlorophenol	.001	1000	1 ppb	0
60. Picloram	.5	1000	500 ppb	500
61. Simazine	.004	1000	4 ppb	4
62. Toxaphene	.003	1000	3 ppb	0
Volatile Organic Contaminants				
63. Benzene	.005	1000	5 ppb	0
64. Carbon tetrachloride	.005	1000	5 ppb	0
65. Chlorobenzene	.1	1000	100 ppb	100
66. o-Dichlorobenzene	.6	1000	600 ppb	600
67. p-Dichlorobenzene	.075	1000	75 ppb	75
68. 1,2-Dichloroethane	.005	1000	5 ppb	0
69. 1,1-Dichloroethylene	.007	1000	7 ppb	7
70. cis-1,2-Dichloroethylene	.07	1000	70 ppb	70
71. trans-1,2-Dichloroethylene	.1	1000	100 ppb	100
72. Dichloromethane	.005	1000	5 ppb	0
73. 1,2-Dichloropropane	.005	1000	5 ppb	0
74. Ethylbenzene	.7	1000	700 ppb	700
75. Haloacetic acids	0.060	1000	60 ppb	n/a
76. Styrene	.1	1000	100 ppb	100
77. Tetrachloroethylene	.005	1000	5 ppb	0
78. 1,2,4-Trichlorobenzene	.07	1000	70 ppb	70
79. 1,1,1-Trichloroethane	.2	1000	200 ppb	200
80. 1,1,2-Trichloroethane	.005	1000	5 ppb	3
81. Trichloroethylene	.005	1000	5 ppb	0
82. TTHMs (Total trihalomethanes)	.10	1000	100 ppb	n/a
83. Toluene	1		1 ppm	1
84. Vinyl Chloride	.002	1000	2 ppb	0
85. Xylenes	10		10 ppm	10

Figure: 30 TAC §290.275(2)

Appendix B - Sources of Regulated Contaminants

Key	
AL	Action Level
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MFL	million fibers per liter
mrem/year	millirems per year (a measure of radiation absorbed by the body)
n/a	Not Applicable
NTU	Nephelometric Turbidity Units
pCi/L	picocuries per liter (a measure of radioactivity)
ppm	parts per million, or milligrams per liter (mg/L)
ppb	parts per billion, or micrograms per liter (µg/L)
ppt	parts per trillion, or nanograms per liter
ppq	parts per quadrillion, or picograms per liter
TT	Treatment Technique

Contaminant (units)	**MCLG**	**MCL**	**Major sources in drinking water**
Microbiological Contaminants			
1. Total Coliform Bacteria	0	For systems that collect 40 or more samples per month - Presence of coliform bacteria in more than 5% of monthly samples. For systems that collect fewer than 40 samples per month - Presence of coliform bacteria in more than 1 sample per month.	Naturally present in the environment.
2. Fecal coliform and *E. coli*	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or *E. coli* positive. An uncorrected *E. coli*-positive sample at the raw groundwater source is a TT for the Ground Water Rule (GWR).	Human and animal fecal waste.
3. Fecal indicators (enterococci or coliphage)	n/a	TT. An uncorrected fecal indicator-positive sample at the raw groundwater source is a TT for the GWR.	Human and animal fecal waste.
4. Total organic carbon (ppm)	n/a	TT	Naturally present in the environment.

5. Turbidity	n/a	TT	Soil runoff.
Radioactive Contaminants			
6. Beta/photon emitters (mrem/yr)	0	4	Decay of natural and man-made deposits.
7. Alpha emitters (pCi/L)	0	15	Erosion of natural deposits.
8. Combined radium (µg/L)	0	5	Erosion of natural deposits.
Inorganic Contaminants			
9. Uranium (µg/L)	0	30	Erosion of natural deposits.
10. Antimony (ppb)	6	6	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
11. Arsenic (ppb)	n/a	10	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
12. Asbestos (MFL)	7	7	Decay of asbestos cement water mains; Erosion of natural deposits.
13. Barium (ppm)	2	2	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
14. Beryllium (ppb)	4	4	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries.
15. Bromate (ppb)	0	10	By-product of drinking water disinfection.
16. Cadmium (ppb)	5	5	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; runoff from waste batteries and paints.
17. Chloramines (ppm)	MRDLG=4	MRDL=4	Water additive used to control microbes.
18. Chlorine (ppm)	MRDLG=4	MRDL=4	Water additive used to control microbes.
19. Chlorine Dioxide (ppb)	800	800	Water additive used to control microbes.
20. Chlorite (ppm)	1.0	1.0	By-product of drinking water disinfection.
21. Chromium (ppb)	100	100	Discharge from steel and pulp mills; Erosion of natural deposits.
22. Copper (ppm)	1.3	AL=1.3	Corrosion of household plumbing systems; Erosion of natural deposits.
23. Cyanide (ppb)	200	200	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.
24. Fluoride (ppm)	4	4	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.

25. Lead (ppb)	0	AL=15	Corrosion of household plumbing systems; Erosion of natural deposits.
26. Mercury (inorganic) (ppb)	2	2	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland.
27. Nitrate (as Nitrogen) (ppm)	10	10	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
28. Nitrite (as Nitrogen) (ppm)	1	1	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
29. Selenium (ppb)	50	50	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.
30. Thallium (ppb)	0.5	2	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories.
Synthetic Organic Contaminants including Pesticides and Herbicides			
31. 2,4-D (ppb)	70	70	Runoff from herbicide used on row crops.
32. 2,4,5-TP (Silvex) (ppb)	50	50	Residue of banned herbicide.
33. Acrylamide	0	TT	Added to water during sewage/wastewater treatment.
34. Alachlor (ppb)	0	2	Runoff from herbicide used on row crops.
35. Atrazine (ppb)	3	3	Runoff from herbicide used on row crops.
36. Benzo(a)pyrene (PAH) (nanograms/L)	0	200	Leaching from linings of water storage tanks and distribution lines.
37. Carbofuran (ppb)	40	40	Leaching of soil fumigant used on rice and alfalfa.
38. Chlordane (ppb)	0	2	Residue of banned termiticide.
39. Dalapon (ppb)	200	200	Runoff from herbicide used on rights of way.
40. Di(2-ethylhexyl) adipate (ppb)	400	400	Discharge from chemical factories.
41. Di(2-ethylhexyl)phthalate (ppb)	0	6	Discharge from rubber and chemical factories.
42. Dibromochloropropane (ppt)	0	200	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards.
43. Dinoseb (ppb)	7	7	Runoff from herbicide used on soybeans and vegetables.
44. Diquat (ppb)	20	20	Runoff from herbicide use.
45. Dioxin (2,3,7,8-TCDD) (ppq)	0	30	Emissions from waste incineration and other combustion; Discharge from chemical factories.
46. Endothall (ppb)	100	100	Runoff from herbicide use.

47. Endrin (ppb)	2	2	Residue of banned insecticide.
48. Epichlorohydrin	0	TT	Discharge from industrial chemical factories; An impurity of some water treatment chemicals.
49. Ethylene dibromide (ppt)	0	50	Discharge from petroleum refineries.
50. Glyphosate (ppb)	700	700	Runoff from herbicide use.
51. Heptachlor (ppt)	0	400	Residue of banned termiticide.
52. Heptachlor epoxide (ppt)	0	200	Breakdown of heptachlor.
53. Hexachlorobenzene (ppb)	0	1	Discharge from metal refineries and agricultural chemical factories.
54. Hexachlorocyclopentadiene (ppb)	50	50	Discharge from chemical factories.
55. Lindane (ppt)	200	200	Runoff/leaching from insecticide used on cattle, lumber, gardens.
56. Methoxychlor (ppb)	40	40	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock.
57. Oxamyl (Vydate) (ppb)	200	200	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes.
58. PCB (Polychlorinated biphenyls) (ppt)	0	500	Runoff from landfills; Discharge of waste chemicals.
59. Pentachlorophenol (ppb)	0	1	Discharge from wood preserving factories.
60. Picloram (ppb)	500	500	Herbicide runoff.
61. Simazine (ppb)	4	4	Herbicide runoff.
62. Toxaphene (ppb)	0	3	Runoff/leaching from insecticide used on cotton and cattle.
Volatile Organic Compounds			
63. Benzene (ppb)	0	5	Discharge from factories; Leaching from gas storage tanks and landfills.
64. Carbon tetrachloride (ppb)	0	5	Discharge from chemical plants and other industrial activities.
65. Chlorobenzene (ppb)	100	100	Discharge from chemical and agricultural chemical factories.
66. o-Dichlorobenzene (ppb)	600	600	Discharge from industrial chemical factories.
67. p-Dichlorobenzene (ppb)	75	75	Discharge from industrial chemical factories.
68. 1,2-Dichloroethane (ppb)	0	5	Discharge from industrial chemical factories.
69. 1,1-Dichloroethylene (ppb)	7	7	Discharge from industrial chemical factories.
70. cis-1,2-Dichloroethylene (ppb)	70	70	Discharge from industrial chemical factories.
71. trans-1,2-Dichloroethylene (ppb)	100	100	Discharge from industrial chemical factories.

72. Dichloromethane (ppb)	0	5	Discharge from pharmaceutical and chemical factories.
73. 1,2-Dichloropropane (ppb)	0	5	Discharge from industrial chemical factories.
74. Ethylbenzene (ppb)	700	700	Discharge from petroleum refineries.
75. Haloacetic acids (HAA) (ppb)	n/a	60	By-product of drinking water disinfection.
76. Styrene (ppb)	100	100	Discharge from rubber and plastic factories; Leaching from landfills.
77. Tetrachloroethylene (ppb)	0	5	Leaching from PVC pipes; Discharge from factories and dry cleaners.
78. 1,2,4-Trichlorobenzene (ppb)	70	70	Discharge from textile-finishing factories.
79. 1,1,1-Trichloroethane (ppb)	200	200	Discharge from metal degreasing sites and other factories.
80. 1,1,2-Trichloroethane (ppb)	3	5	Discharge from industrial chemical factories.
81. Trichloroethylene (ppb)	0	5	Discharge from metal degreasing sites and other factories.
82. TTHMs (Total trihalomethanes) (ppb)	n/a	80	By-product of drinking water disinfection.
83. Toluene (ppm)	1	1	Discharge from petroleum factories.
84. Vinyl Chloride (ppb)	0	2	Leaching from PVC piping; Discharge from plastics factories.
85. Xylenes (ppm)	10	10	Discharge from petroleum factories; Discharge from chemical factories.

Federal Register Environmental Documents

National Primary Drinking Water Regulations: Ground Water Rule

Note: EPA no longer updates this information, but it may be useful as a reference or resource.

[Federal Register: November 21, 2006 (Volume 71, Number 224)]
[CORRECTIONS]
[Page 67427]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr21no06-88]

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 141
[EPA-HQ-OW-2002-0061; FRL-8231-9]
RIN 2040-AA97

National Primary Drinking Water Regulations: Ground Water Rule

Correction

In rule document 06-8763 beginning on page 65574 in the issue of Wednesday, November 8, 2006, make the following correction:

Sec. 141.402 [Corrected]

On page 65655, in Sec. 141.402(c)(2), the table is corrected to read as follows:

Analytical Methods for Source Water Monitoring

Fecal indicator \1\	Methodology	Method citation
E. coli.....	Colilert \3\.....	9223 B.\2\
	Colisure \3\.....	9223 B.\2\
	Membrane Filter Method with MI Agar.	EPA Method 1604.\4\
	m-ColiBlue24 Test \5\.	.....
	E*Colite Test \6\.....	.....
	EC-MUG \7\.....	9221 F.\2\
	NA-MUG \7\.....	9222 G.\2\
Enterococci	Multiple-Tube Technique.	9230B.\2\
	Membrane Filter	9230C.\2\

	Technique.	
	Membrane Filter Technique.	EPA Method 1600.\8\
	Enterolert \9\.....	.....
Coliphage.....	Two-Step Enrichment Presence-Absence Procedure.	EPA Method 1601.\10\
	Single Agar Layer Procedure.	EPA Method 1602.\11\

[FR Doc. C6-8763 Filed 11-20-06; 8:45 am]
BILLING CODE 1505-01-D

Notices For 2009 2008 2007 2006 2005 2004 2003 2002 2001 2000 1999 1998 1997 1996 1995 1994

IV. Statutory and Executive Order Reviews

Under the Clean Air Act, the Administrator is required to approve a SIP submission that complies with the provisions of the Act and applicable Federal regulations. 42 U.S.C. 7410(k); 40 CFR 52.02(a). Thus, in reviewing SIP submissions, EPA's role is to approve State choices, provided that they meet the criteria of the Clean Air Act. Accordingly, this action merely approves State law as meeting Federal requirements and does not impose additional requirements beyond those imposed by State law. For that reason, this action:

- Is not a ''significant regulatory action'' subject to review by the Office of Management and Budget under Executive Order 12866 (58 FR 51735, October 4, 1993);
- Does not impose an information collection burden under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 *et seq.*);
- Is certified as not having a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*);
- Does not contain any unfunded mandate or significantly or uniquely affect small governments, as described in the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4);
- Does not have Federalism implications as specified in Executive Order 13132 (64 FR 43255, August 10, 1999);
- Is not an economically significant regulatory action based on health or safety risks subject to Executive Order 13045 (62 FR 19885, April 23, 1997);
- Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001);
- Is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the Clean Air Act; and
- Does not provide EPA with the discretionary authority to address, as appropriate, disproportionate human health or environmental effects, using practicable and legally permissible methods, under Executive Order 12898 (59 FR 7629, February 16, 1994).

In addition, this rule does not have tribal implications as specified by Executive Order 13175 (65 FR 67249, November 9, 2000), because the SIP is not approved to apply in Indian country located in the State, and EPA notes that it will not impose substantial direct costs on tribal governments or preempt tribal law.

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this action and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register.** A major rule cannot take effect until 60 days after it is published in the **Federal Register.** This action is not a ''major rule'' as defined by 5 U.S.C. 804(2).

Under section 307(b)(1) of the Clean Air Act, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by January 11, 2010. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. This action may not be challenged later in proceedings to enforce its requirements (see section 307(b)(2)).

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Incorporation by reference, Intergovernmental relations, Particulate matter, Reporting and recordkeeping requirements.

Dated: September 18, 2009.

Jane Diamond,

Acting Regional Administrator, Region IX.

■ Part 52, Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

PART 52—[AMENDED]

■ 1. The authority citation for Part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart F—California

■ 2. Section 52.220 is amended by adding paragraphs (c)(364)(i)(A)(*2*) and (c)(364)(i)(B), and (c)(366) to read as follows:

§ 52.220 Identification of plan.

* * * * *

(c) * * *

(364) * * *

(i) * * *

(A) * * *

(*2*) Rule 4901, ''Wood Burning Fireplaces and Wood Burning Heaters,'' amended on October 16, 2008.

* * * * *

(B) South Coast Air Quality Management District.

(*1*) Rule 1158, ''Storage, Handling, and Transport of Coke, Coal and Sulfur,'' amended July 11, 2008.

* * * * *

(366) New and amended regulations for the following agencies were submitted on April 6, 2009, by the Governor's designee.

(i) *Incorporation by reference.*

(A) San Joaquin Valley Unified Air Pollution Control District.

(*1*) Rule 4103, ''Open Burning,'' amended May 17, 2007.

* * * * *

[FR Doc. E9–26958 Filed 11–9–09; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 141

[EPA–HQ–OW–2009–0707; FRL–8979–5]

Expedited Approval of Alternative Test Procedures for the Analysis of Contaminants Under the Safe Drinking Water Act; Analysis and Sampling Procedures

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This action announces the Environmental Protection Agency's (EPA's) approval of alternative testing methods for use in measuring the levels of contaminants in drinking water and determining compliance with national primary drinking water regulations. The Safe Drinking Water Act (SDWA) authorizes EPA to approve the use of alternative testing methods through publication in the **Federal Register.** EPA is using this streamlined authority to make 25 additional methods available for analyzing drinking water samples required by regulation. This expedited approach provides public water systems, laboratories, and primacy agencies with more timely access to new measurement techniques and greater flexibility in the selection of analytical methods, thereby reducing monitoring costs while maintaining public health protection.

DATES: This action is effective November 10, 2009.

FOR FURTHER INFORMATION CONTACT: Safe Drinking Water Hotline: (800) 426–4791

or Patricia Snyder Fair, Technical Support Center, Office of Ground Water and Drinking Water (MS 140), Environmental Protection Agency, 26 West Martin Luther King Drive, Cincinnati, OH 45268; telephone number: (513) 569–7937; e-mail address: *fair.pat@epa.gov.*

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does This Action Apply to Me?

Public water systems are the regulated entities required to measure contaminants in drinking water samples. In addition, EPA Regions as well as States and Tribal governments with authority to administer the regulatory program for public water systems under SDWA may also measure contaminants in water samples. When EPA sets a monitoring requirement in its national primary drinking water regulations for a given contaminant, the Agency also establishes in the regulations standardized test procedures for analysis of the contaminant. This action makes alternative testing methods available for particular drinking water contaminants beyond the testing methods currently established in the regulations. EPA is providing public water systems required to test water samples with a choice of using either a test procedure already established in the existing regulations or an alternative test procedure that has been approved in this action. Categories and entities that may ultimately be affected by this action include:

Category	Examples of potentially regulated entities	NAICS [1]
State, Local, & Tribal Governments	States, local and Tribal governments that analyze water samples on behalf of public water systems required to conduct such analysis; States, local and Tribal governments that themselves operate community and non-transient non-community water systems required to monitor.	924110
Industry	Private operators of community and non-transient non-community water systems required to monitor.	221310
Municipalities	Municipal operators of community and non-transient non-community water systems required to monitor.	924110

[1] North American Industry Classification System.

This table is not exhaustive, but rather provides a guide for readers regarding entities likely to be affected by this action. This table lists the types of entities that EPA is now aware could potentially be affected by this action. Other types of entities not listed in the table could also be impacted. To determine whether your facility is affected by this action, you should carefully examine the applicability language at 40 CFR 141.2 (definition of public water system). 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. How Can I Get Copies of This Document and Other Related Information?

Docket. EPA established a docket for this action under Docket ID No. EPA–HQ–OW–2009–0707. Publicly available docket materials are available either electronically through *http://www.regulations.gov* or in hard copy at the Water Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. Copyrighted materials are available only in hard copy. The EPA Docket Center 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.

Abbreviations and Acronyms Used in This Action

CFR: Code of Federal Regulations.
DOC: Dissolved Organic Carbon.
DPD: N,N-Diethyl-p-phenylenediamine.
E. coli: Escherichia coli.
EPA: Environmental Protection Agency.
HAA5: Haloacetic Acids (five); Sum of Monochloroacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Monobromoacetic Acid, and Dibromoacetic Acid.
IC: Ion Chromatography.
IC–ESI–MS/MS: Ion Chromatography Electrospray Ionization Tandem Mass Spectrometry.
LED: Light Emitting Diode.
mg/L: Milligrams/Liter.
MRL: Minimum Reporting Level.
NEMI: National Environmental Methods Index.
nm: Nanometers.
QC: Quality Control.
SDWA: Safe Drinking Water Act.
SUVA: Specific Ultraviolet Absorbance.
TOC: Total Organic Carbon.
UV_{254}: Ultraviolet Absorbance at 254 nanometers.

Table of Contents

I. General Information
A. Does This Action Apply to Me?
B. How Can I Get Copies of This Document and Other Related Information?
II. Background
A. What Is the Purpose of This Action?
B. What Is the Basis for This Action?
III. Summary of Approvals
A. Methods Developed by EPA
B. Methods Developed by Voluntary Consensus Standard Bodies (VCSB)
C. Methods Developed by Vendors
IV. Statutory and Executive Order Reviews
V. References

II. Background

A. What Is the Purpose of This Action?

In this action, EPA is approving 25 analytical methods for determining contaminant concentrations in samples collected under SDWA. Regulated parties required to sample and monitor may use either the testing methods already established in existing regulations or the alternative testing methods being approved in this action. The new methods are listed in Appendix A to Subpart C in 40 CFR 141 and on EPA's drinking water methods Web site at *http://www.epa.gov/safewater/methods/analyticalmethods_expedited.html.*

B. What Is the Basis for This Action?

When EPA determines that an alternative analytical method is ''equally effective'' (*i.e.,* as effective as a method that has already been promulgated in the regulations), SDWA allows EPA to approve the use of the alternative method through publication in the **Federal Register.** (*See* Section 1401(1) of SDWA.) EPA is using this streamlined approval authority to make 25 additional methods available for determining contaminant concentrations in samples collected under SDWA. EPA has determined that, for each contaminant or group of contaminants listed in Section III, the additional testing methods being approved in this action are equally effective as one or more of the testing methods already established in the regulations for those contaminants.

Section 1401(1) states that the newly approved methods ''shall be treated as an alternative for public water systems to the quality control and testing procedures listed in the regulation.'' Accordingly, this action makes these additional (and optional) 25 analytical methods legally available for meeting EPA's monitoring requirements.

This action does not add regulatory language, but does, for informational purposes, update an appendix to the regulations at 40 CFR part 141 that lists all methods approved under Section 1401(1) of SDWA. Accordingly, while this action is not a rule, it is updating CFR text and therefore is being published in the ''Final Rules'' section of this **Federal Register.**

EPA described this expedited methods approval process in an April 10, 2007, **Federal Register** notice (72 FR 17902) (USEPA 2007) and announced its intent to begin using the process. EPA published the first set of approvals in a June 3, 2008, **Federal Register** notice (73 FR 31616) (USEPA 2008) and added Appendix A to 40 CFR Part 141, Subpart C. Six additional methods were added to Appendix A to Subpart C in an August 3, 2009, **Federal Register** notice (74 FR 38348) (USEPA 2009a). Future approvals using this process are anticipated.

III. Summary of Approvals

EPA is approving 25 methods that are equally effective relative to methods previously promulgated in the regulations. By means of this notice, these 25 methods are added to Appendix A of 40 CFR Part 141, Subpart C.

A. Methods Developed by EPA

1. EPA Method 334.0, ''Determination of Residual Chlorine in Drinking Water Using an On-line Chlorine Analyzer'' (USEPA 2009b) establishes quality control (QC) criteria for on-line chlorine analyzers such that the analyzers provide data equivalent to the grab sample methodologies that are already approved in the regulations. The on-line chlorine analyzer is calibrated using aqueous standards or the results from grab samples that are collected at the same sample point as used by the analyzer. The grab samples are analyzed for chlorine using a method that is approved for drinking water compliance monitoring. The accuracy of the on-line chlorine analyzer is periodically verified (and adjustments made when necessary) based on results from grab sample analyses.

Previously approved methods for determining free and total chlorine residuals in drinking water are listed in the tables at 40 CFR 141.74(a)(2) and 40 CFR 141.131(c)(1). All of the methods are designed for grab sample analyses. The regulation at 40 CFR 141.74(a)(2) also states, ''Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the State.''

Continuous monitoring instruments that use N,N-Diethyl-p-phenylenediamine (DPD) chemistry are the only on-line chlorine analyzers that, prior to this action, met the drinking water regulatory requirement to use the same chemistry as an approved method. The instruments perform chlorine residual measurements on a frequent basis using an automated version of Standard Method 4500–Cl G (APHA 1998), which is listed in the tables at 40 CFR 141.74(a)(2) and 40 CFR 141.131(c)(1). Since the instruments use an approved method, they have the capability to provide the same accuracy and precision as the approved method (Standard Method 4500–Cl G), if they are properly installed and maintained. The performance characteristics of the instruments are periodically checked by comparing the instrumental results to grab sample measurements according to a protocol approved by the State.

EPA Method 334.0 now allows the use of on-line chlorine analyzers based on chemistry different from that of approved methods. It is a ''performance based'' method, which means it establishes QC criteria to bench-mark the performance of the on-line chlorine analyzer against the performance of approved grab sample methods. As long as the on-line analyzer meets the QC criteria in EPA Method 334.0, the data are deemed equivalent to data obtained using the approved grab sample methods. EPA Method 334.0 can be used with any type of on-line chlorine analyzer.

Data from 38 drinking water treatment facilities (EE&T, Inc. 2009) were used as the basis for establishing the on-line chlorine analyzer QC criteria in EPA Method 334.0. Chlorine residual measurements from on-line amperometric chlorine analyzers were compared to the results from grab sample analyses performed using either Standard Method 4500–Cl D (amperometric titration) (APHA 1998) or Standard Method 4500–Cl G (DPD colorimetric). Both Standard Methods are approved for drinking water compliance monitoring analyses and are listed in the tables at 40 CFR 141.74(a)(2) and 40 CFR 141.131(c)(1). The data from the 38 facilities demonstrate that on-line amperometric chlorine analyzers can provide data that are equivalent to approved methods.

EPA Method 334.0 requires that the analyst demonstrate that the grab sample method provides reliable data prior to using it to verify the performance of an on-line chlorine analyzer. This QC requirement is consistent with the QC requirements in the approved grab sample methods. Aqueous standards are analyzed to demonstrate the accuracy and precision of the measurements. EPA recommends that the grab sample QC requirements in EPA Method 334.0 be used with all on-line chlorine analyzers, including those that are originally approved under the provisions of 40 CFR 141.74.

A preliminary draft of EPA Method 334.0 was provided to the Association of State Drinking Water Administrators, the American Water Works Association, and the Water and Wastewater Equipment Manufacturers Association. A revised draft was reviewed by persons from two State agencies and two drinking water utilities. The final method reflects changes made in response to review comments. The public docket for this action includes the comments from these organizations and the Agency's response to comments (USEPA 2009c).

EPA has determined that EPA Method 334.0 is equally effective for measuring free and total chlorine residuals as the methods that are promulgated in the regulations at 40 CFR 141.74(a)(2) and 40 CFR 141.131(c)(1). The basis for this determination is discussed in Fair and Wendelken 2009. EPA is therefore approving use of EPA Method 334.0 for on-line analyses of free and total chlorine. A copy of the method can be accessed and downloaded directly on-line at *http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html.*

~~2. EPA Method 302.0, ''Determination of Bromate in Drinking Waters using Two-Dimensional Ion Chromatography with Suppressed Conductivity Detection'' (USEPA 2009d) is a large volume (1.0 mL), two-dimensional ion chromatography (IC) method that uses suppressed conductivity detection for the determination of bromate in raw and finished drinking waters. Because this method utilizes two dissimilar IC columns it does not require second column confirmation. Detection and quantitation are accomplished in the second dimension by suppressed conductivity measurement. Bromate~~

Federal Register

Wednesday,
November 8, 2006

Part II

Environmental Protection Agency

40 CFR Parts 9, 141, and 142

National Primary Drinking Water Regulations: Ground Water Rule; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9, 141 and 142

[EPA–HQ–OW–2002–0061; FRL–8231–9]

RIN 2040–AA97

National Primary Drinking Water Regulations: Ground Water Rule

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency is promulgating a National Primary Drinking Water Regulation, the Ground Water Rule, to provide for increased protection against microbial pathogens in public water systems that use ground water sources. This final rule is in accordance with the Safe Drinking Water Act as amended, which requires the Environmental Protection Agency to promulgate National Primary Drinking Water Regulations requiring disinfection as a treatment technique for all public water systems, including surface water systems and, as necessary, ground water systems.

The Ground Water Rule establishes a risk-targeted approach to target ground water systems that are susceptible to fecal contamination, instead of requiring disinfection for all ground water systems. The occurrence of fecal indicators in a drinking water supply is an indication of the potential presence of microbial pathogens that may pose a threat to public health. This rule requires ground water systems that are at risk of fecal contamination to take corrective action to reduce cases of illnesses and deaths due to exposure to microbial pathogens.

DATES: This final rule is effective on January 8, 2007. The incorporation by reference of certain publications listed in this rule is approved by the Director of the Federal Register as of January 8, 2007. For judicial review purposes, this final rule is promulgated as of 1 p.m. Eastern time on November 22, 2006, as provided in 40 Code of Federal Regulations (CFR) 23.7. The compliance date, unless otherwise noted, for the rule requirements is December 1, 2009.

ADDRESSES: The Environmental Protection Agency (EPA) has established a docket for this action under Docket ID No. EPA–HQ–OW–2002–0061. All documents in the docket are listed on the *http://www.regulations.gov* Web site. Although listed in the index, some information is not publicly available, *e.g.*, CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through *http://www.regulations.gov* or in hard copy at the Water Docket.

Note: The EPA Docket Center suffered damage due to flooding during the last week of June 2006. The Docket Center is continuing to operate. However, during the cleanup, there will be temporary changes to Docket Center telephone numbers, addresses, and hours of operation for people who wish to visit the Public Reading Room to view documents. Consult EPA's **Federal Register** notice at 71 FR 54815 (September 19, 2006) or the EPA Web site at *http://www.epa.gov/epahome/dockets.htm* for current information on docket status, locations and telephone numbers.

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SUPPLEMENTARY INFORMATION:

I. General Information

Entities potentially regulated by the Ground Water Rule (GWR) are public water systems (PWSs) using ground water as a drinking water source. Regulated categories and entities include the following:

Category	Examples of regulated entities
Industry	Public ground water systems.
State, Local, Tribal or Federal Governments.	Public ground water systems.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be 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 applicability criteria found in § 141.400 of this 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.

Abbreviations Used in This Document

AIDS Acquired Immune Deficiency Syndrome
AGI Acute Gastrointestinal Illness
AWWA American Water Works Association
ASDWA Association of State Drinking Water Administrators
AWWARF American Water Works Association Research Foundation
AWWSCo American Water Works Service Company
BGLB Brilliant green lactose bile broth
BGM Buffalo Green Monkey
BMPs Best Management Practices
CAFO Concentrated Animal Feeding Operation
CBI Confidential Business Information
CCR Consumer Confidence Report
CDBG Community Development Block Grant
CDC Centers for Disease Control and Prevention
CFR Code of Federal Regulation
COI Cost of Illness
CT The Residual Concentration of Disinfectant (mg/L) Multiplied by the Contact Time (in minutes)
CWS Community Water System
CWSS Community Water System Survey
DBPs Disinfection Byproducts
DWSRF Drinking Water State Revolving Fund
EA Economic Analysis
EPA United States Environmental Protection Agency
FR Federal Register
GAO United States Government Accountability Office
GI Gastrointestinal
GWUDI Ground Water Under the Direct Influence of Surface Water
GWR Ground Water Rule
GWS Ground Water System
HAV Hepatitis A Virus
HRRCA Health Risk Reduction and Cost Analysis
HSA Hydrogeologic Sensitivity Assessment
ICR Information Collection Request
IESWTR Interim Enhanced Surface Water Treatment Rule
IRFA Initial Regulatory Flexibility Analysis
LTB Lauryl tryptose broth
m Meters
mL Milliliters
MCL Maximum Contaminant Level
mg/L Milligrams per Liter
MPNIU Most Probable Number of Infectious Units
MRDL Maximum Residual Disinfectant Level
MWCO Molecular Weight Cut-Off
NCWS Non-Community Water System
NDWAC National Drinking Water Advisory Council
NF Nanofiltration
NODA Notice of Data Availability
NTNCWS Non-Transient Non-Community Water System
NTTAA National Technology Transfer and Advancement Act of 1995
NPDWR National Primary Drinking Water Regulation
O&M Operation and Maintenance

OMB Office of Management and Budget
P–A Presence-absence
PCR Polymerase Chain Reaction
PNR Public Notification Rule
PWS Public Water System
RFA Regulatory Flexibility Act
RIA Regulatory Impact Analysis
RO Reverse Osmosis
RT–PCR Reverse Transcriptase—Polymerase Chain Reaction
SAB Science Advisory Board
SBREFA Small Business Regulatory Enforcement Fairness Act
SD Standard Deviation
SDWA Safe Drinking Water Act
SDWIS Safe Drinking Water Information System
SEFA Small Entity Flexibility Analysis
Stage 2 DBPR Stage 2 Disinfectants and Disinfection Byproducts Rule
SWAP Source Water Assessment Program
SWTR Surface Water Treatment Rule
TCR Total Coliform Rule
TNCWS Transient Non-Community Water System
UIC Underground Injection Control
UMRA Unfunded Mandates Reform Act
US United States
USGS United States Geological Survey
UV Ultraviolet Radiation
VSL Value of Statistical Life
WHO World Health Organization
WTP Willingness To Pay

Table of Contents

I. General Information
II. Summary
A. Why Is EPA Promulgating the GWR?
B. What Does the GWR Require?
1. Sanitary Surveys
2. Source Water Monitoring
3. Treatment Technique Requirements
4. Compliance Monitoring
C. How Has the Final Rule Changed From What EPA Proposed?
D. Does This Regulation Apply to My Water System?
III. Background
A. What Is the Statutory Authority for the GWR?
B. What Is the Regulatory History of the GWR and How Were Stakeholders Involved?
C. What Public Health Concerns Does the GWR Address?
1. Introduction
2. Waterborne Disease Outbreaks in Ground Water Systems
3. Microbial Contamination in Public Ground Water Systems
4. Potential Risk Implications From Occurrence Data
IV. Discussion of GWR Requirements
A. Sanitary Surveys
1. What Are the Requirements of This Rule?
2. What Is EPA's Rationale for the GWR Sanitary Survey Requirements?
3. What Were the Key Issues Raised by Commenters on the Proposed GWR Sanitary Survey Requirements?
B. Source Water Monitoring
1. What Are the Requirements of This Rule?
2. What Is EPA's Rationale for the GWR Source Water Monitoring Requirements?
3. What Were the Key Issues Raised by Commenters on the Proposed GWR Source Water Monitoring Requirements?
C. Corrective Action Treatment Techniques for Systems With Significant Deficiencies or Source Water Fecal Contamination
1. What Are the Requirements of This Rule?
2. What Is EPA's Rationale for the GWR Treatment Technique Requirements?
3. What Were the Key Issues Raised by Commenters on the Proposed GWR Treatment Technique Requirements?
D. Providing Notification and Information to the Public
1. What Are the Requirements of This Rule?
2. What Is EPA's Rationale for the Public Notice Requirements?
3. What Were the Key Issues Raised by Commenters on the Proposed GWR Public Notification Requirements?
E. What Are the Reporting and Recordkeeping Requirements for Systems?
1. Reporting Requirements
2. Recordkeeping Requirements
3. What Were the Key Issues Raised by Commenters on the Proposed GWR Reporting and Recordkeeping Requirements for Systems?
F. What Are the Special Primacy, Reporting, and Recordkeeping Requirements for States?
1. Primacy Requirements
2. Reporting Requirements
3. Recordkeeping Requirements
4. What Were the Key Issues Raised by Commenters on the Proposed GWR Special Primacy, Reporting, and Recordkeeping Requirements for States?
G. Variances and Exemptions
1. Variances
2. Exemptions
V. Explanation of Extent of GWR
A. Mixed Systems
B. Cross-Connection Control
VI. Implementation
VII. Economic Analysis (Health Risk Reduction and Cost Analysis)
A. How Has the Final Rule Alternative Changed From the Proposed Rule Alternative?
B. Analyses That Support This Rule
1. Occurrence Analysis
2. Risk Analyses
C. What Are the Benefits of the GWR?
1. Calculation of Baseline Health Risk
2. Calculation of Avoided Illnesses and Deaths
3. Derivation of Quantified Benefits
4. Nonquantifiable Benefits
5. How Have the Benefits Changed Since the Proposal?
D. What Are the Costs of the GWR?
1. Summary of Quantified Costs
2. Derivation of Quantified Costs
3. Nonquantifiable Costs
4. How Have the Costs Changed Since the Proposal?
E. What Is the Potential Impact of the GWR on Households?
F. What Are the Incremental Costs and Benefits of the GWR?
G. Are There Any Benefits From Simultaneous Reduction of Co-Occurring Contaminants?
H. Is There Any Increase in Risk From Other Contaminants?
I. What Are the Effects of the Contaminant on the General Population and Groups Within the General Population That Are Identified as Likely To Be at Greater Risk of Adverse Health Effects?
1. Risk of Acute Viral Illness to Children and Pregnant Women
2. Risk of Viral Illness to the Elderly and Immunocompromised
J. What Are the Uncertainties in the Risk, Benefit, and Cost Estimates for the GWR?
1. The Baseline Numbers of Ground Water Systems, Populations Served, and Associated Disinfection Practice
2. The Numbers of Wells Designated as More Versus Less Vulnerable
3. The Baseline Occurrence of Viruses and *E. coli* in Ground Water Wells
4. For the Sanitary Survey Provisions, the Percentage of Systems Identified as Having Significant Deficiencies, the Percentage of These Deficiencies That Are Corrected, and State Costs for Conducting Surveys
5. The Predicted Rates at Which Virally Contaminated (and Non-Contaminated) Wells Will Be Required To Take Action After Finding *E. coli* Ground Water Sources
6. The Infectivity of Echovirus and Rotavirus Used to Represent Viruses That Occur in Ground Water
7. The Costs of Illnesses Due to Ingestion of Contaminated Ground Water
8. The Costs of Taking Action After Finding *E. coli* in Ground Water Sources
9. Nonquantifiable Benefits
10. Optional Assessment Source Water Monitoring
11. Corrective Actions and Significant Deficiencies
12. Uncertainty Summary
K. What Is the Benefit/Cost Determination for the GWR?
L. What Were Some of the Major Comments Received on the Economic Analysis and What Are EPA's Responses?
1. Costs
2. Benefits
3. Risk Management
VIII. Statutory and Executive Order Reviews
A. Executive Order 12866: Regulatory Planning and Review
B. Paperwork Reduction Act
C. Regulatory Flexibility Act (RFA)
D. Unfunded Mandates Reform Act (UMRA)
E. Executive Order 13132: Federalism
F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments
G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks
H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use
1. Energy Supply
2. Energy Distribution
3. Energy Use

I. National Technology Transfer and Advancement Act
J. Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
K. Congressional Review Act
L. Analysis of the Likely Effect of Compliance With the GWR on the Technical, Financial, and Managerial Capacity of Public Water Systems
IX. Consultation With Science Advisory Board, National Drinking Water Advisory Council, and the Secretary of Health and Human Services; and Peer Review
X. References

II. Summary

This section includes a discussion of the purpose of the Ground Water Rule (GWR) and a summary of the GWR requirements.

A. Why Is EPA Promulgating the GWR?

EPA is promulgating the GWR to provide for increased protection against microbial pathogens, specifically viral and bacterial pathogens, in public water systems (PWSs) that use ground water sources. EPA is particularly concerned about ground water systems (GWSs) that are susceptible to fecal contamination because these systems may be at risk of supplying water that contains harmful microbial pathogens. Viral pathogens found in GWSs may include enteric viruses such as Echovirus, Coxsackie viruses, Hepatitis A and E, Rotavirus and Noroviruses (*i.e.*, Norwalk-like viruses) and enteric bacterial pathogens such as *Escherichia coli* (most *E. coli* is harmless but a few species are pathogenic, including *E. coli* O157:H7), *Salmonella* species, *Shigella* species, and *Vibrio cholerae*. Ingestion of these pathogens can cause gastroenteritis or, in certain cases, serious illnesses such as meningitis, hepatitis, or myocarditis. Health implications in sensitive subpopulations (*e.g.*, children, elderly, immuno-compromised) may be severe (*e.g.*, hemolytic uremic syndrome) and may cause death.

One goal of the GWR is to identify and target GWSs that are susceptible to fecal contamination because such contamination is the likely source of viral and bacterial pathogens in drinking water supplies. Ground water is fecally contaminated when fecal indicators (*e.g., E. coli*, enterococci, or coliphage) are present. While fecal indicators typically are not harmful when ingested, their presence demonstrates that there is a pathway for pathogenic viruses and bacteria to enter ground water sources. Another key objective of the rule is to protect public health by requiring these higher risk GWSs to monitor and, when necessary, take corrective action. Corrective action can include correcting all significant deficiencies; providing an alternate source of water; eliminating the source of contamination; or providing treatment that reliably achieves at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) for each contaminated ground water source. Each of these corrective actions is intended to remove all or nearly all fecal contamination, including both viral and bacterial pathogens. This rule implements section 1412(b)(8) of the 1996 Safe Drinking Water Act (SDWA) Amendments to promulgate a rule requiring GWSs to disinfect ''as necessary.'' The risk-targeted approach in this rule is a critical distinction from the approach outlined in the 1986 SDWA, which would have required all PWSs using surface water or ground water to disinfect. Because there are so many GWSs (approximately 147,000) in the United States, such a requirement would have been a great challenge for systems and States to implement.

This rule is necessary to protect public health because current regulatory provisions for GWSs (for example, sanitary survey requirements in the Total Coliform Rule (TCR) (54 FR 27544, June 29, 1989) (USEPA, 1989a)) do not adequately address fecal contamination at the ground water source. In fact, no Federal regulation exists that requires either monitoring of ground water sources or corrective action upon finding fecal contamination or identifying a significant deficiency during a sanitary survey. In addition, the U.S. Government Accountability Office (GAO) 1993 report (USGAO, 1993) found that many sanitary surveys did not evaluate one or more of the components that EPA recommended be evaluated, and that efforts to ensure correction were often limited. Also, GAO found that follow-up on major problems was often lacking. Moreover, the report found that problems associated with system infrastructure identified during sanitary surveys frequently remain uncorrected. The GWR provides much needed public health protection by requiring systems that do not treat their ground water sources to monitor their ground water source and to take corrective actions when fecal contamination or a significant deficiency is found.

In addition, EPA has evaluated data on outbreaks and the occurrence of waterborne viral and bacterial pathogens and indicators of fecal contamination in ground water supplying PWS wells. These data indicate that there is a subset of GWSs that are susceptible to fecal contamination; therefore, EPA believes that risk management strategies are needed to protect public health. Specifically, the Centers for Disease Control and Prevention (CDC) reports that between 1991 (the year in which the TCR became effective) and 2000, GWSs were associated with 68 waterborne disease outbreaks that caused 10,926 illnesses (Moore *et al.* (1993); Kramer *et al.* (1996); Levy *et al.* (1998); Barwick *et al.* (2000); and Lee *et al.* (2002)). These outbreaks accounted for 51 percent of all waterborne disease outbreaks in the United States during that time period. The major deficiencies identified by the CDC report as the likely cause of the outbreaks were source water contamination and inadequate treatment (or treatment failures); see Section III.C.2 for a summary of these outbreak data. Studies of viral and bacterial pathogens and/or fecal indicator occurrence in ground waters that supply PWSs show that dozens of the public ground water wells sampled had fecal indicator or viral presence in their wells. See Section III.C.3 of this preamble for a summary of occurrence studies. Based on these outbreak and occurrence data, along with concern about lack of monitoring and follow-up actions for GWSs, EPA has concluded that GWSs need to implement targeted, risk management strategies to protect public health from bacterial and viral pathogens in fecally contaminated ground water sources.

To provide a flexible, risk-targeted approach to achieve public health protection, this rule builds on existing State programs—some that emphasize the importance of disinfection and others that emphasize assessments and technical assistance—to identify and target susceptible GWSs. In addition, the GWR establishes treatment technique requirements, which provide public GWSs with multiple options to correct source water fecal contamination and significant deficiencies that present a public health risk. Furthermore, this rule establishes compliance monitoring requirements to ensure that treatment effectiveness is maintained.

B. What Does the GWR Require?

The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and source water fecal contamination in public GWSs. A central objective of the GWR is to identify the subset of ground water sources that are at higher risk of fecal contamination among the large number

of existing GWSs (approximately 147,000), and then further target those systems that must take corrective action to protect public health. This risk-targeting strategy includes the following:

- Regular GWS sanitary surveys to check for significant deficiencies in eight key operational areas;
- A flexible program for identifying higher risk systems through existing TCR monitoring and State determinations; and
- Ground water source monitoring to detect fecal contamination at targeted GWSs that do not provide 4-log treatment of viruses.

Measures to protect public health include the following:

- Treatment technique requirements to address sanitary survey significant deficiencies and fecal contamination in ground water; and
- Compliance monitoring to ensure that 4-log treatment of viruses is maintained where it is used to comply with this rule.

To meet the treatment technique requirements of this rule, GWSs with a significant deficiency or evidence of source water fecal contamination, following consultation with their primacy agency (herein referred to as ''the State''), must implement one or more of the following corrective action options: Correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) for each ground water source. Each of these corrective actions is intended to remove all or nearly all fecal contamination, including both viral and bacterial pathogens. In addition, the GWS must inform its customers of any uncorrected significant deficiencies or fecal indicator-positive ground water source samples.

The following sections provide more detailed information on the provisions of the GWR.

1. Sanitary Surveys

Sanitary surveys are an important tool for identifying potential vulnerabilities to fecal contamination at GWSs. The final GWR includes Federal sanitary survey requirements for all GWSs for the first time. This rule requires States, as a condition for primacy, to perform regular comprehensive sanitary surveys of the following eight critical components to the extent that they apply to the individual water system being surveyed: (1) Source; (2) treatment; (3) distribution system; (4) finished water storage; (5) pumps, pump facilities, and controls; (6) monitoring, reporting, and data verification; (7) system management and operation; and (8) operator compliance with State requirements. This rule includes conditions of primacy in 40 CFR part 142 under which States will have until December 31, 2012 to complete the initial sanitary survey cycle for community water systems (CWSs), except those that meet performance criteria, and until December 31, 2014 to complete the initial sanitary survey cycle for all non-community water system (NCWSs) and CWSs that meet performance criteria (refer to Section IV.A.1 for crtieria). Following the initial sanitary survey cycle, States must conduct these surveys every three years for CWSs (defined in § 141.2), and every five years for all NCWSs and CWSs that meet certain performance criteria as discussed in Section IV.A.1.

If a significant deficiency is identified as a result of a sanitary survey, the system must take corrective action. If the system does not complete corrective action within 120 days of receiving notification from the State, or is not in compliance with a State-approved corrective action plan and schedule, the system will be in violation of the treatment technique requirements of this rule.

The final GWR sanitary survey provision provides comprehensive and effective public health protection by specifying the scope and frequency of sanitary surveys and by requiring corrective action for systems with significant deficiencies.

2. Source Water Monitoring

This rule requires triggered source water monitoring and provides States with the option to require assessment source water monitoring. Source water monitoring is an effective tool to target at-risk systems that must take corrective action to protect public health. Indications of risk may come from total coliform monitoring, hydrogeologic sensitivity analyses, or other system-specific data and information.

In this rule, a GWS with a distribution system TCR sample that tests positive for total coliform is required to conduct triggered source water monitoring to evaluate whether the total coliform presence in the distribution system is due to fecal contamination in the ground water source. A GWS that does not provide at least 4-log treatment of viruses must conduct triggered source water monitoring upon being notified that a TCR sample is total coliform-positive. Within 24 hours of receiving the total coliform-positive notice, the system must collect at least one ground water sample from each ground water source (unless the GWS has an approved triggered source water monitoring plan that specifies the applicable source for collecting source samples). The GWS must test the ground water source sample(s) for the presence of one of three State-specified fecal indicators (*E. coli,* enterococci, or coliphage). If the source sample is fecal indicator-positive, this rule requires the GWS to notify the State and the public. Unless directed by the State to take immediate corrective action, the GWS must collect and test five additional source water samples for the presence of the same State-specified fecal indicator within 24 hours. If any one of the five additional source water samples tests positive for the State-specified fecal indicator (*E. coli,* enterococci, or coliphage), this rule requires the GWS to notify the State and the public and comply with the treatment technique requirements, which require the system to take one of four corrective actions discussed in the following section. The compliance date of the triggered source water monitoring requirement is December 1, 2009.

As a complement to the triggered source water monitoring provision, States have the option of requiring GWSs to conduct assessment source water monitoring. This flexible provision gives States the opportunity to target higher risk GWSs for additional source water monitoring and evaluation. The State may require a GWS to conduct assessment source water monitoring as needed. EPA recommends that States use Hydrogeologic Sensitivity Assessments (HSAs) and TCR/triggered source water monitoring results, along with other information to identify higher risk systems for assessment source water monitoring. For assessment source water monitoring, EPA recommends that GWSs take 12 monthly samples and test them for one of the GWR indicators (*E. coli*, enterococci, or coliphage). Corrective action for systems performing assessment source water monitoring is determined by the State.

3. Treatment Technique Requirements

This rule requires a GWS to comply with the treatment technique requirements if a significant deficiency is identified during a sanitary survey. Also, the rule requires a GWS to comply with the treatment technique requirements if one of the five additional ground water source samples (or at State discretion, the initial source

sample) has tested positive for fecal contamination (*i.e.*, the sample is positive for one of the three fecal indicators and is not invalidated by the State). The treatment technique requires that a GWS implement at least one of the following corrective actions: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses. Furthermore, the GWS must inform the public served by the water system of any uncorrected significant deficiencies and/or fecal contamination in the ground water source. The compliance date of the treatment technique requirements is December 1, 2009.

4. Compliance Monitoring

Compliance monitoring requirements are the final defense against viral and bacterial pathogens provided by this rule. All GWSs that provide at least 4-log treatment of viruses using chemical disinfection, membrane filtration, or a State-approved alternative treatment technology must conduct compliance monitoring to demonstrate treatment effectiveness. The compliance date of the compliance monitoring requirement is December 1, 2009.

C. How Has the Final Rule Changed From What EPA Proposed?

The primary elements of the proposed GWR were sanitary surveys, triggered monitoring, HSAs, routine monitoring, corrective action, and compliance monitoring. EPA received numerous comments on the proposed GWR and has carefully considered those comments in developing the final GWR. This consideration has led to a number of changes that the Agency believes will result in a more flexible, more targeted, more protective final GWR.

Most of the changes are minor and are discussed throughout this preamble in the pertinent sections. The most significant change from the proposed rule to the final rule is to the routine monitoring provision. The proposed routine monitoring provision would have required GWSs in sensitive aquifers, as defined by a State performed HSA, to collect monthly source water samples.

EPA received many negative comments on the HSA provision. Some States said that the proposed GWR did not allow sufficient time to conduct the HSA prior to the start of routine monitoring, which would result in GWSs in non-sensitive aquifers being required to monitor. Others stated that they would not do the HSA; rather, they would require all GWSs to conduct routine monitoring. In addition, EPA received comments that the routine monitoring provision was too burdensome.

If the HSA provision would not be implemented in many States to target the routine monitoring to systems in sensitive aquifers that are most at risk, then the Agency agrees with the commenters that the routine monitoring provision would be overly burdensome. This is because some systems, located in non-sensitive aquifers, would be conducting routine monitoring unnecessarily. Moreover, EPA now believes that it is more difficult to capture contamination than estimated in the proposal, which further highlights the importance of correctly identifying systems for which source water monitoring would be prudent. Furthermore, commenters strongly supported revision of the GWR proposal to maximize State flexibility and discretion in making system-specific decisions.

Given the importance of correctly targeting systems for source water monitoring, in conjunction with the State's desire for enough flexibility to ensure sensible decisions on a case-by-case basis, EPA decided to redesign the source water monitoring provision. Accordingly, the final rule does not include a national requirement for HSAs and routine monitoring for systems in sensitive aquifers. Rather, EPA concludes that the States are in the best position to assess which systems would most benefit from a source water monitoring program. The final provision is similar to routine monitoring but is now optional for States and has been renamed assessment source water monitoring. States argued in their comments that the information available to them from other programs such as source water assessments, wellhead protection plans, and historical data would be important factors to consider when determining the need for source water monitoring. Because States are best able to identify higher risk systems, the final GWR provides States with the option to require GWSs to perform assessment source water monitoring. The Agency finds the comments received on the proposal to be persuasive and to support the approach in the final GWR.

The purpose of the optional assessment source water monitoring requirement is to allow States to target such monitoring to GWSs that the State believes are at higher risk for fecal contamination. States specifically requested this flexibility and discretion in their comments to EPA. The flexibility of this provision provides many benefits. First, it gives States the ability to make case-by-case determinations of the need for source water monitoring. Given the variety of aquifer and well conditions across the United States and even within each State, State programs make more sense than a nationally-directed program. Second, the optional assessment source water monitoring requirement allows States to require assessment source water monitoring as needed. System conditions change over time and the ability of States to target this requirement to a specific system and time period will reduce burden and be critical to protecting public health by allowing States to focus attention on problem systems. The lack of time constraints will also allow States to prioritize susceptibility assessments and further target those systems most in need.

EPA recommends that States use HSAs as one tool to identify high risk systems for assessment source water monitoring. HSAs can be an effective screening tool to identify sensitive hydrogeologic settings that transmit water, and any pathogens in that water, quickly from the surface to the aquifer. States have other information available to them to target high risk systems, such as source water assessments, wellhead protection plans, and historical monitoring data. Data on past indications of source water fecal contamination, particularly from TCR monitoring, in combination with GWR triggered source water monitoring results, can be another important tool.

D. Does This Regulation Apply to My Water System?

The requirements in this final rule apply to all PWSs (CWSs and NCWSs) that use ground water sources, in whole or in part (including consecutive systems that receive finished ground water from another PWS), except that they do not apply to PWSs that combine all of their ground water with surface water or ground water under the direct influence of surface water (GWUDI) prior to treatment under the Surface Water Treatment Rule (SWTR) (54 FR 27486, June 29, 1989) (USEPA, 1989b). The GWR ensures that the same level of public health protection is provided to persons served solely by GWSs as to those served by mixed systems supplied by both ground water and surface water sources. See Section V.A of this preamble for more information on mixed systems.

III. Background

This section includes a discussion of the statutory requirements, regulatory

history, stakeholder involvement, and the public health concerns that this rule addresses.

A. What Is the Statutory Authority for the GWR?

Section 1412(b)(8) of the SDWA, as amended on August 6, 1996, requires EPA to promulgate National Primary Drinking Water Regulations (NPDWRs) requiring disinfection as a treatment technique for all PWSs, including surface water systems and, as necessary, GWSs. In addition, section 1412(b)(8) requires EPA to promulgate criteria as part of the regulations for determining whether disinfection should be required as a treatment technique for any PWS served by ground water. In contrast, the 1986 Amendments to the SDWA directed EPA to promulgate regulations requiring disinfection at all PWSs using either surface water or ground water. The SWTR implemented that requirement for surface water systems, but when Congress amended the SDWA again in 1996, EPA had not promulgated regulations requiring disinfection for PWSs that use ground water. In the legislative history of the 1996 Amendments to the SDWA, Congress identified several reasons for the delay, including the recognition that not all GWSs are at risk of contamination, as well as the high cost of across-the-board disinfection. This rule implements section 1412(b)(8) of the SDWA, as amended, by establishing a regulatory framework for determining which GWSs are susceptible to fecal contamination and requiring those systems to implement corrective action options, only one of which is to provide 4-log treatment of viruses (*e.g.*, disinfection).

Section 1413(a)(1) of the SDWA allows EPA to grant a State primary enforcement responsibility (''primacy'') for NPDWRs when EPA has determined that the State has adopted regulations that are no less stringent than EPA's. To obtain primacy for this rule, States must adopt comparable regulations within two years of EPA's promulgation of the final rule, unless EPA grants the State a two-year extension. State primacy requires, among other things, adequate enforcement (including monitoring and inspections) authority and reporting requirement. EPA must approve or deny State primacy applications within 90 days of submission to EPA (SDWA section 1413(b)(2)). In some cases, a State submitting revisions to adopt an NPDWR has primacy enforcement authority for the new regulation while EPA's decision on the revision is pending (SDWA section 1413(c)). Section 1445 of the SDWA authorizes the Administrator to establish monitoring, recordkeeping, and reporting regulations to assist the Administrator in determining compliance with the SDWA and in advising the public of the risks of unregulated contaminants. Section 1450 of the SDWA authorizes the Administrator to prescribe such regulations as are necessary or appropriate to carry out his or her functions under the Act.

B. What Is the Regulatory History of the GWR and How Were Stakeholders Involved?

EPA has devoted a tremendous effort to engage stakeholders in the development of the GWR. EPA began developing the GWR in 1987 to address potential fecal contamination of GWSs by requiring across-the-board disinfection, as directed by the 1986 Amendments to the SDWA. A preliminary public meeting on issues related to GWSs was held in 1990 (55 FR 21093, May 22, 1990) (USEPA, 1990). By 1992, EPA had developed a draft proposed rule that would have required disinfection for all GWSs (57 FR 33960, July 31, 1992) (USEPA, 1992). The draft proposed rule incorporated stakeholder input and was made available for stakeholder review. While some stakeholders supported the increased public health protection for people drinking ground water, most stakeholders were concerned that the rule was crafted such that all GWSs were assumed to be contaminated until monitoring proved otherwise and that disinfection waivers would be difficult to obtain.

Throughout the early and mid-1990s, EPA conducted technical discussions with *ad hoc* working groups during more than 50 conference calls, with participation of EPA Headquarters, EPA Regional offices, States, local governments, academicians, and trade associations. In 1996, Congress amended the SDWA and required EPA, under section 1412(b)(8), to develop regulations requiring disinfection as a treatment technique for GWSs ''as necessary.'' As discussed previously, this Amendment to the SDWA called for a different regulatory framework to address fecal contamination in GWSs. In light of this statutory change in direction, EPA determined that further stakeholder involvement would be crucial to establishing an effective approach for regulating fecal contamination in PWSs that use ground water sources.

Technical meetings were held in Irvine, California in July 1996 (USEPA, 1996), and in Austin, Texas in March 1997 (USEPA, 1997a). These technical discussions focused primarily on establishing a reasonable means for determining if a ground water source was vulnerable to fecal contamination. EPA evaluated the possibility of developing a vulnerability assessment tool that would consider hydrogeologic information and sources of fecal contamination.

In addition, EPA held a series of stakeholder meetings (in Portland, OR; Madison, WI; Dallas, TX; Lincoln, NE; and Washington, DC) designed to engage all stakeholders in developing a risk-based regulatory framework. The purpose of these meetings was to review available information on risk and to discuss methods to identify GWSs that are susceptible to fecal contamination, and therefore, should be required to take corrective actions. EPA also held three early involvement meetings with State representatives (in Portland, OR; Chicago, IL; and Washington, DC) and received valuable input from small system operators as part of an Agency outreach initiative under the Small Business Regulatory Enforcement Fairness Act. Over the course of these stakeholder meetings, the participants evaluated a continuum of regulatory approaches. The meetings fostered EPA's understanding of how State strategies fit together as a part of a national strategy. Taken together, the meetings were crucial in guiding the Agency's development of regulatory components for the GWR proposal.

On February 3, 1999, EPA distributed a preliminary draft preamble using the approach developed during the stakeholder meetings. Eighty individual comment letters were received from representatives of State and local governments, trade associations, academic institutions, individual PWSs, and other Federal agencies. EPA considered all of the comments received from this informal process as the Agency revised the draft proposal.

The proposed GWR was published in the **Federal Register** in 2000 (65 FR 30194, May 10, 2000) (USEPA, 2000a). The comment period closed on August 9, 2000, and EPA received comments from over 250 individuals, corporations, organizations, PWSs, States and Tribes, industry and trade associations, and environmental groups. EPA has carefully considered all of these comments in developing this final rule. Comments received on the proposed rule, along with EPA's responses, are compiled in the *Public Comment and Response Document for the Final Ground Water Rule* (USEPA, 2006c).

EPA published a Notice of Data Availability (NODA) in the **Federal Register** in 2006 (71 FR 15105, March

27, 2006) (USEPA, 2006e). The purpose of the NODA was to present additional studies that the Agency was considering in conducting its economic analysis for the final rule. The comment period closed on April 26, 2006. EPA received 14 sets of comments from individuals, trade associations, State and local governments, an organization, and a university. Comments received on the NODA, along with EPA's responses, are also compiled in the *Public Comment and Response Document for the Final Ground Water Rule* (USEPA, 2006c).

C. What Public Health Concerns Does the GWR Address?

This section explains the public health concerns associated with fecal contamination in GWSs by summarizing information on how ground water sources could become fecally contaminated, the causes of ground water outbreaks, and the health effects of consuming contaminated water.

1. Introduction

EPA estimates that approximately 114 million people consume drinking water from PWSs that use ground water sources (Table III–1). These PWSs (total of about 147,000) distribute disinfected or undisinfected ground water to their customers. Approximately 18 percent (20 million) of people served by PWSs that use ground water sources receive undisinfected water, while over 60 percent (70 million) receive either undisinfected water or water treated to less than 4-log inactivation or removal of viruses.

Over 100 million people receive ground water from community water systems (CWSs) (Table III–1), while about 14 million people receive ground water from non-community water systems (NCWSs); non-transient non-community water systems (NTNCWSs) serve ground water to about five million people and transient non-community water systems (TNCWSs) serve ground water to about nine million people. Table III–1 shows that, of the number of people receiving water from CWSs, NTNCWSs, and TNCWSs, approximately 9.3 million (9.2 percent), 3.6 million (71 percent), and 7.2 million, (83 percent), respectively, receive water that is not disinfected at all. The Table also shows that 56.8 million people served by CWSs, 4.7 million people served by NTNCWSs, and 8.6 million people served by TNCWSs receive water that is either undisinfected or treated to less than 4-log.

TABLE III–1.—POPULATION SERVED BY GROUND WATER SYSTEMS

[Millions]

	Total population served by ground water systems	Population served untreated ground water	Population served ground water that is either undisinfected or treated to less than 4-log
CWSs	100.4	9.3	56.8
NTNCWSs	5.1	3.6	4.7
TNCWSs	8.7	7.2	8.6

Source: Exhibit 4.4 of the GWR EA (USEPA, 2006d).

As discussed previously in Section II.A, the CDC identified source water contamination and inadequate treatment as the major causes for ground water-related outbreaks between 1991 and 2000. Untreated or inadequately treated ground water may contain viral and bacterial pathogens. Therefore, undisinfected ground water or water treated to less than 4-log may pose a public health risk to consumers.

Waterborne disease attributable to viral and bacterial pathogens is a significant public health problem. EPA's Science Advisory Board cited drinking water contamination, particularly contamination by pathogenic microorganisms, as one of the most important environmental risks (USEPA/SAB, 1990). The CDC reports significant numbers of recent waterborne disease outbreaks and cases of illness associated with ground waters (Moore *et al.* (1993); Kramer *et al.* (1996); Levy *et al.* (1998); Barwick *et al.* (2000); Lee *et al.* (2002)).

Most waterborne pathogens, including viral and bacterial pathogens, cause gastrointestinal (GI) illness with diarrhea, abdominal discomfort, nausea, vomiting, and other symptoms. The effects of a waterborne disease are usually acute, resulting from a single exposure. Most GI illnesses are generally of short duration and result in mild illness, but some can result in severe illness and even death. For example, during a recent ground water outbreak in New York, a healthy three-year old child died from hemolytic uremic syndrome (kidney failure) (New York State Department of Health, 2000). Waterborne pathogens also cause other serious disorders such as hepatitis, Legionnaires Disease, myocarditis, paralysis, acute hemorrhagic conjunctivitis, meningitis, and reactive arthritis. Waterborne pathogens have also been associated with diabetes, encephalitis, and other diseases (Lederberg, 1992).

Sensitive populations are at greater risk from waterborne disease from viral and bacterial pathogens than the general population. These sensitive subpopulations include children (especially the very young); the elderly; the malnourished; pregnant women; chronically ill patients (*e.g.*, those with diabetes or cystic fibrosis); and a broad category of those with compromised immune systems, such as AIDS patients, those with autoimmune disorders (*e.g.*, rheumatoid arthritis, lupus erythematosus, and multiple sclerosis), organ transplant recipients, and those receiving chemotherapy (Rose, 1997). Sensitive subpopulations (or those with compromised immune systems) represent almost 20 percent of the population in the United States (Gerba *et al.*, 1996). The severity and duration of illness is often greater in sensitive subpopulations than in healthy individuals, and may occasionally result in death.

When humans are exposed to and infected by an enteric pathogen, such as a bacterium or virus, 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, etc.), which is referred to as secondary spread.

Waterborne pathogens thus may infect people via a variety of routes.

Fecal contamination of drinking water is a primary cause of waterborne disease (Szewzyk *et al.*, 2000). Viral and bacterial pathogens associated with fecal contamination can reach ground water via pathways in the subsurface and near surface. First, fecal contamination from, for example, improper storage or management of manure, runoff from land-applied manure, leaking sewer lines, or failed septic systems can reach the ground water source by traveling—sometimes great distances—through the subsurface (especially through transmissive materials such as karst, gravel, or fractured bedrock). Twenty-five million households in the United States use conventional onsite wastewater treatment systems, according to the 1990 Census. These systems include septic systems and leach fields. A national estimate of failure rates of these systems is not available; however, a National Small Flows Clearinghouse survey reports that in 1993 alone, 90,632 failures were reported (USEPA, 1997b). The volume of septic tank waste alone that is released into the subsurface has been estimated at one trillion gallons per year (Canter and Knox, 1984). This contamination may eventually reach the intake zone of a drinking water well.

Second, fecal contamination from the surface may enter a drinking water well along the casing or through cracks in the sanitary seal if it is not properly constructed, protected, or maintained. In addition to source contamination, fecal contamination may also enter the distribution system when cross-connection controls fail or when negative pressure in a leaking pipe allows contaminant infiltration. A subset of GWSs is susceptible to contamination by one or more of these routes.

2. Waterborne Disease Outbreaks in Ground Water Systems

The Centers for Disease Control and Prevention (CDC) reports that between 1991 (the year in which implementation of the TCR began) and 2000, GWSs (both CWSs and NCWSs) were associated with 68 outbreaks that caused 10,926 illnesses (Table III–2). These account for 51 percent of all waterborne disease outbreaks in the United States during that period. The outbreak data illustrate that the major deficiency in GWSs was source water contamination. Contaminated source water was the cause of 79 percent of the outbreaks in GWSs (63 percent of CWS outbreaks and 86 percent of NCWS outbreaks), shown as untreated ground water and treatment deficiencies in Table III–2. Consumers of undisinfected water are especially vulnerable to source water contamination. Approximately 70 percent of GWSs provide either untreated ground water or provide treatment of less than 4-log virus inactivation or removal as discussed in the GWR EA (USEPA, 2006d).

Of the 68 outbreaks in GWSs, 14 (21 percent) were associated with specific bacterial pathogens (see Table III–3). The fecal bacterial pathogen *Shigella* caused more reported outbreaks (five, seven percent) than any other bacterial agent. Identified viral pathogens were associated with four (six percent) reported outbreaks. Etiologic agents were not identified in 39 (57 percent) outbreaks; however, EPA suspects that many of these outbreaks were caused by viruses given that it is generally more difficult to analyze for viral pathogens than bacterial pathogens. EPA regulates for protozoa, including *Giardia* and *Cryptosporidium,* under the SWTRs, which also cover GWUDI systems. For the most part, the outbreaks associated with protozoa that occurred in GWSs were later determined by the State to be GWUDI systems.

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Table III-2: Sources of Waterborne Disease Outbreaks in Ground Water Systems, 1991 – 2000

Cause of Contamination	Number of Outbreaks	Percent Outbreaks	Cases of Illness	Percent Illnesses	Cases per Outbreak
Community Water Systems					
Untreated Ground Water	5	26%	167	6%	33
Treatment Deficiency	7	37%	1,624	58%	232
Distribution System Deficiency	5	26%	803	29%	161
Miscellaneous/Unknown	2	11%	183	7%	92
Total	**19**	**100%**	**2,777**	**100%**	**146**
Noncommunity Water Systems					
Untreated Ground Water	23	47%	4,057	50%	176
Treatment Deficiency	19	39%	3,264	40%	172
Distribution System Deficiency	6	12%	442	5%	74
Miscellaneous/Unknown	1	2%	386	5%	386
Total	**49**	**100%**	**8,149**	**100%**	**166**
Combined					
Untreated Ground Water	28	41%	4,224	39%	151
Treatment Deficiency	26	38%	4,888	45%	188
Distribution System Deficiency	11	16%	1,245	11%	113
Miscellaneous/Unknown	3	4%	569	5%	190
Total	**68**	**100%**	**10,926**	**100%**	**161**

Sources: Moore *et al.* (1993); Kramer *et al.* (1996); Levy *et al.* (1998); Barwick *et al.* (2000); and Lee *et al.* (2002).

Table III-3: Etiology of Waterborne Outbreaks in Ground Water Systems, 1991-2000

	CWSs			NCWSs			TOTAL		
Causative Agent	Outbreaks	Cases of Illness	Percent of Total Outbreaks	Outbreaks	Cases of Illness	Percent of Total Outbreaks	Outbreaks	Cases of Illness	Percent of Total Outbreaks
Protozoa	**8**	**1,675**	**42.1%**	**3**	**576**	**6.1%**	**11**	**2,251**	**16.2%**
Giardia	5	136	26.3%	2	25	4.1%	7	161	10.3%
Cryptosporidium	3	1,539	15.8%	1	551	2.0%	4	2,090	5.9%
Virus	**-**	**-**	**0.0%**	**4**	**1,806**	**8.2%**	**4**	**1,806**	**5.9%**
Hepatitis A	-	-	0.0%	-	-	0.0%	-	-	0.0%
Norwalk Virus	-	-	0.0%	4	1,806	8.2%	4	1,806	5.9%
Bacteria	**6**	**1,037**	**31.6%**	**8**	**1,309**	**16.3%**	**14**	**2,346**	**20.6%**
Shigella	1	83	5.3%	4	473	8.2%	5	556	7.4%
Campylobacter	1	172	5.3%	2	51	4.1%	3	223	4.4%
Salmonella, non-typhoid	1	625	5.3%	-	-	0.0%	1	625	1.5%
S. typhimurium	1	124	5.3%	-	-	0.0%	1	124	1.5%
E. coli	1	22	5.3%	2	785	4.1%	3	807	4.4%
Vibrio	1	11	5.3%	-	-	0.0%	1	11	1.5%
Undetermined	**5**	**65**	**26.3%**	**34**	**4,458**	**69.4%**	**39**	**4,523**	**57.4%**
Total	**19**	**2,777**	**100.0%**	**49**	**8,149**	**100.0%**	**68**	**10,926**	**100.0%**

Note: Detail may not add to totals due to independent rounding.
Sources: Moore *et al.* (1993); Kramer *et al.* (1996); Levy *et al.* (1998); Barwick *et al.* (2000); and Lee *et al.* (2002).

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Large outbreaks are rarely associated with GWSs because most GWSs are small. In addition, the number of identified and reported outbreaks in the CDC database is believed to substantially understate the actual incidence of waterborne disease outbreaks and cases of illness (Craun and Calderon, 1996; National Research Council, 1997). This underestimation is due to a number of factors. Many people experiencing gastrointestinal illness do not seek medical attention. Where medical attention is provided, testing to identify the pathogenic agent is often not done and even if it is, the pathogenic agent may not be identified through correct testing (*e.g.*, when a sample is tested for a limited number of pathogens). Physicians often lack sufficient information to attribute gastrointestinal illness to any specific origin, such as drinking water, and few

States have an active outbreak surveillance program. Furthermore, the outbreak reporting system in the U.S. is paper-based and voluntary. Consequently, waterborne disease outbreaks are often not recognized in a community or, if recognized, are not traced to a drinking water source even though it may be the cause of the outbreak. Although it occurred in a community served by a surface water source, the 1993 *Cryptosporidium* outbreak in Milwaukee, Wisconsin is an example of how difficult it is to recognize a drinking waterborne disease outbreak. In one study of this large outbreak, only six percent sought health care and only six percent of those health care cases were tested for parasites (with only four percent of those cases specifically tested for *Cryptosporidium*) (Juranek, 1997). Thus, over 99 percent of estimated cases of illness went undiagnosed in this outbreak. In addition to epidemic illness, an unknown but probably significant portion of waterborne disease is endemic (*i.e.,* isolated cases not associated with an outbreak) and is even more difficult to recognize.

Collectively, the data indicate that outbreaks in GWSs are a problem and that source water contamination and inadequate treatment (or treatment failures) are responsible for the great majority of outbreaks.

3. Microbial Contamination in Public Ground Water Systems

The extent to which viral and bacterial pathogens occur in public ground water supplies influences the risk of exposure to populations consuming ground water from PWSs. Such risks of exposure pertain to populations using both undisinfected and disinfected water supplies. For undisinfected supplies, pathogens in the water are an immediate risk, since no treatment barrier exists prior to consumption. For disinfected supplies, if disinfection is inadequate or if treatment plant upsets occur, pathogens can reach consumers. These exposure risks were discussed in Section III.C.2 from an outbreak perspective. This section will discuss data on the occurrence of waterborne viral pathogens and indicators of fecal contamination in ground water supplying PWS wells.

a. *Occurrence studies and data.* For this rule, EPA examined the occurrence of viral pathogens and some fecal indicators. EPA reviewed data from 24 studies on pathogen and fecal indicator occurrence in ground water wells that supply PWSs. This total includes 16 studies described in the proposal, seven studies that became available since proposal as described in the NODA (USEPA, 2006e), and one study that was provided to EPA in comment as a result of the NODA. Each study was conducted independently and with a different objective and scope. The *Occurrence and Monitoring Document for the Final Ground Water Rule* (USEPA, 2006b) provides a detailed discussion of each examined occurrence study. The available data show a wide range of enterovirus and fecal indicator occurrence in water drawn from wells across the U.S. EPA selected 15 studies to estimate national viral and fecal indicator occurrence in ground water. To arrive at the conclusion that these 15 studies provide the best possible representation of ground water contamination at a national level, EPA evaluated all available studies (24 studies) that were applicable to the risk assessment analyses (USEPA, 2006d). See Section VII.B.1 of this preamble for a discussion of study selection.

Enterovirus cell culture data from the 15 studies were used to estimate the baseline risk related to virus occurrence in ground water. EPA believes that enterovirus cell culture measurements provide the best available basis for estimating pathogenic viral occurrence since they capture viruses that are infectious. However, because the cell culture procedure only captures a portion of all viruses that may actually occur in well water due to assay limitations, use of this method may underestimate viral occurrence.

EPA used data on the indicator *E. coli* from these same studies to inform estimates of fecal contamination occurrence. Indicator data are important because illness can result from consuming ground water with fecal contamination in the absence of identified viruses. For example, some viruses such as infectious norovirus are not recoverable, other viruses such as enteroviruses have variable and limited recovery, and a variety of bacteria of fecal origin can cause disease. EPA chose to use *E. coli* data instead of other fecal indicator data for this analysis. This choice was driven by EPA's assessment that *E. coli* will be the most likely fecal indicator used when PWSs implement the GWR, because *E. coli* is frequently used to fulfill follow-up monitoring requirements under the TCR. Therefore national estimates of *E. coli* occurrence can be used to inform potential cost implications for implementing the GWR. EPA recognizes that any indicator organism, including *E. coli,* may or may not co-occur with pathogens and that co-occurrence could be intermittent. *E. coli* is an imperfect indicator of viral occurrence. Some wells with *E. coli* have no viral occurrence. Some wells with viral occurrence have no *E. coli.*

b. *Estimates of national occurrence of viral and fecal indicator contamination.* This section discusses national occurrence of viral and fecal indicator (*E. coli*) contamination, which includes estimates of viral concentrations in contaminated wells and estimates of the probability that a well may have detectable viral and/or fecal indicator contamination. For purposes of this analysis, EPA uses the term ''sometime contamination'' as contamination that occurs at one or more points in time. Because fecal contamination is intermittent, viruses and *E. coli* will only be present at detectable levels some fraction of the time in a contaminated well. These fractions will vary from well to well. Some wells may be frequently contaminated but others may only be contaminated for a small fraction of time.

EPA analyzed the 15 studies for data to inform the concentration analysis. Among the 15 studies used for the national occurrence analysis, 12 provided data on occurrence of enterovirus cell culture and 11 provided data on occurrence of *E. coli.* Among the 12 data sets with enterovirus cell culture measurement, three included viral concentration data. Concentration measurements in the three surveys ranged from 0.09 to 212 enteric virus infectious units (plaque forming units) per 100 liters. Although the measurement methods were often not capable of detecting viruses at concentrations below 0.2 units per 100 liters, it is likely that viruses also occur at levels below the detection limit.

Data from each of the 15 studies were combined into one complete data set to determine the probabilities of sometime well contamination for viral (indicated by enterovirus cell culture) or fecal indicator (indicated by *E. coli*) contamination. The results of this effort led naturally to a combined analysis, which models occurrence and co-occurrence of viruses and *E. coli.* EPA's analysis also considers uncertainty and variability about these estimates. The model serves as the basis of EPA's national quantitative occurrence estimates. See the *Occurrence and Monitoring Document for the Final Ground Water Rule* for more information (USEPA, 2006b).

Overall, the analysis indicates a public health concern in that approximately 26 percent of the wells sometimes have fecal contamination (indicated by *E. coli*) and approximately 27 percent of the wells sometimes have

viral contamination. Due to the intermittent nature of fecal contamination, some of these wells are only contaminated for a small fraction of time. On average, wells with sometime virus occurrence have detectable concentrations about 11 percent of the time, and wells with sometime *E. coli* occurrence have detectable concentrations about 14 percent of the time. The remainder of the time, the well's water is essentially virus free (assuming that concentration is zero when not detected by measurement methods like those used in the occurrence studies). Compared to the analysis in the proposal, the number of wells with fecal contamination is greater but the frequency at which contamination occurs in each well is less.

In summary, EPA's occurrence analysis shows that fecal contamination is intermittent and that some individuals are at risk because pathogens and/or fecal indicators occur at PWSs that use ground water as a source of drinking water. The next section discusses this risk.

4. Potential Risk Implications From Occurrence Data

As discussed previously, to assess the public health risk associated with drinking ground water, EPA evaluated information and conducted analyses on (1) Health effects data from a range of pathogens, (2) waterborne disease outbreak data, and (3) occurrence data from ground water studies and surveys. As a result of this evaluation and analysis, EPA concludes that the potential risk to public health posed by a subset of PWSs with contaminated ground water sources is significant enough to warrant regulation.

When a PWS uses contaminated source water, its customers are at risk of infection and illness. Their risk depends on a number of factors including whether the system provides at least 4-log treatment of viruses, the frequency at which the well is contaminated, the level of contamination (*i.e.*, concentration), and the infectivity of the pathogens that are present.

To develop risk estimates from viral exposure, EPA considered two types of viruses, Type A (represented by data available on rotavirus) and Type B (represented by data available on enterovirus or echovirus), which are used to estimate risk from exposure to viral-contaminated wells. These two virus types have different infection morbidity and disease severity characteristics. Type A viruses are considered to be highly infectious but cause primarily mild illness, while Type B viruses are considered much less infectious but may cause more severe illnesses.

The infectivity of a virus relates the probability of infection to a given amount, or dose, of virus consumed. Together with infectivity, morbidity (risk of illness given infection) and mortality (risk of premature death given an illness) are used to predict the disease burden associated with a particular virus level in drinking water. As discussed in the previous section, a typical contaminated well may have detectable virus concentrations 11 percent of the time. The remainder of the time, the well's water is essentially virus free (assuming that concentration is zero when not detected by measurement methods like those used in the occurrence studies). EPA has viral concentration data from the three studies as discussed in Section III.C.3.b of this preamble. Virus concentration data combined with viral exposure data can be used to predict infection rates given viral dose-response information. Figure III–1 indicates the annual risk of infection from exposure to rotavirus, assuming one liter of water consumed per day, based on a range of possible mean annual source water concentrations and different levels of treatment. For example, if an untreated ground water source had a mean annual source water concentration of 0.1 viruses per 100 L (*e.g.*, a source water concentration of one virus per 100 L, 10 percent of the time), people consuming one liter of this water per day would have approximately a seven percent probability of being infected in the course of the year (90 percent confidence interval of three percent to 13 percent). The risk of infection implications from exposure to echovirus are 10 to 100 times less than those from rotavirus, assuming the same levels of exposure. However, illness resulting from infection of echovirus may be more severe than illness resulting from infection by rotavirus.

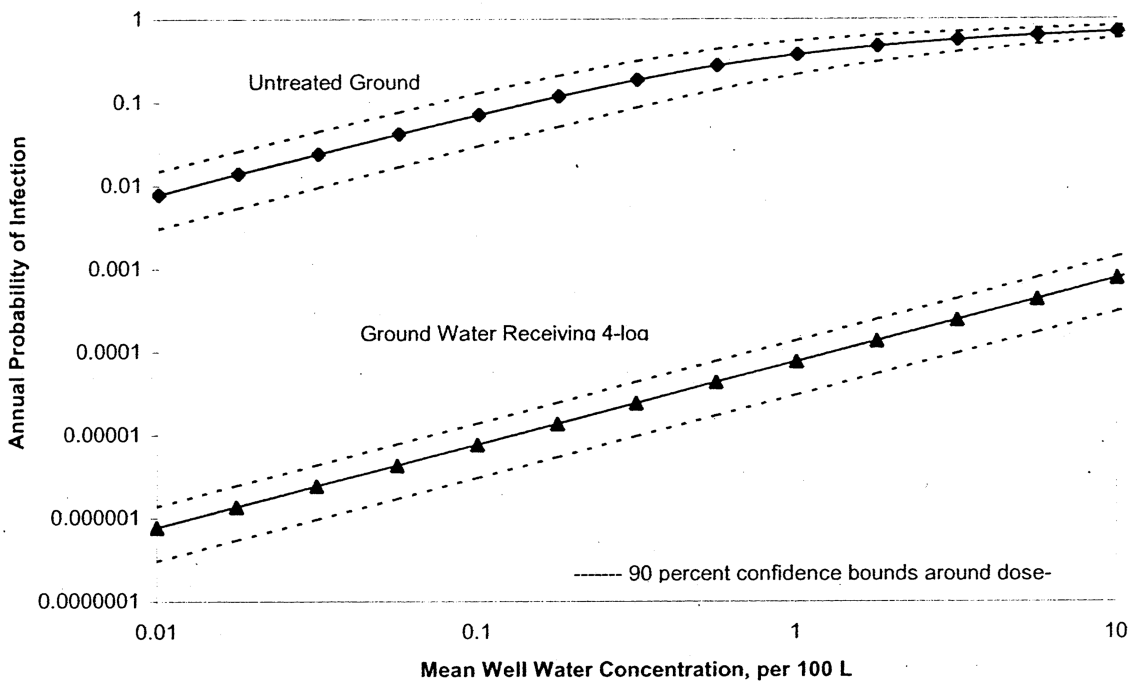
It is important to recognize that EPA's quantitative risk analysis is limited by the data available, specifically data on rotavirus and echovirus. Other pathogenic viruses also cause disease and may be more or less infectious than those modeled. Pathogens may cause chronic and acute illnesses in addition to those considered in the quantitative risk analysis. Furthermore, EPA's quantitative risk analysis does not consider bacterial illness and deaths resulting from contaminated drinking water due to limited data. Taken together, these limitations imply an underestimate of the actual illnesses and deaths that result from exposure to contaminated ground water when only these sources of uncertainty are considered. The GWR national risk implications from exposure to pathogenic viruses and bacteria are discussed in Section VII of this preamble and more fully discussed in the GWR EA (USEPA, 2006d).

Even at the levels EPA is able to quantify, the risk analysis supports the conclusion that a substantial number of people served by GWSs are at risk of exposure to waterborne pathogens. EPA's occurrence analysis (USEPA, 2006b) demonstrates that some wells have high viral occurrence while others have lower occurrence, and thus lower risk. For public health protection, it is most important to target those wells with higher occurrence. In addition, the occurrence analysis demonstrates that contamination is intermittent. Because of the intermittent nature of contamination, an ongoing monitoring program is critical to effectively target higher risk systems.

The intent of the GWR is to reduce risk by targeting susceptible systems for corrective action. The corrective action options are: Correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses. As illustrated in Figure III–1, treatment will provide large improvements in public health. Thus, the final GWR components of sanitary surveys, source water monitoring, and corrective action are each critical steps to improving public health in communities served by undisinfected (or inadequately disinfected) GWSs.

Implementation of this rule is expected to result in approximately 42,000 avoided viral illnesses and one avoided death annually. The analysis is uncertain and these estimates could be an over-or under-estimate of actual illnesses and deaths. The nonquantified benefits are those that the Agency was unable to quantify due to data limitations, which include decreased incidence of other acute viral disease endpoints, decreased incidence of chronic viral illness sequelae, decreased incidence of bacterial illness and death, decreased incidence of waterborne disease outbreaks and epidemic illness, and decreased illness through minimizing treatment and distribution system failures. The nonquantified benefits associated with this rule are significant and are discussed in detail in Section 5.4 of the GWR EA (USEPA, 2006d).

Figure III-1: Estimated Annual Risks of Infection from Rotavirus for Different Exposure Conditions



IV. Discussion of GWR Requirements

This section describes the rule requirements and rationale for each component of the risk-targeted strategy of this rule. A summary of, and responses to, key comments on the proposed rule are also provided.

A. Sanitary Surveys

EPA believes that comprehensive, periodic sanitary surveys and the identification and correction of significant deficiencies are indispensable for ensuring the long-term safety of drinking water supplies. They are an important tool for identifying potential vulnerabilities to fecal contamination at GWSs. The final GWR includes Federal requirements for sanitary surveys of all GWSs for the first time.

This rule provides the States with flexibility to prioritize and carry out the sanitary survey process, while ensuring that the survey is an effective, preventive tool for GWSs. The sanitary survey provision in this rule builds on existing State sanitary survey programs established under the 1989 TCR and the Interim Enhanced Surface Water Treatment Rule (IESWTR) (63 FR 69477, December 16, 1998) (USEPA, 1998b) and gives States the authority to define both outstanding performance and significant deficiencies. At the same time, the GWR's sanitary survey requirements for minimum frequencies, scope, documentation, and mandatory corrective action strengthen existing sanitary survey programs and address many of the concerns associated with current sanitary survey programs as identified by the GAO (USGAO, 1993).

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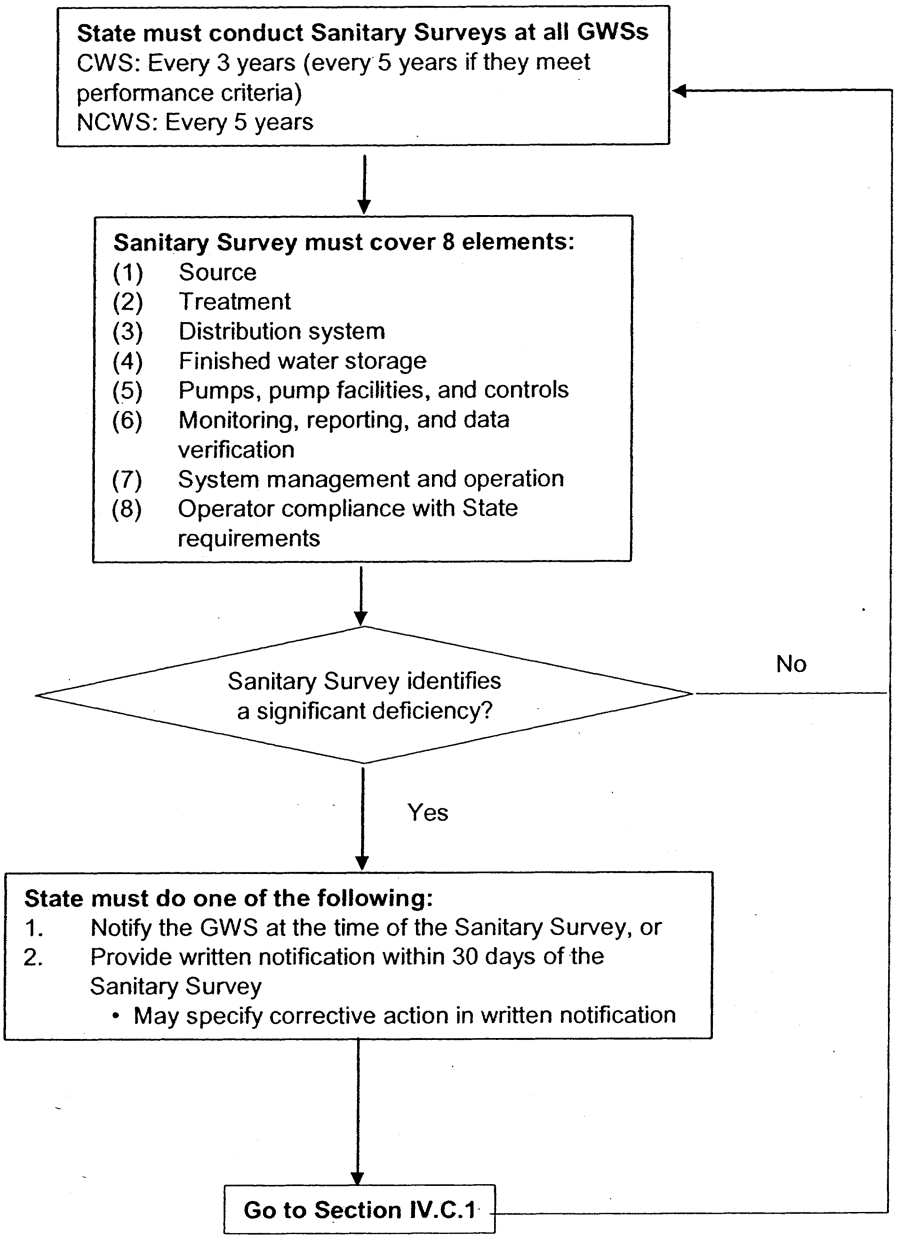
Figure IV-1: Sanitary Survey Requirements



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1. What Are the Requirements of This Rule?

This rule requires States to perform sanitary surveys for all GWSs. Ground water systems must provide the State with any pertinent, existing information that will enable the State to perform the sanitary survey. This rule goes beyond the existing definition of sanitary survey at § 141.2, explicitly references the use and relevance of source water assessments required under the 1996 SDWA Amendments, and specifies in more detail the scope of a sanitary survey. Specifically, this rule requires that States evaluate eight components as part of the sanitary survey to the extent that they apply to an individual system: (1) Source; (2) treatment; (3) distribution system; (4) finished water storage; (5) pumps, pump facilities, and controls; (6) monitoring, reporting, and data verification; (7) system management and operation; and (8) operator compliance with State requirements. This rule outlines the eight minimum elements using broad categories and recognizes that certain elements may not be present in a particular system depending on its size or complexity.

This rule requires States to conduct sanitary surveys of ground water CWSs every three years (every five years for CWSs that meet performance criteria as described in the following paragraph) and of ground water NCWSs every five years. States are required to complete the initial sanitary survey cycle by December 31, 2012 for CWSs, except those that meet performance criteria, and December 31, 2014 for all NCWSs and CWSs that meet performance criteria. States may conduct more frequent sanitary survey cycles for any GWS as appropriate.

This rule allows individual components of a sanitary survey to be conducted according to a phased review process (*e.g.*, as part of ongoing State assessment programs). While all

applicable components need not be evaluated at the same time, they must be evaluated within the required three-or five-year frequency interval. Also, this rule allows the three-year CWS schedule to be extended to a five-year frequency if the system meets certain criteria (referred to in this preamble as ''performance criteria''). These performance criteria are:

• Provides 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 all its ground water sources, or

• Has an outstanding performance record (as defined by the State) documented in previous sanitary surveys, and has no history of total coliform MCL or monitoring violations under the TCR since the last sanitary survey.

Finally, this rule requires that GWSs correct any significant deficiencies identified in sanitary surveys. Significant deficiencies, as determined by the State, include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the State determines to be causing, or have the potential for causing, the introduction of contamination into the water delivered to consumers.

Significant deficiencies may include, but are not limited to, the following:

Source

• Well near a source of fecal contamination (*e.g.*, failing septic systems or a leaking sewer line).

• Well in a flood zone.

• Improperly constructed well (*e.g.*, improper surface or subsurface seal).

• Spring boxes that are poorly constructed and/or subject to flooding.

Treatment

• Inadequate application of treatment chemicals (*e.g.*, disinfection contact time is inadequate).

• Lack of redundant mechanical components where disinfection is required.

• Unprotected cross-connections with treatment chemical systems.

• Inadequate treatment process monitoring.

Distribution System

• Negative pressures that could result in the entrance of contaminants.

• Inadequate disinfectant residual monitoring, when required.

• Unprotected cross-connections.

Finished Water Storage

• Inadequate internal cleaning and maintenance of storage tanks.

• Lack of proper screening of overflow pipes, drains, or vents.

• Storage tank roofs or covers need repair (*e.g.*, holes or hatch of improper construction).

Pumps, Pump Facilities, and Controls

• Inadequate pump capacity.

• Inadequate maintenance.

• Inadequate/inoperable control system.

Monitoring, Reporting, and Data Verification

• Failure to properly monitor water quality.

• Failure to meet reporting requirements.

• Inadequate recordkeeping.

System Management and Operation

• Failure to meet water supply demands/interruptions to service (*e.g.*, unreliable water source or lack of auxiliary power).

• Lack of approved emergency response plan.

• Inadequate follow-up to deficiencies noted in previous assessment/survey.

Operator Compliance with State Requirements

• Operator is not certified as required by the State.

• Lack of operator training.

The State must provide the GWS with written notification, which describes any significant deficiencies found, no later than 30 days after the State identifies the significant deficiency. The notice may be sent to the PWS, or it may be provided on-site either at the time the sanitary survey is conducted or the significant deficiency is identified. The State may specify appropriate follow-up corrective action steps in the notice or may notify the GWS of appropriate corrective actions during the consultation period. After receiving the written notification, the GWS has 30 days to consult with the State regarding corrective actions. However, the State may prescribe corrective actions and completion dates, including immediate and/or interim corrective actions, in lieu of the consultation process. Under this rule, a GWS must complete corrective action or be in compliance with a State-approved corrective action plan and schedule within 120 days of receiving written notice from the State, as described in Section IV.C of this preamble. Failure to do so will result in a treatment technique violation. This rule requires systems to notify customers of uncorrected significant deficiencies. When a significant deficiency is identified at a PWS that uses both ground water and surface water sources, the GWR treatment technique requirements apply except in cases where the State determines that the significant deficiency is in a portion of the distribution system that is served by surface water (or ground water under the direct influence of surface water).

2. What Is EPA's Rationale for the GWR Sanitary Survey Requirements?

As discussed in the proposed GWR, sanitary surveys enable States (and systems) to provide a comprehensive and accurate review of the components of water systems, to assess the operating conditions and adequacy of the water system, and to determine if past recommendations have been implemented effectively. A GWS has the responsibility of providing the information necessary to conduct a sanitary survey to the State upon request to enable a comprehensive assessment of the system. The purpose of the sanitary survey is to evaluate and document the capabilities of the water system's sources, treatment, storage, distribution network, operation and maintenance, and overall management to ensure the provision of safe water. In addition, sanitary surveys provide an opportunity for PWS inspectors to visit the water system and educate operators about proper monitoring and sampling procedures and to provide technical assistance.

Historically, sanitary surveys have been conducted by State drinking water programs as preventative tools for identifying water system deficiencies before contamination occurs. In 1976, EPA regulations required, as a condition of primacy, that States develop a systematic program for conducting sanitary surveys, but EPA did not define the scope of sanitary surveys or specify minimum criteria at that time. In 1989, the TCR included a provision requiring sanitary surveys for systems collecting fewer than five TCR samples per month (systems serving fewer than 4,100 people). For those systems, sanitary surveys are required under the TCR once every five years for CWSs and NCWSs (but once every 10 years for NCWSs that use protected or disinfected ground water). However, the TCR did not establish what must be evaluated in a sanitary survey or specifically address significant deficiencies.

Consequently, a number of concerns have been raised regarding post-TCR sanitary survey practices. For example, the GAO investigated sanitary survey practices in 1993 and found that many surveys did not evaluate one or more of the major components and operations that EPA requires be evaluated under the final GWR and that efforts to ensure that deficiencies were corrected were often limited (USGAO, 1993). A review of State regulations found that many States do not specifically require systems to correct deficiencies. These

factors, coupled with information on contaminant occurrence and analysis of microbial waterborne disease outbreak data, indicated that public health protection can be strengthened by requiring regular sanitary surveys, specifying the scope of surveys, and requiring corrective action of significant deficiencies.

In 1995, EPA and the States (through the Association of State Drinking Water Administrators) issued a joint guidance on sanitary surveys entitled *EPA/State Joint Guidance on Sanitary Surveys* (USEPA/ASDWA, 1995). Recognizing the essential role of sanitary surveys and the need to define the broad areas that all sanitary surveys should cover, the guidance recommended eight elements for a comprehensive sanitary survey. The guidance also recommended the development of assessment criteria, proper documentation of results, and thorough follow-up, tracking, and enforcement after the survey. The IESWTR, (USEPA, 1998b), requires States to address the same eight elements in sanitary surveys conducted at surface water systems and at GWUDI systems. The GWR incorporates the same eight elements into the sanitary survey requirements for GWSs to be consistent with, and as comprehensive as, the IESWTR. Based on consultation with the States and EPA regions, EPA believes that the majority of States today include the eight elements in their sanitary survey programs for both surface water and GWSs.

In addition to requiring these eight elements, the GWR requires the State to conduct sanitary surveys no less frequently than every three years for CWSs and every five years for NCWSs. This rule provides the State with the flexibility to reduce the frequency for CWSs to every five years for systems that meet performance criteria (refer to Section IV.A.1 for criteria). These frequencies are consistent with the recommendations for surface water systems made by the Microbial/Disinfection Byproducts Federal Advisory Committee, which included various stakeholders representing a wide range of sectors in the drinking water community. Given this, EPA believes that the same three- and five-year interval for conducting sanitary surveys is appropriate for GWSs. The GWR requires the first sanitary survey cycle to be completed by December 31, 2012 for CWSs, except those that meet performance criteria, and December 31, 2014 for all NCWSs and CWSs that meet performance criteria. See Section VI of this preamble for explanation of initial sanitary survey completion dates.

As noted earlier, this regulation attempts to build on existing State public health programs to the extent possible. Consequently, the GWR allows individual elements of a sanitary survey to be conducted on a phased review schedule as part of ongoing State assessment programs within the established three-or five-year frequency interval. This allows States to more efficiently use existing assessment schedules and maximize the effective allocation of staff resources and expertise across a State in conjunction with other priorities. EPA believes that the frequency of sanitary surveys and the required eight sanitary survey elements in this rule ensure greater public health protection while providing adequate flexibility for States and systems to effectively implement the requirements. The GWR requires the initial sanitary surveys to be completed six years after rule promulgation for CWSs and eight years after rule promulgation for NCWSs. The six to eight year time frame for initial sanitary surveys is based on several considerations. First, States need time to adopt the rule and obtain primacy (two to four years allowed by the SDWA at 1413(a)(1)). In addition, systems are given three years to comply with drinking water regulations by the SDWA at (1412(b)(10)). Finally, States need three to five years to complete the first cycle of sanitary surveys because there are many GWSs and States have limited resources.

A key finding of the GAO report was that deficiencies identified in one sanitary survey were often found still uncorrected at the next sanitary survey. For example, in a four-State sample of 200 sanitary surveys, GAO found approximately 60 percent of the surveys cited deficiencies that were also cited in previous surveys. While the report indicated that smaller systems (serving 3,300 or fewer people) were in the greatest need of improvement, GAO found that, regardless of system size, previously identified deficiencies frequently went uncorrected. GAO found that some States lacked the authority to ensure that water system owners and operators correct documented deficiencies. Additional causes for uncorrected deficiencies included a lack of documentation or ineffective tracking of survey results. The Agency believes that a sanitary survey is an effective tool for identifying significant deficiencies. Once identified, it is also essential that such deficiencies be corrected in a timely manner. A study of the effectiveness of a range of best management practices shows that follow-up and correction of sanitary survey deficiencies were correlated with lower levels of total coliform, fecal coliform, and *E. coli* (ASDWA, 1998). Thus, this rule requires that systems coordinate with the State within 30 days of being notified of the significant deficiency and that the systems correct the significant deficiency (or be on an enforceable State-prescribed schedule) within 120 days of being notified of the significant deficiency. See Section IV.C for details on corrective action time frames.

3. What Were the Key Issues Raised by Commenters on the Proposed GWR Sanitary Survey Requirements?

The majority of commenters on the GWR proposal were supportive of a sanitary survey requirement for all GWSs. Most commenters supported the proposed frequencies of three years for CWSs and five years for NCWSs. Several commenters noted that some States conduct surveys at more frequent intervals than required in this rule. However, a few commenters suggested extending the frequency interval for CWSs, because they believed that CWSs would be less likely to have significant deficiencies.

The Agency believes that frequent, comprehensive sanitary surveys are an important proactive public health measure and that the minimum frequencies of sanitary surveys under this rule balance public health protection with State implementation issues. This rule requirement is consistent with the frequency required for surface water systems under the IESWTR. The GWR provides flexibility in allowing States to perform more frequent sanitary surveys or to reduce the frequency for CWSs to five years if the CWS meets performance criteria (Section IV.A.1). States also have the flexibility to phase-in the evaluation of sanitary survey elements within the required frequency interval. The Agency believes that a frequency of three years for CWSs and five years for NCWSs, combined with flexibility on both timing and implementation, appropriately considers limited resource issues while advancing public health protection.

EPA specifically requested comments on ''grandfathering'' sanitary surveys conducted under the TCR to satisfy the initial sanitary survey requirements of the GWR. The majority of comments favored allowing the use of sanitary surveys conducted under the TCR or existing State programs to meet the initial sanitary survey requirements of the GWR. These comments were largely based on an interest in reducing State

implementation burden and allowing States to transition their existing sanitary survey programs into programs and schedules that meet the requirements of the GWR.

Because of the time frames laid out in the GWR for initial and repeat sanitary surveys, grandfathering sanitary surveys is not practicable. States must complete their initial CWS sanitary surveys six years after rule promulgation for CWSs and eight years for NCWSs. The deadline for completing the first round of sanitary surveys is longer than the minimum required sanitary survey frequency, so grandfathering would not result in a burden reduction for the State. For example, if a State were to grandfather a CWS sanitary survey from 2005, they would be required to complete a second sanitary survey by 2008 and a third by 2011, whereas a State that completed their first sanitary survey in 2009 would not be required to complete their second sanitary survey until 2012. As described in Section IV.A.2, the six to eight year time frame for initial sanitary surveys is based on several considerations. First, States need time to adopt the rule and obtain primacy (two to four years allowed under the SDWA at 1413(a)(1)). In addition, systems are given three years to comply with drinking water regulations by the SDWA at (1412(b)(10)). Finally, States need three to five years to complete the first cycle of sanitary surveys because there are many GWSs and States have limited resources.

EPA believes that it is important to reduce State implementation burden and that information from existing sanitary surveys and other sources is an important resource. Thus, this rule allows States to reduce the frequency of sanitary surveys for CWSs that meet performance criteria (Section IV.A.1) at any time subsequent to the effective date of this rule from every three to every five years. This allows States to reduce the implementation burden of sanitary surveys based on information collected under the TCR and existing sanitary survey programs while still ensuring a minimum sanitary survey frequency of five years for both CWSs and NCWSs. Since a significant proportion of GWSs are small NCWSs and the GAO report found the greatest need for improvement in smaller systems, EPA believes that a reduction in frequency for NCWSs would not advance public health protection. EPA notes that surveys or elements of sanitary surveys conducted under the TCR or as part of site assessment or other State programs may be used to meet the GWR requirements if they meet the criteria specified in the GWR (*i.e.*, if the minimum eight elements specified in the GWR are addressed at the specified GWR frequency).

EPA received a number of comments on the 30-day time frame that States have to notify a system when a significant deficiency is identified in the sanitary survey. Some commenters noted that this requirement is consistent with current procedures; notice of significant deficiencies is often provided to a system much sooner. However, other commenters were concerned that this requirement placed an unnecessary deadline on the State and that current State policies and practices adequately address timely notification of systems with significant deficiencies.

The Agency believes that timely notification of significant deficiencies is essential to the timely correction of those deficiencies and to the safety of drinking water. EPA believes requiring a 30-day maximum notification period in all States is reasonable, given the potential public health risk of significant deficiencies, and ensures equitable protection of public health across the nation.

EPA also received comments on what constitutes a significant deficiency under the GWR. EPA proposed defining significant deficiencies as a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the State determines to be causing, or has the potential for causing, the introduction of contamination into the water delivered to consumers. Several commenters urged EPA to go beyond that definition and require States to specify a minimum list of significant deficiencies under each of the applicable eight sanitary survey components set out in the EPA/State Joint Guidance on Sanitary Surveys. EPA also received comments regarding specific examples of significant deficiencies in each applicable component. Section IV.A.1 of this preamble includes specific examples of some significant deficiencies provided by commenters.

The Agency believes that to provide adequate public health protection, States must identify and require correction of all significant deficiencies. Also, EPA recognizes the importance for the State to include additional case-specific deficiencies. This rule states that significant deficiencies ''include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the State determines to be causing, or has the potential for causing, the introduction of contamination into the water delivered to consumers.'' The GWR requires each State, in its primacy application, to define and describe at least one specific significant deficiency in each of the eight sanitary survey elements. This enables States to work within their existing programs to define significant deficiencies as part of their primacy application and to define and describe significant deficiencies that may be unique to system size, type, location, or State requirements. EPA also recognizes that some systems may not have all eight components; for example, some TNCWSs may not have storage or require certified operators.

EPA requested comment on having public involvement and/or meetings for certain PWSs to discuss the results of sanitary surveys and specifically what approaches might be practical and not overly burdensome to involve the public in working with water systems to address the results of sanitary surveys. Some commenters suggested publishing the results in the system's Consumer Confidence Report (CCR) or reviewing the results at a public meeting. Others supported notifying the public that the results were available and how those results could be obtained. Some commenters noted that significant deficiencies would be corrected rapidly and that involving or informing the public after the correction might not be useful. One commenter suggested posting the results of surveys in a public place for non-community systems.

EPA believes that adequate opportunities exist for customers to obtain information on the complete sanitary survey of their water supplier. Results of sanitary surveys and notification from the State to the water supplier of significant deficiencies would be available to the public upon request from the State or the water supplier. However, EPA also believes that the public served by the water system should be made aware of significant deficiencies found in sanitary surveys that remain uncorrected and be fully informed as to how and when those deficiencies will be corrected. This rule requires systems to notify customers of such significant deficiencies including the date and nature of the significant deficiency, the schedule for correction, any interim measures taken, and the progress to date. The State may require the system to notify customers of corrected significant deficiencies. This requirement is described further in Section IV.D of this preamble.

EPA received comments suggesting that the sanitary survey provisions of

the TCR are sufficient to address viral and bacterial pathogens in GWSs and there is no need for sanitary surveys under the GWR. While EPA believes the TCR was a significant step forward for public health protection in 1989, the TCR does not require systems to correct significant deficiencies or require a minimum frequency of sanitary surveys for all systems. Thus, the GWR sanitary survey requirement better addresses the potential public health consequences of uncorrected significant deficiencies.

B. Source Water Monitoring

This rule requires ground water source monitoring as an essential element in its risk-targeted approach for identifying those GWSs with source water fecal contamination that need corrective action. Systems targeted for source water monitoring are those with an indication that they may be at risk for fecal contamination. Indicators of risk may come from total coliform monitoring, hydrogeologic sensitivity analyses, or other system-specific data and information. This rule requires triggered source water monitoring and provides States with the option to require assessment source water monitoring. Source water monitoring is not required for any GWS that is already providing at least 4-log treatment of viruses.

A GWS with a distribution system TCR sample that tests positive for total coliform is required to conduct triggered source water monitoring to evaluate whether the total coliform presence in the distribution system is due to fecal contamination in the ground water source. Triggered source water monitoring provides a critical ongoing evaluation of GWSs.

As a complement to the triggered source water monitoring provision, the GWR gives States the flexibility to require more comprehensive assessment source water monitoring on a case-by-case basis. The purpose of this optional assessment source water monitoring requirement is to target source water monitoring to systems that the State determines are at higher risk for fecal contamination. States are in the best position to assess which systems are at risk and would most benefit from source water monitoring.

EPA believes that source water monitoring targeted at higher risk systems, namely triggered source water monitoring, in conjunction with optional assessment source water monitoring, will be effective in identifying systems with source water fecal contamination. With implementation of the follow-up corrective action requirements outlined in Section IV.C, these requirements will provide meaningful opportunities to reduce public health risk for a substantial number of people served by GWSs.

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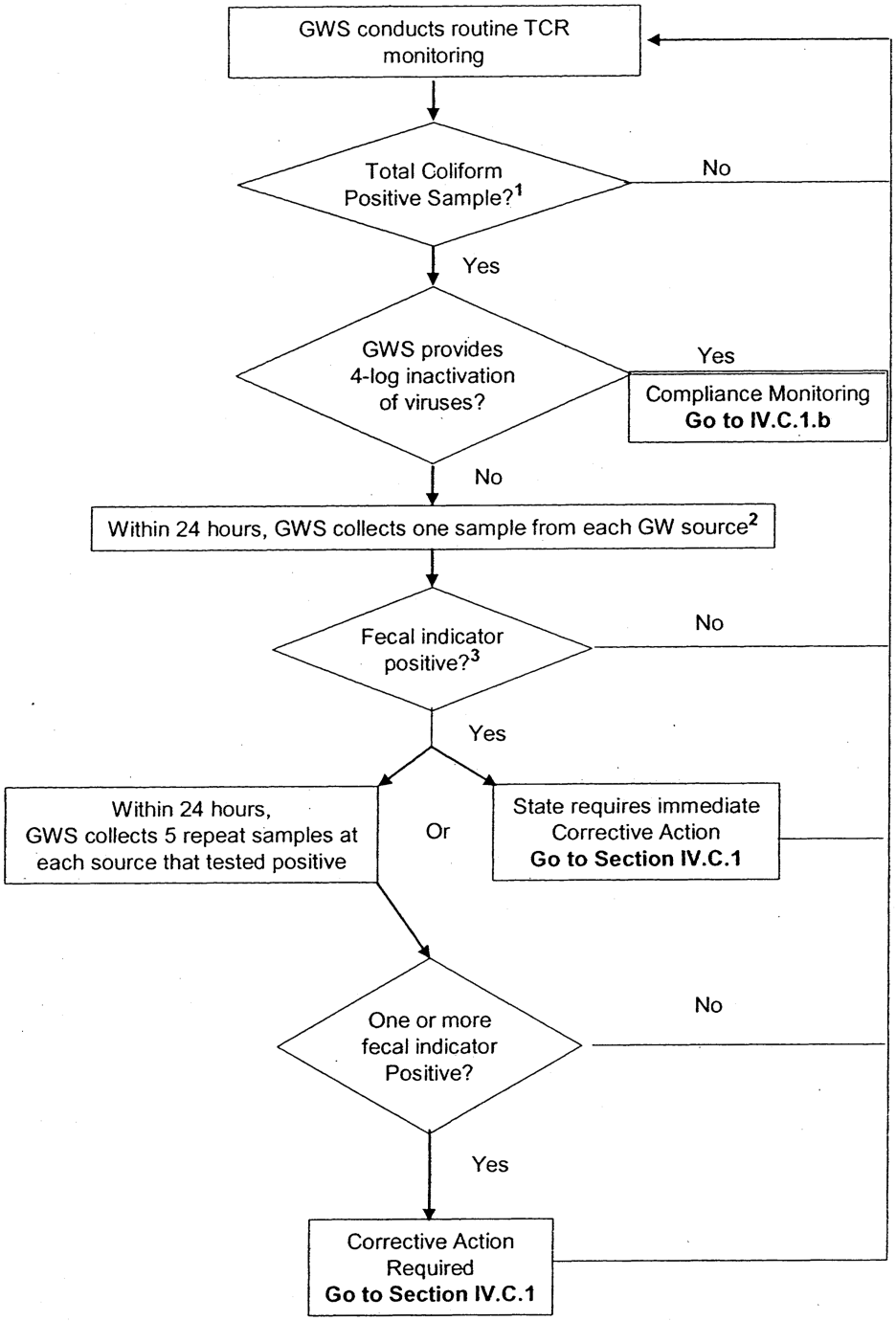
Figure IV-2: Triggered Source Water Monitoring Requirements



[1]Answer "no" if the sample is invalidated under 141.21(c) or the State determines that the cause of the total coliform-positive sample directly relates to the distribution system

[2]If approved by the State, systems with more than one ground water source may monitor at representative ground water source(s) according to a triggered source water monitoring plan

[3]*E. coli*, enterococci, or coliphage

BILLING CODE 6560–50–C

1. What Are the Requirements of This Rule?

a. *Triggered source water monitoring.* A GWS must conduct triggered source water monitoring within 24 hours of receiving notification that a routine sample collected in accordance with § 141.21(a) (TCR) is total coliform-positive. A GWS must collect at least one ground water source sample from each ground water source (*e.g.*, a well or spring) in use at the time the total coliform-positive sample was collected. Triggered source water monitoring is required unless: (1) The system provides 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; (2) the system is notified that a positive sample collected in accordance with § 141.21(a) (TCR) has been invalidated under § 141.21(c); or (3) the cause of the total coliform-positive collected under § 141.21(a) directly relates to the distribution system as determined by the system according to State criteria or as determined by the State. The State may extend the 24-hour limit on a case-by-case basis if the State determines that 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.

Systems are not required to conduct triggered source water monitoring if, according to State criteria or a State determination, the cause of the total coliform-positive sample collected under § 141.21(a) directly relates to the distribution system. If the GWS makes the decision according to State criteria, the GWS must document the decision in writing; if the decision is made by the State, the State must document the decision in writing. In the primacy application, the State must include criteria that will be used to determine that the cause of a total coliform-positive sample collected under § 141.21(a) is directly related to the distribution system.

If the State approves the use of *E. coli* as a fecal indicator for triggered source water monitoring, GWSs serving 1,000 people or fewer may use a TCR repeat sample collected from a ground water source to simultaneously meet the requirements of § 141.21(b) and satisfy the GWR's triggered source water monitoring requirements for that ground water source only.

If approved by the State, systems with more than one ground water source may conduct triggered source water monitoring at a representative ground water source or sources. The State may require systems with more than one ground water source to submit for approval a triggered source water monitoring plan that the system will use for representative sampling. A triggered source water monitoring plan must identify ground water sources that are representative of each monitoring site in the system's TCR sample siting plan.

If any initial triggered source water sample is fecal indicator-positive, the system must collect five additional source water samples within 24 hours at that site, unless the State requires immediate corrective action to address contamination at that site. The samples must be tested for the same fecal indicator for which the initial source water sample tested positive.

Ground water systems that purchase or sell finished drinking water (referred to as consecutive or wholesale systems, respectively) must comply with triggered source water monitoring provisions for their own sources.

Consecutive and wholesale systems must also comply with other triggered source water monitoring requirements. A consecutive GWS that has a total coliform-positive sample collected under § 141.21(a) (TCR) must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample. If a wholesale GWS receives notice from a consecutive system it serves that a sample collected under § 141.21(a) (TCR) is total coliform-positive, the wholesale GWS must conduct triggered source water monitoring. If the sample is fecal indicator-positive, in addition to notifying its own customers, the wholesale GWS must notify all consecutive systems served by that ground water source. The consecutive system is responsible for providing any required public notice to the persons it serves.

b. *Assessment source water monitoring.* The GWR provides States with the option to require systems to conduct assessment source water monitoring at any time and require systems to take corrective action. See Section IV.B.2.b for EPA's recommendations of when assessment source water monitoring may be appropriate and how to structure the monitoring program. If the State chooses to use HSAs to determine the appropriateness of assessment source water monitoring, then systems must comply with State requests for information.

c. *Source water microbial indicators and analytical methods.* A system that collects a source water sample to comply with this rule must analyze the sample for one of the three fecal indicators (*E. coli*, enterococci, or coliphage). Under this rule, GWSs must use one of seven specified analytical methods for *E. coli*, one of three methods specified for enterococci, or one of two methods specified for coliphage. The system is required to test at least a 100 mL sample volume for one of the three fecal indicators (*E. coli*, enterococci, or coliphage). All analyses must be conducted by a laboratory certified by the State or EPA.

d. *Invalidation of a fecal indicator-positive ground water source sample.* This rule allows systems to obtain written State invalidation of a fecal indicator-positive ground water source sample under either of the following conditions: (1) The system provides the State with written notice from the laboratory that improper sample analysis occurred; or (2) the State determines and documents in writing that there is substantial evidence that a fecal indicator-positive ground water source sample is due to a circumstance that does not reflect source water quality. If the State invalidates a fecal indicator-positive ground water source sample, the system must collect another ground water source sample within 24 hours of being notified of the invalidation by the State and have it analyzed for the same fecal indicator. The State may extend the 24-hour limit on a case-by-case basis if it determines that the system cannot collect the ground water source water sample within 24 hours due to circumstances beyond the system's control. In the case of an extension, the State must specify how much time the system has to collect the sample.

2. What Is EPA's Rationale for the GWR Source Water Monitoring Requirements?

a. *Triggered source water monitoring.*

i. Overall basis for provision. The GWR builds on the public health protection provided by the TCR by requiring systems to collect a ground water source sample when a TCR distribution system sample is total coliform-positive. Because a total coliform-positive sample in the distribution system may be caused by either a distribution system problem or source water contamination, the GWR triggered source water monitoring provision is necessary to distinguish between these two possible sources of fecal contamination. Thus, using the total coliform indicator is an efficient way to target higher risk systems where source water monitoring is warranted to investigate potential fecal

contamination. EPA believes that the GWR triggered source water monitoring provisions provide an effective means for improving public health protection.

Total coliform monitoring in the distribution system is already required under the TCR. Thus, total coliform monitoring provides a no-cost screening for potential fecal contamination and pathogen occurrence at the source. Total coliform is a sensitive indicator for the presence of potential fecal contamination. In the occurrence studies evaluated for the GWR, wells that were monitored with high frequency for enterovirus and total coliforms detected both enterovirus and total coliform in their source water (*i.e.*, Lieberman *et al.*, 2002; Karim *et al.*, 2004; Wisconsin Department of Health, 2000). Total coliform presence in source water can also be an indicator of recent surface and near surface water inflow to ground water, and pathogens originate at or near the surface.

Triggered source water monitoring provides an ongoing evaluation of fecal contamination in the source water of all GWSs. Because well conditions and sources of fecal contamination can change over time, EPA believes that the ongoing continuous assessment provided by triggered source water monitoring is important.

EPA believes that the triggered source water monitoring requirements of the GWR will effectively target higher risk GWSs. EPA's analysis indicates that the triggered source water monitoring provisions will identify nearly 40 percent of those wells with fecal contamination in their source water (See Chapter 6 of USEPA, 2006d). In addition, the wells with the highest frequencies of fecal contamination occurrence (which EPA believes are the highest risk wells from a public health perspective) will likely be captured first and wells with less frequent fecal contamination will be identified over time (USEPA, 2006d).

ii. Reduced burden for small systems. Under the final GWR, a GWS serving 1,000 people or fewer may use a TCR repeat sample to simultaneously meet requirements of the TCR and the GWR. Under the TCR, when a total coliform sample at a small system (serving 1,000 people or fewer) is positive, the TCR requires the system to collect four repeat samples (one upstream and proximate to the initial total coliform-positive, one at the same location, one downstream and proximate to the original total coliform-positive, and one at another unspecified location). If the State approves the use of *E. coli* as a fecal indicator for ground water source monitoring, the GWR allows these small systems to meet the repeat monitoring requirements of § 141.21(b) (TCR) by collecting their unspecified fourth repeat sample at the ground water source, thereby satisfying the GWR's triggered source water monitoring requirements for that ground water source at the same time. The purpose of this provision is to mitigate the triggered fecal indicator source water monitoring burden for small systems and to improve upon the diagnostic value of repeat sampling under the TCR.

The TCR repeat sample can be used for satisfying both the TCR repeat sample requirement and the initial source water fecal indicator under the GWR because the TCR methods and requirements provide the information necessary for complying with the GWR. If the repeat sample is negative for total coliform bacteria, then it is also negative for *E. coli* bacteria, and no further testing under the GWR is required. Under the TCR, if a repeat sample is positive for total coliform bacteria, the sample must then be further analyzed for the presence of either *E. coli* or fecal coliforms. If the sample is analyzed for *E. coli*, that will satisfy the GWR triggered monitoring requirements.

Total coliform bacteria are a group of bacteria that include *E. coli*. The methods approved for the analysis of the water samples taken under the TCR can be found at § 141.21. Most of these methods are also approved for *E. coli* monitoring under the GWR (see Table IV–1 and § 141.402(c)). The analytical methods approved for use under the TCR listed in Table IV–1 may all be used for both total coliform detection, and most can be used for subsequent *E. coli* detection under the GWR. Two of the methods approved under the TCR (and listed with an asterix in Table IV–1) can be used for total coliform detection only. In these two techniques (one of which is multiple tube fermentation and the other of which is membrane filtration using m-Endo medium), total coliforms are first cultured and confirmed. The laboratory analyst could then proceed to further analyze the total coliform-positive culture for either fecal coliforms or *E. coli* by simply choosing which subsequent medium to inoculate. Testing for fecal coliforms requires EC-Broth while testing for *E. coli* requires use of EC-MUG broth. These two broths are similar, and require the same incubation temperatures and conditions. The only difference between the two media is the addition of the substrate 4-methylumbelliferone-β-D-glucuronide (MUG) to EC Broth, which is added to detect *E. coli*. Thus, if the State has approved *E. coli* as the fecal indicator for the GWR, the *E. coli* sample analyzed under the TCR will meet the GWR source water sample requirements. For the TCR repeat sample, a PWS must collect a 100 mL water sample and analyze it for total coliform bacteria, and further analyze it for a fecal indicator if it is total coliform-positive. This means that small systems (serving 1,000 people or fewer) have no additional sampling burden or costs from the GWR triggered source water monitoring requirement for an initial source water sample.

TABLE IV–1.—METHODS APPROVED FOR DETECTION OF TOTAL COLIFORMS UNDER THE TCR AND FOR THE DETECTION OF *E. coli* UNDER THE GWR (SEE § 141.402(C) FOR DETAILS REGARDING THESE METHODS) **

Method technology type	Method	Total coliforms detected	E. coli detected	TCR/GWR approval
Multiple tube fermentation	(LTB/P–A → BGLB)*	X		X
	EC–MUG		X	X
	NA–MUG		X	X
Enzyme Substrate	Colilert/Colilert-18	X	X	X
	Colisure	X	X	X
	E* Colite Test	X	X	X
Membrane filtration	(m-Endo→LTB/BGLB)*	X		X
	EC–MUG		X	X
	MI Agar	X	X	X

TABLE IV–1.—METHODS APPROVED FOR DETECTION OF TOTAL COLIFORMS UNDER THE TCR AND FOR THE DETECTION OF *E. coli* UNDER THE GWR (SEE § 141.402(C) FOR DETAILS REGARDING THESE METHODS) **—Continued

Method technology type	Method	Total coliforms detected	E. coli detected	TCR/GWR approval
	m-ColiBlue 24 Test	X	X	X

* Methods in parentheses detect total coliforms but not *E. coli*; if a total coliform sample is determined by this method in the source water sample, the analyst can choose the appropriate inoculation medium to analyze for *E. coli*.

** If a total coliform sample is determined negative, no further testing under the GWR is required. If it is positive, the analyst can choose the appropriate *E. coli* method.

iii. Provision for total coliform-positive result directly related to the distribution system. EPA recognizes that some systems may have a known problem in their distribution system that causes total coliform-positive results. In cases when the cause of a total coliform-positive result collected under § 141.21(a) is directly related to the distribution system according to State criteria or a State determination, systems are not required to collect ground water source samples to investigate potential fecal contamination in the source water. A State must include in its primacy application the criteria it will use to determine whether the cause of a total coliform-positive sample collected under § 141.21(a) is directly related to the distribution system. Systems will use these criteria to determine if the cause of a total coliform-positive sample is directly related to the distribution system. If the sample meets the criteria, the system is not required to do triggered source water monitoring. The State needs to determine these criteria as part of their primacy package so that GWSs that collect a total coliform-positive sample can decide whether they need to collect a source water sample(s) within the required 24 hour timeframe. The system must document this determination to the State within 30 days so the State can ensure that the criteria are used correctly and that no potential public health risk from source water contamination has been overlooked. For issues not covered by the pre-determined criteria, the State can also make a determination that the cause of the total coliform-positive sample directly relates to the distribution system.

iv. Basis for additional fecal indicator sampling following triggered source water monitoring. Numerous public comments on the proposal expressed concern that a corrective action should not be required based on one source water indicator-positive sample, as EPA proposed for triggered source water monitoring. The rationale for the proposal was that the likelihood of a false positive result occurring in both the distribution system sample and the fecal indicator source water sample would be small, and therefore it would be likely that the source water positive result was caused by true contamination.

EPA has re-evaluated the use of repeat samples under the triggered source water monitoring provisions. Given that total coliform-positives in the distribution system can result from either distribution system or source water causes, a total coliform-positive in the distribution system does not necessarily predict fecal contamination of the source water. The possibility of false positives at the source and the associated potential for unnecessary follow-up corrective actions, even if relatively infrequent, prompted EPA to revise the final rule triggered source water monitoring provisions to require five additional samples following the initial positive sample before requiring corrective action (if one or more additional sample is positive), unless the State determines that immediate corrective action is necessary. In addition, the potential cost implications for a corrective action could be substantial, especially for small systems.

EPA believes that in most cases these five additional samples should capture the fecal contamination event since the samples are taken within 24 hours. Discrete contamination releases, such as fecal septage, together with discrete precipitation events, become dispersed by hydrogeological processes over time. As a result, shorter duration events at the original contamination source may become longer duration (*i.e.*, days or weeks) but more diluted events at the well. Thus, if an initial fecal indicator-positive is detected at the well, that occurrence should be detectable again with additional samples within 24 hours. Nevertheless, since the nature and source of contamination and the subsurface condition vary from site to site, prompt resampling within 24 hours is needed to capture events that may not be dispersed over time. Prompt resampling is particularly important in cases where the initial sampling event transpires at the tail-end of the well contamination event.

b. *Assessment source water monitoring.* As a complement to the triggered source water monitoring provision, States have the option of requiring systems to conduct assessment source water monitoring. This flexible provision gives States the opportunity to target higher risk systems for additional source water monitoring and require corrective action, if necessary. EPA decided not to include requirements for assessment source water monitoring in the GWR for the reasons given in Section II.C of the preamble. Rather, EPA decided to give States flexibility to require assessment source water monitoring on a case-by-case basis. The purpose for this optional source water monitoring provision is to target systems that the States believe are at high risk from fecal contamination for a thorough evaluation of source water quality. Also, this allows lower risk GWSs to avoid unnecessary sampling (as determined by States).

While EPA believes that triggered source water monitoring will capture many high risk systems, EPA also recognizes that the triggered source water monitoring provisions have limitations. Triggered source water monitoring under the TCR may not be timely (soon enough) or frequent enough to identify systems with intermittent fecal contamination. Also, coliforms are not a good indicator in certain aquifers in which viruses travel faster and further than bacteria. EPA believes that assessment source water monitoring can be an important complement to triggered source water monitoring because assessment source water monitoring provides a thorough examination of the source water at those systems that States deem to be at potentially high risk from fecal contamination. The flexibility of this requirement allows States to require assessment source water monitoring when and where it is needed most. Source water quality can change over time, so it is important for States to be

able to use assessment source water monitoring at any point in time. State programs work closely with PWSs on a daily basis and are thus knowledgeable about system specific conditions and issues. Therefore, EPA believes that the States are in the best position to assess for which systems the thorough evaluation of source water quality provided by assessment source water monitoring is most appropriate. EPA believes that assessment source water monitoring programs within the States' discretion will be important to identify fecally contaminated systems for which corrective action is necessary to protect public health. EPA expects that States may use assessment source water monitoring for high-risk systems that are potentially susceptible to fecal contamination, especially where contamination is often present but intermittent enough to be missed by triggered source water monitoring.

i. EPA's recommendations for targeting systems for assessment source water monitoring. Information on a system's potential susceptibility to fecal contamination is available to the States from many sources. For example, HSAs, source water assessments, wellhead protection plans, past microbial monitoring data particularly triggered source water monitoring results and frequency, and sanitary survey findings are available to States. In addition to these sources of information, EPA recommends that States consider the following risk factors in targeting susceptible systems for assessment source water monitoring: (1) High population density combined with on-site wastewater treatment systems, particularly those in aquifers with restricted geographic extent, such as barrier island sand aquifers; (2) aquifers in which viruses may travel faster and further than bacteria (*e.g.* alluvial or coastal plain sand aquifers); (3) shallow unconfined aquifers; (4) aquifers with thin or absent soil cover; (5) wells previously identified as having been fecally contaminated; and (6) sensitive aquifers. These factors are described in more detail below.

Some localities may be at high risk because they serve large, sometimes seasonal, populations in areas without centralized sewage treatment and their aquifers are of restricted geographic extent, such as barrier island sand aquifers and Great Lakes island karst limestone aquifers. In these locations, the large population using septic tanks can overload the subsurface attenuation capability. Outbreaks have occurred in such resort communities (*e.g.*, South Bass Island, OH, Ohio EPA, 2005, CDC, 2005; Drummond Island, MI, Ground Water Education in Michigan, 1992; Chippewa County Health Department, unpublished report, 1992) due to overloaded septic tanks.

Viruses travel faster and further than bacteria in some aquifers. In barrier island sand aquifers, traditional bacterial fecal indicator organisms such as total coliform and *E. coli* may not be mobile or sufficiently long-lived in the subsurface so as to adequately indicate the hazard from longer-lived and more mobile viral pathogens. Thus, a system could have fecal contamination and yet not be triggered for source water monitoring by TCR monitoring results. In such cases, assessment source water monitoring using coliphage would be the best means for identifying fecal contaminants because coliphage is a viral fecal indicator and thus is more likely to reach the well than bacterial indicators such as *E. coli* and enterococci.

Shallow, unconfined aquifers are high risk because the vertical flow path to the aquifer is short and unrestricted by barriers. Pathogens originate at or near the surface and may be more likely to contaminate well water when the travel time for infiltrating precipitation is short and unhindered.

Wells previously identified as having been fecally contaminated should be considered high risk because such fecal contamination can reoccur. For example, wells in this category may include wells associated with a previous acute TCR violation related to the source or those wells that had an initial fecal indicator-positive triggered source water sample but had five negative additional samples (especially wells with highly variable source water such as those in sensitive aquifers). Wells with highly variable source water may be subject to occasional short-lived contamination events. Thus it is possible to have a true fecal indicator-positive sample followed by true fecal indicator-negative samples. Exposures during intermittent contamination events can be significant, so it is important to identify such high-risk systems. This is best accomplished through a thorough source water evaluation program such as assessment source water monitoring.

Sensitive aquifers (*e.g.*, karst, fractured bedrock, or gravel) can have fast (kilometers per day) and direct ground water flow through large interconnected openings (void spaces) during which very little pathogen attenuation may occur (either by natural inactivation or attachment) between a fecal source of contamination and the well. Consequently, sensitive aquifers are efficient at transmitting pathogens, if present, from surface and near-surface sources to PWS wells. Ground water flow in non-sensitive aquifers (such as a sand aquifer) tends to be very slow (feet per day), takes a very indirect path around a very large number of sand grains, and provides more opportunities for pathogen die-off and attachment. The faster flow travel time within a sensitive, as opposed to a non-sensitive, aquifer enables a much larger contaminant plume from potential fecal contamination events (*e.g.*, failing septic systems or a leaking sewer line).

When ground water flow is fast and direct as in sensitive aquifers, contamination can be short and intermittent and difficult to capture. The frequency by which triggered source water monitoring is prompted via detection of a total coliform-positive sample under the TCR may not be timely enough to recognize that a well is at risk from fecal contamination. First, TCR monitoring at some systems is infrequent. Small systems conduct limited total coliform monitoring in the distribution system under the TCR and thus intermittent fecal contamination of the source could be missed (*i.e.*, these systems may conduct triggered source water monitoring infrequently under the GWR). Second, the lag time between an initial fecal contamination event and total coliform presence in the distribution system may be several days. Thus, if the fecal contamination event is of short duration, triggered source water monitoring may not capture the initial event.

Some of the largest reported waterborne disease outbreaks in GWSs have occurred among systems drawing water from sensitive aquifers. Table IV–2 provides a summary of recent outbreaks reported in sensitive aquifers. The number and nature of recent waterborne outbreaks shown in the table suggest that additional measures are necessary to protect those consuming water from PWS wells in sensitive aquifers. Noteworthy among these outbreaks is the South Bass Island, Ohio outbreak. After that outbreak in 2004, 16 of the 18 TNCWSs on South Bass Island tested positive for fecal indicator organisms (Ohio EPA, 2005; CDC, 2005). Thus, the monitoring protections offered by the TCR were inadequate to protect the community from experiencing a waterborne disease outbreak in this karst limestone aquifer.

TABLE IV–2.—RECENT WATERBORNE DISEASE OUTBREAKS (PWSS) REPORTED IN KARST LIMESTONE AND FRACTURED BEDROCK (SENSITIVE) AQUIFERS

Location	Reference	Number of illnesses/agent
Outbreaks in Karst Limestone Aquifers		
South Bass Island, OH	Ohio EPA, 2005; CDC, 2005	1,450/Norovirus, *Campylobacter, Salmonella.*
Walkerton, Ontario, Canada	Health Canada, 2000; Bopp *et al.*, 2003; Worthington *et al.*, 2002.	1,346 cases/*E. coli* O157:H7 (+ *Campylobacter*); 7 deaths.
Brushy Creek, TX	Bergmire-Sweat *et al.*, 1999; Lee *et al.*, 2001	1,300–1,500 cases/*Cryptosporidium* (not recognized as GWUDI until after the outbreak).
Reading, PA	Moore *et al.*, 1993	551 cases/*Cryptosporidium* (not recognized as GWUDI until after the outbreak).
Racine, MO	MO Department of Health, unpublished report, 1992.	28 cases/HAV.
Drummond Island, MI	Ground Water Education in Michigan, 1992; Chippewa County Health Department, unpublished report, 1992.	39 cases/Unknown.
Cabool, MO	Swerdlow *et al.*, 1992	243 cases/E. coli O157:H7; 4 deaths.
Outbreaks in Fractured Bedrock Aquifers		
Big Horn Lodge, WY	Anderson *et al.*, 2003	35/Norovirus.
Atlantic City, WY	Parshionikar *et al.*, 2003	84/Norovirus.
Couer d'Alene, ID	Rice *et al.*, 1999	117/Arcobacter butzleri.
Island Park, ID	CDC, 1996	82 cases/Shigella.
Northern AZ	Lawson *et al.*, 1991	900 cases/Norwalk virus.

Where the type of aquifer is unknown, EPA recommends that the State conduct an HSA to identify sensitive aquifers and to determine if assessment source water monitoring is appropriate. In sensitive aquifers, more frequent monitoring could more quickly identify wells with fecal contamination. EPA recommends that States use HSAs as a tool to determine at-risk GWSs, and EPA intends to provide guidance on how to conduct HSAs.

Several means can be used to evaluate wells without site-specific inspections to determine if they are located in sensitive hydrogeologic settings. For example, hydrogeologic data are available from published and unpublished materials such as maps, reports, and well logs. As discussed in more detail in the GWR proposal (USEPA, 2000a), the United States Geologic Survey (USGS), U.S. Department of Agriculture's Natural Resource Conservation Service, USGS Earth Resources Observation System Data Center, the EPA Source Water Assessment Program and Wellhead Protection Program, State geological surveys, and universities have substantial amounts of regional site-specific information. States can also base assessments on available information about the character of the regional geology, regional maps, and rock outcrop studies.

In summary, HSAs can be an effective screening tool for identifying GWSs susceptible to fecal contamination for which assessment source water monitoring would be appropriate and beneficial.

ii. EPA's recommendations for assessment source water monitoring program. EPA recommends that States require systems that are conducting assessment source water monitoring to collect a total of 12 ground water source samples that represent each month the system provides ground water to the public. The 12 sample minimum is based on several considerations:

- The sampling frequency should consider diminishing returns on the effectiveness of identifying fecally contaminated wells;
- The sampling should be frequent enough to capture a range of conditions that can vary over the course of a year; and
- The sampling frequency should consider ground water source monitoring costs incurred by GWSs.

EPA estimates that about 26 percent of all wells have *E. coli* occurrence at some time, but the periods of such contamination may be very short and thus difficult to detect by the triggered source water monitoring requirements for some systems. With 12 assessment ground water source samples alone (*i.e.*, absent any triggered source water monitoring), at least half of the wells with sometime *E. coli* contamination would be expected to test positive at least once. Table IV–3 shows that as sampling frequency increases above 12 samples, the ability to identify additional wells that have *E. coli* presence rises more slowly and that relatively smaller percentages of additional wells with *E. coli* are identified per additional sample assay. This table shows that the sampling with 12 assays (*i.e.*, tests) captures 52 percent of the wells with sometime *E. coli* contamination, but sampling with 24 assays only captures an additional nine percent.

TABLE IV–3.—NUMBER OF *E. coli* ASSAYS AND PERCENT CONTAMINATED WELLS IDENTIFIED

Number of assays (N)	Fraction identified (Mean in percent)
3	28
6	40
12	52
24	61
36	65
48	68
60	70

The wells that the assessment source water monitoring identifies as contaminated tend to be those that have frequent occurrence of *E. coli*. Those wells with highly infrequent *E. coli* occurrence would be difficult to capture even with a significant increase in number of samples because the overall period of time of indicator occurrence is small relative to when the sampling occurs.

Considering the costs of additional assays (beyond 12 assessment ground water source samples) and the reduced efficiency at identifying additional

contaminated wells, EPA believes that 12 assays are appropriate.

EPA recommends that the assessment source water monitoring program be representative of the system's typical operation. Using a minimum of 12 samples for assessment source water monitoring would also ensure sampling for each month that most systems are in operation, which is important because of the impact that seasonal events can have on contamination (*e.g.*, heavy rain events). For seasonal systems, EPA recommends equally distributing 12 samples or sampling during consecutive years.

The option under the GWR for States to specify assessment source water monitoring requirements allows States to initiate a more thorough source water monitoring program than that resulting from the triggered source water monitoring provisions alone on a case-by-case basis, as deemed appropriate. For example, a sanitary survey may indicate that there has been a recent development of added source water vulnerability that would warrant additional source water sampling to discern whether there is potential fecal contamination beyond that which would be triggered through the TCR. Additionally, belated recognition of the significance of karst limestone after an outbreak (*e.g.*, Walkerton, Ontario; South Bass Island, Ohio) suggests that States may choose to specify identification of sensitive aquifers combined with assessment source water monitoring to enhance multi-barrier protection.

c. *Source Water Samples*

i. Source water microbial indicators. The final GWR requires GWSs that are performing triggered source water monitoring to monitor their ground water source(s) for one of three fecal indicators (*E. coli*, enterococci, or coliphage). The State must specify which fecal indicator the GWSs must test for in their ground water source(s). EPA recommends that States use these same requirements for GWSs performing assessment source water monitoring.

In this rule, EPA is authorizing the use of *E. coli* and enterococci as bacterial indicators of fecal contamination. Both of these indicators are closely associated with fresh fecal contamination and are found in high concentrations in sewage and septage. Approved analytical methods for these indicators are commercially available, simple, reliable, and inexpensive. *E. coli* is monitored under the TCR and therefore GWSs are familiar with its measurement and interpretation. Enterococci are recommended as one of the indicators for fecally contaminated recreational waters and therefore have widespread use. Enterococci may be a more sensitive fecal indicator than *E. coli* in certain aquifer settings and therefore may be the preferred indicator in such locations.

EPA is also authorizing the use of coliphage as a viral indicator of fecal contamination. Coliphage are viruses that infect the bacterium *E. coli*. They are closely associated with fecal contamination because they do not tend to infect other non-fecal bacteria. Because they are viruses, their stability and transport through soil and certain aquifer types are similar to the fate and transport of pathogenic viruses. There are two categories of coliphage—somatic coliphage and male-specific coliphage. Local knowledge of hydrogeological conditions may inform which of the indicators may be most effective for identifying fecal contamination (USEPA, 2006b). EPA plans to publish a guidance manual to help to inform such decisions. This rule gives States the discretion to specify use of *E. coli*, enterococci, or one of the coliphage types to monitor for potential presence of fecal contamination in ground water sources.

ii. Basis for requiring one versus more than one fecal indicator. EPA's Science Advisory Board (SAB) and the National Drinking Water Advisory Council (NDWAC) recommended that EPA require monitoring for coliphage *and* either *E. coli* or enterococci for source water monitoring. The reasons stated by SAB and NDWAC were that (1) Ground water occurrence data show that no single indicator can fully capture all fecal contamination, (2) coliphage is an important indicator of enteric virus contamination in terms of transport and survival characteristics, and (3) a significant portion of waterborne disease risk is associated with exposure to pathogenic viruses in ground water sources utilized by a subset of PWSs (USEPA, 2000h and 2000i).

EPA had insufficient data to evaluate the effectiveness, on a national level, of using both coliphage and either *E. coli* or enterococci as source water indicators of fecal contamination. While coliphage data is available for many of the occurrence studies used to estimate national occurrence for *E. coli*, the methods used to measure coliphage are often based on high volume analysis and a variety of methods different than those specified under the final GWR. Thus, EPA could not determine whether SAB's proposal would provide additional effectiveness.

EPA is concerned with the potential increase in sampling burden relative to the additional number of fecally contaminated wells that would be identified using two indicators compared to the use of one indicator. The analytical cost for coliphage (viral fecal indicator) monitoring is estimated to be about two to three times the cost for bacterial fecal indicator monitoring. Therefore, requiring a GWS to monitor for both bacterial and viral fecal indicators would more than double the analytical costs for GWSs. Based on the limited data available, EPA believes that it is not reasonable to require all GWSs to monitor for both a bacterial and a coliphage indicator in their source water.

EPA believes that the most appropriate indicator may vary from State to State or site to site. This may be due to regional or site-specific differences or other reasons that may be identified by the State. EPA intends to provide guidance on how to determine which indicator may be most appropriate to use.

For the reasons discussed above, EPA believes that the use of a single fecal indicator (*E. coli*, enterococci, or coliphage) provides a cost-effective means for identifying fecally contaminated wells and protecting public health.

iii. Sample volume and analytical methods. This rule requires GWSs performing triggered source water monitoring to collect and test at least a 100 mL sample volume. EPA recommends that States use this requirement for assessment source water monitoring. The final GWR requires a minimum sample volume of 100 mL because most utilities are familiar with this sample volume for bacterial indicator analysis, and the two EPA approved coliphage methods include at least this volume in their procedures. EPA believes that specifying a higher minimum sample volume would unduly increase the cost per sample (especially due to shipping). Furthermore, if a higher minimum sample volume were specified in the GWR, small systems would not be able to realize the considerable monitoring cost savings from use of TCR repeat sampling previously discussed in Section IV.B.2.a.ii.

With regard to analytical methods used for ground water source monitoring under this rule, four of the seven methods for the analysis of *E. coli* in source waters allowed under this rule are consensus methods described in *Standard Methods for the Examination of Water and Wastewater* (20th editions) (APHA, 1998). The three *E. coli* methods that are not consensus methods are as follows: MI agar (a membrane filter method), the ColiBlue 24 test (a

membrane filter method), and the E*Colite test (a defined dehydrated medium to which water is added). EPA has already evaluated and approved these three methods for use under the TCR. In the proposed rule § 141.403(d), footnotes 4 and 5, the use of MI agar with Membrane Filtration Method was allowed. Membrane Filtration Method is an EPA-approved drinking water method, as indicated in footnote 4, while footnote 5 cites a manuscript describing MI agar. Subsequent to the proposal of the GWR, EPA developed EPA method 1604 ''Total Coliforms and *Escherichia coli* in Water by Membrane Filtration Using a Simultaneous Detection Technique (MI Medium)'' (USEPA, 2002c). This method was created to ensure consistency with other EPA microbiological methods and was promulgated under the Clean Water Act for use in ambient water monitoring July 21, 2003 (68 FR 43272–43283) at 40 CFR 136.3, Table 1A, footnote 22. Method 1604 is equivalent to both the manuscript and the EPA-approved Membrane Filtration Method, and EPA has indicated in Section 5.4.2.1.3 of the *Manual for the Certification of Laboratories Analyzing Drinking Water* (USEPA, 2005b) that Method 1604 is identical. EPA Method 1604 is available on the EPA Web site at *http://www.epa.gov/microbes*. This rule allows EPA Method 1604 because the Agency believes it will be easily available to the public.

Three enterococci methods for the analysis of source water are allowed under this rule; two of these are consensus methods in *Standard Methods* (APHA, 1998), and the third (Enterolert) was published in a peer-reviewed journal article (Budnick *et al.*, 1996). The description for each of the *E. coli* and enterococci methods explicitly states that the method is appropriate for fresh waters or drinking waters. The proposed rule, § 141.403(d), footnote 8 of the table, also proposed to allow EPA Method 1600 (USEPA, 1997d) as an approved variation of one of the two consensus methods, *Standard Method* 9230C, for enterococci. However, subsequent to the proposal of the GWR, EPA slightly modified EPA Method 1600 (USEPA, 2002a) and promulgated the new version under the Clean Water Act on July 21, 2003 (68 FR 43272–43283), at § 136.3, Table 1A, Footnote 25. The revised method replaced the 1997 version on the EPA Web site (*http://www.epa.gov/microbes*). EPA does not regard the changes in the newer version of Method 1600 as substantive and, aside from changes in format, contact, and grammar, has indicated the differences between the two versions in a memo dated March 12, 2004 that is included in the Water Docket for the GWR. This rule allows the more recent version of EPA Method 1600 because, and in addition to a few updates and more clarifications, the Agency believes that it will be much more easily available to the public.

EPA proposed to allow, and continues to allow under this rule, the use of the two coliphage methods, U.S. EPA Methods 1601 and 1602 (USEPA, 2001a, 2001b), for source water testing—a new two-step enrichment method (Method 1601) and a single-agar layer method (Method 1602) recently optimized for ground water samples. These methods have been round-robin tested (USEPA, 2003a and b) and the Agency has also conducted performance studies, using 10 laboratories, on the two proposed methods. A full report of each of the two performance studies is available in the Water Docket. They are entitled (1) *Results of the Interlaboratory Validation of EPA Method 1601 for Presence/Absence of Male-specific (F+) and Somatic Coliphage in Water by Two-Step Enrichment* (USEPA, 2003a), and (2) *Results of the Interlaboratory Validation of EPA Method 1602 for Enumeration of Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer* (SAL) (USEPA, 2003b).

With regard to method cost, EPA queried seven laboratories that participated in the round-robin performance testing of the proposed coliphage tests. Based upon this survey, EPA estimates that the coliphage tests (not including sampling or shipping costs) will cost about $59–$65 per test (DynCorp, 2000). This compares to about $20–25 for bacterial indicators.

iv. Invalidation of a fecal indicator-positive ground water source sample. This rule allows the State to invalidate a fecal indicator-positive triggered source water monitoring sample if the system provides the State with written notice from the laboratory that improper sample analysis occurred, or if the State determines and documents in writing that there is substantial evidence that a fecal indicator-positive ground water source sample is not related to source water quality. These provisions are consistent with the sample invalidation criteria under the TCR and provide a necessary flexibility to States.

3. What Were the Key Issues Raised by Commenters on the Proposed GWR Source Water Monitoring Requirements?

a. *Triggered source water monitoring.*

i. Use of total coliform-positive result as a trigger for source water fecal indicator monitoring. Many commenters maintained that a single total coliform-positive sample was too sensitive of a trigger to prompt a requirement to collect a ground water source sample. Among their reasons were that a single total coliform-positive sample in the distribution system is not necessarily linked to any source water problem or even a public health risk. Some argued that other triggers were more suitable, such as an acute MCL violation or a non-acute MCL violation under the TCR. A number of commenters were opposed to triggered source water monitoring altogether.

As discussed in Section IV.B.2, EPA believes that triggered source water monitoring is an important requirement to protect public health. In response to commenters' concerns that a single total coliform-positive sample in the distribution system is not necessarily linked to any source water problem, EPA has added language in the final GWR that allows States to determine that the cause of a total coliform-positive collected under § 141.21(a) is directly related to the distribution system and will thus not be a trigger for fecal indicator source water monitoring. Because the time available to make the determination is short, the State may develop criteria for systems to use to make the determination, which would be followed by a report to the State.

Unless clearly indicated otherwise, EPA believes that a total coliform-positive sample in the distribution system is an indication of potential microbial contamination of the GWS that may have originated from the ground water source. This is a potentially serious public health risk that warrants follow-up action.

EPA believes that basing triggered source water monitoring on TCR MCL violations would not be sensitive enough to identify the majority of fecal contamination events at the source. EPA estimated that the percentage of fecally contaminated wells that would be identified under such a provision would be an order of magnitude less than under the requirements of the final rule. Consequently, EPA believes that such a requirement would not be adequately protective.

ii. Consecutive system and wholesale system requirements. EPA requested comment on which GWR requirements should apply to consecutive systems and specifically who should be responsible for triggered source water monitoring after a total coliform-positive sample is found in the consecutive system's distribution system. Many commenters recommended that the seller (or wholesale) system be responsible for

ground water source monitoring, not the consecutive system. Others suggested the State should decide which system should take the ground water source sample. In addition, some commenters maintained that the buyer (or consecutive) system should not be responsible for meeting the treatment technique requirements (*e.g.*, 4-log treatment) for sources.

EPA infers that some commenters based their comments on an understanding that consecutive systems were only systems that received all their finished water from a wholesale system, although that is not always correct. Since the GWR proposal, EPA defined ''consecutive system'' and ''wholesale system'' in § 141.2 in the Stage 2 Disinfectants and Disinfection Byproducts Rule (DBPR) (71 FR 388, January 4, 2006) (USEPA, 2006g). In those definitions, which apply to all requirements in 40 CFR Part 141 (including the GWR), EPA specified and clarified that consecutive systems include both systems that receive all of their finished water from one or more wholesale systems and systems that receive some of their finished water from one or more wholesale systems (with the balance coming from a source or sources operated and treated, as necessary, by the consecutive system).

The Agency has added requirements to clarify the responsibilities of consecutive and wholesale systems in response to comments received, and to facilitate implementation and compliance. EPA believes that public health and risk concerns underlying the requirement for triggered ground water source monitoring after a total coliform-positive sample are equally applicable to consecutive systems and wholesale systems. EPA also believes that the system that operates the ground water source should be responsible for any required triggered or assessment source water monitoring and any required corrective actions, including 4-log treatment installation, operation, and compliance monitoring.

Without treatment, water quality problems in the wholesale system will remain in the water delivered to the consecutive system and thus water quality problems in the consecutive system may be related to problems in the wholesale system (even if the wholesale system has not identified the problems). Therefore, in the GWR, specific triggered source water monitoring requirements apply to consecutive systems and wholesale systems (as explained in the following paragraphs) unless the cause of the total coliform-positive collected under § 141.21(a) directly relates to the distribution system as determined by the system according to State criteria, or as determined by the State.

Consecutive systems that have a total coliform-positive sample must notify the wholesale system(s) within 24 hours of being notified of the total coliform-positive sample so that the wholesale system(s) can conduct triggered source water monitoring, since the wholesale system's source water may be the cause. Also, a consecutive system with its own ground water source(s) that has a total coliform-positive sample under the TCR must conduct triggered source water monitoring of its own sources, just like any other GWS that must conduct triggered source water monitoring. A consecutive system that has no source of its own (*i.e.*, it receives all of its finished water from one or more wholesale systems) is not required to conduct triggered source water monitoring, since it has no source water. Only systems that produce finished ground water (*i.e.*, have their own sources) are required to conduct triggered source water monitoring.

Consecutive systems are required to comply with the GWR treatment technique requirements only in cases of contamination in the consecutive system's own ground water source. Consecutive systems are not required to comply with GWR treatment technique requirements if a fecal indicator-positive is detected only in the wholesale system's ground water source; only the system with the source contamination must comply with the GWR treatment technique requirements (in this case, the wholesale system). Similarly, wholesale systems are not required to comply with GWR treatment technique requirements if a fecal indicator-positive is detected only in the consecutive system's ground water source and not in the wholesale system's source; again, only the system with the source contamination must comply with the GWR treatment technique requirements (in this case, the consecutive system).

iii. Repeat samples to confirm initial fecal indicator-positive. Several commenters raised concerns that a single positive fecal indicator source water sample should not result in a corrective action because the indicator sample result may be a false positive. The same commenters recommended that repeat samples be taken to confirm the initial result before requiring corrective action. In response to commenters and based on the discussion in Section IV.B.2, unless the State determines that corrective action should be taken following an initial fecal indicator-positive source water sample, the final GWR requires that the GWS take five additional samples, and that only if one of those samples is fecal indicator-positive is corrective action required. This prevents systems from incurring costs from the application of unnecessary corrective actions. The State may require the system to take corrective action after the first fecal indicator-positive source water sample.

EPA believes that five additional samples following a positive triggered source water monitoring sample provides a reasonable balance between ensuring that corrective actions are warranted, avoiding excessive re-sampling costs, and avoiding an incorrect conclusion that the initial positive was false (*i.e.*, avoiding a situation in which corrective action is needed but not taken because of false re-sample results). EPA believes that multiple samples, rather than one, are needed to ensure that corrective action is taken when necessary. EPA proposed using five repeat samples under the routine monitoring provisions (65 FR 30230) (USEPA, 2000a). Commenters wanted EPA to use repeat samples for the triggered monitoring provisions also because they were concerned about false positives and systems taking unnecessary corrective actions. They recommended four or five repeat samples for triggered monitoring. In response to comments, the final GWR requires five repeat samples under the triggered source water monitoring provisions.

iv. Source water monitoring burden. In the final GWR, EPA has reduced the sampling burden for small systems serving 1,000 people or fewer. Under the TCR, a system that collects one or fewer routine samples per month (systems that serve 1,000 people or fewer) with a total coliform-positive sample (that has not been invalidated) is already required to collect a set of four repeat samples in the distribution system within 24 hours of the total coliform-positive sample. Under this rule, one of the four repeat samples required under the TCR may be used to satisfy the GWR source water monitoring requirements if the sample is taken at a ground water source and only if the State approves the use of *E. coli* as a fecal indicator.

In addition, the final rule reduces sampling burden for systems with more than one well (*e.g.*, many large systems). Based on comments received, the GWR provides flexibility for systems with more than one well. The triggered source water monitoring provision allows systems with more than one ground water source, upon State approval, to sample a representative ground water source (or sources)

following any total coliform-positive sample. The State may require systems with more than one ground water source to submit for approval a triggered source water monitoring plan that the system will use for representative sampling. EPA believes that this alternative can be as protective of public health as monitoring all wellheads, provided that the chosen wells are truly representative of all wellheads. In addition, for situations where a particular sample site is inaccessible, the State may identify an alternate sampling site that is representative of the water quality of the ground water at the inaccessible sample site.

b. *Routine Monitoring.* Many comments regarding routine source water monitoring were related to HSAs. Many commenters suggested State discretion on which systems should be considered sensitive and thus be required to do routine monitoring.

EPA has taken public comments on routine monitoring and HSAs into consideration, as discussed in Section II.C. The final GWR provides State the option to require assessment source water monitoring at GWSs that the State determines to be most susceptible to fecal contamination. EPA believes that this optional provision is an important tool that should be used by States to protect public health.

EPA recommends HSAs as one way to identify higher risk systems for which assessment source water monitoring would be beneficial and appropriate. Based on comments received, the final GWR does not require HSAs or assessment source water monitoring, except as provided by the State (see Section II.C).

c. *Source water microbial indicators and analytical methods.* This rule allows a State to direct a system to use *E. coli*, enterococci, or coliphage for ground water source monitoring. Regarding coliphage testing, one major issue raised by commenters pertained to the performance of the two proposed coliphage methods. Many commenters questioned method reliability, specificity, sensitivity, false-positive rates, and lack of comprehensive field testing. They were also concerned about analytical costs and the availability of laboratory capacity. As explained earlier, the Agency believes that the results of performance studies indicate that both methods have been validated for reliable use in drinking water contexts. As discussed in Section IV.B.2, EPA recognizes that the analytical costs for coliphage testing are more than double the cost for bacterial (*E. coli* and enterococci) analyses. Therefore, EPA believes that many States will specify a bacterial fecal indicator for GWR source water monitoring based on cost. However, the Agency allows coliphage testing in this rule due to awareness that some laboratories are proficient in coliphage analysis and that this indicator may be preferred over others, depending on site-specific knowledge. While EPA recognizes that limited laboratory capacity for coliphage testing may be an issue, this rule provides States with discretion in determining which fecal indicators (*E. coli*, enterococci, or coliphage) will be used. EPA expects that one of the factors that States may use to decide which fecal indicator to specify is laboratory capacity.

C. Corrective Action Treatment Techniques for Systems With Significant Deficiencies or Source Water Fecal Contamination

The final GWR provides for regular, comprehensive sanitary surveys of all GWSs and triggered source water and optional assessment source water monitoring to determine at-risk GWSs. This rule requires the subset of systems with sanitary survey significant deficiencies or source water fecal contamination to complete corrective actions in a timely manner to ensure public health protection. Failure to complete corrective actions within 120 days, including meeting deadlines for interim actions and measures, or comply with a State-approved corrective action plan and schedule, constitutes a treatment technique violation under this rule.

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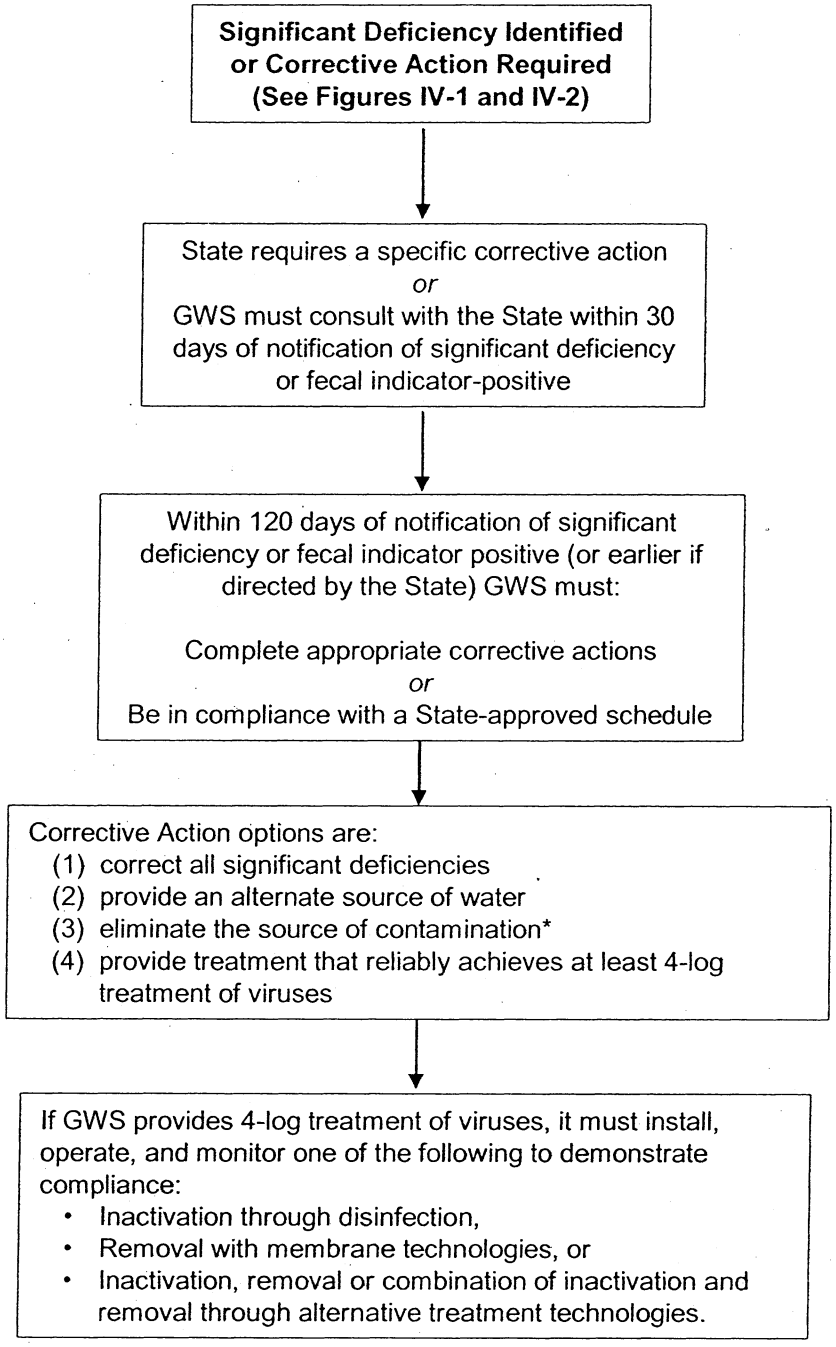
Figure IV-3: Corrective Action Treatment Technique Requirements



* If the State and GWS cannot determine the cause of the source water contamination, and the State determines based on follow-up monitoring or other evidence that the contamination is unlikely to occur again, the State may determine that the source of contamination has been eliminated.

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1. What Are the Requirements of This Rule?

When a system has a significant deficiency, it must consult with the State regarding appropriate corrective action within 30 days of receiving a written notice of the significant deficiency. When a system receives a written notice from a laboratory indicating a fecal indicator positive result in one of the five additional triggered source water monitoring samples, the system must consult with the State regarding appropriate corrective action. When a system receives a written notice from a laboratory indicating a fecal indicator

positive result and the State has determined that corrective action is necessary, the system must consult with the State regarding appropriate corrective action. Consultation must take place within 30 days. In any event, the State may specify corrective action without consultation. In the consultation process, the State may approve and/or modify corrective actions and completion schedules proposed by the system, or the State may specify alternatives. The State may also specify interim corrective action measures.

The GWR rule requires that within 120 days (or earlier if directed by the State) of receiving the notification from the State or laboratory described in the preceding paragraph, the GWS must either (i) Complete appropriate corrective actions in accordance with applicable State plan review processes or other State guidance or direction, or (ii) be in compliance with a State-approved corrective action plan and schedule. If a system is unable to complete corrective action within 120 days or on the schedule specified by the State, then the system is in violation of the treatment technique requirement.

Systems must notify the State within 30 days of completing any State approved or specified corrective action. As a condition of primacy, States must verify that the corrective action has been completed within the next 30 days. States may verify that the corrective action has been completed and has successfully addressed the significant deficiency and/or fecal contamination in the ground water source either by a site visit or by written documentation from the system, which could consist of the system's notification to the State.

a. *What corrective action alternatives are provided for in this rule?* When a system has a significant deficiency or a fecal indicator-positive ground water source sample (either by the initial triggered sample, or positive additional sample, as determined by the State), the GWS must implement one or more of the following corrective action options: (1) Correct all significant deficiencies (*e.g.*, repairs to well pads and sanitary seals, repairs to piping tanks and treatment equipment, control of cross-connections); (2) provide an alternate source of water (*e.g.*, new well, connection to another PWS); (3) eliminate the source of contamination (*e.g.*, remove point sources, relocate pipelines and waste disposal, redirect drainage or run-off, provide or fix existing fencing or housing of the wellhead); or (4) provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for each ground water source requiring corrective action.

b. *Compliance monitoring for systems providing at least 4-log treatment of viruses.* This rule also establishes compliance monitoring requirements for GWSs that provide at least 4-log treatment of viruses as a corrective action. This rule also establishes compliance monitoring requirements for those systems that have notified the State that they provide at least 4-log treatment of viruses for their ground water sources before the first customer and are therefore not required to meet the triggered source water monitoring requirement of this rule.

Treatment technologies capable of providing at least a 4-log treatment of viruses include the following:

- Inactivation, with a sufficient disinfection concentration and contact time, through disinfection with chlorine, chlorine dioxide, ozone, or through anodic oxidation. Disinfectant concentration and contact time (CT) can be based on existing CT tables (USEPA, 1991) or State-approved alternatives.
- Removal with membrane technologies with an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least a 4-log removal of viruses.
- Inactivation, removal or combination of inactivation and removal through alternative treatment technologies (*e.g.*, ultraviolet radiation (UV)) approved by the State, if the alternative treatment technology, alone or in combination (*e.g.*, UV with filtration, chlorination with filtration), can reliably provide at least 4-log treatment of viruses.

Under this rule, systems providing 4-log treatment of viruses using chemical disinfection must monitor for and must meet and maintain a State-determined residual disinfectant concentration (*e.g.*, 4-log inactivation of viruses based on CT tables) or State-approved alternatives every day the GWS serves from the ground water source to the public.

Systems serving greater than 3,300 people and using chemical disinfection (*e.g.*, chlorine) to provide 4-log inactivation must continuously monitor the residual disinfectant concentration using analytical methods specified in § 141.74(a)(2) (Analytical and monitoring requirements) at a location approved by the State, and record the lowest residual disinfectant level each day that the GWS serves water from the ground water source to the public. The system must maintain the State-determined residual disinfectant concentration every day the GWS serves from the ground water source.

Systems serving 3,300 people or fewer that use chemical disinfection must monitor the residual disinfectant concentration using analytical methods specified in § 141.74(a)(2) (Analytical and monitoring requirements) at a location approved by the State either by taking at least one grab sample every day the GWS serves water to the public or by continuously monitoring the disinfectant residual. Systems collecting grab samples must record the disinfectant residual level each day that the GWS serves water from the ground water source to the public. The system must take a grab sample during the hour of peak flow or at another time specified by the State. Systems serving 3,300 people or fewer that use continuous residual monitoring equipment must record the lowest residual disinfectant level each day that the GWS serves water from the ground water source to the public.

If a GWS taking grab samples has a sample measurement that falls below the State-specified residual disinfectant concentration, then the system must take follow-up samples at least every four hours until the State-specified residual disinfectant level is restored. If a system using continuous monitoring equipment fails to maintain the State-specified disinfectant residual level necessary to achieve 4-log inactivation of viruses, the system must restore the disinfectant residual level to the State-specified level within four hours. If continuous disinfectant monitoring equipment fails, the GWS must take a grab sample at least every four hours until the equipment is back on-line. The system has 14 days to resume continuous monitoring. Failure to restore the residual disinfectant level to that required for 4-log inactivation of viruses within four hours, using either continuous monitoring or grab sampling, is a treatment technique violation.

Ground water systems that use a membrane filtration treatment technology must maintain the integrity of the membrane and monitor and operate the membrane filtration system in accordance with State-specified monitoring and compliance requirements (*e.g.*, membrane performance parameters and integrity testing). If a system fails to meet these requirements or maintain the integrity of the membrane, it must correct the problem within four hours or be in violation of the treatment technique requirement.

Systems that use a State-approved alternative treatment technology must monitor and operate the alternative treatment in accordance with all compliance requirements that the State determines to be necessary to demonstrate that at least 4-log treatment of viruses is achieved. If the system does not comply with these requirements, fails to maintain at least 4-log treatment of viruses, and does not restore proper operation within four hours, the system is in violation of the treatment technique requirement.

GWSs providing at least 4-log treatment of viruses may discontinue treatment if the State determines (*e.g.*, based on source water monitoring or replacement of the source) and documents in writing that the need for 4-log treatment of viruses no longer exists for that ground water source. GWSs that discontinue treatment with State approval must comply with the triggered source water requirements of this rule. GWSs that provide 4-log treatment of viruses and notify the State that they are not subject to the source water monitoring requirements of this rule but subsequently discontinue 4-log treatment of viruses must have State approval and must comply with the triggered source water requirements of this rule.

2. What Is EPA's Rationale for the GWR Treatment Technique Requirements?

EPA believes that fecal contamination in ground water sources of undisinfected or minimally disinfected GWSs and significant deficiencies demonstrate public health risks that require prompt corrective action. Application of corrective actions in cases of source water fecal contamination or significant deficiencies provides benefits of eliminating existing problems and can also preempt future public health risks, such as an outbreak. EPA believes that requiring treatment technique provisions to respond to fecally contaminated ground water sources and/or significant deficiencies identified by sanitary surveys will provide enforcement authority to EPA and States to ensure that appropriate corrective actions will be implemented.

The GAO reported that failure to correct deficiencies identified in sanitary surveys is a significant concern (USGAO, 1993). An analysis of Best Management Practices (BMPs) (ASDWA, 1998) showed that correction of deficiencies was correlated with lower levels of total coliform, fecal coliform, and *E. coli*. Therefore, EPA believes that the treatment technique requirements in this rule will result in reduced exposures to fecal contamination and associated health risks.

Findings from a review of the Environmental Law Reporter contained in the *Baseline Profile Document for the Ground Water Rule* (USEPA, 2000g) indicate that (1) Not all States specifically require systems to correct deficiencies, and (2) a number of States may not have the legal authority to require systems to correct deficiencies. The treatment technique requirements of this rule provide for timely correction, as well as public notification, of fecal contamination and significant deficiencies. Treatment corrective actions provide for inactivation or removal of microbes of public health concern in some ground waters and results in reduced exposures and associated health risks. The rule also allows non-treatment alternatives such as removing the source of contamination or providing an alternate source water, both of which also result in reduced exposures and associated health risks.

To avoid unwarranted action, EPA has added a provision under the final rule that allows additional sampling of the source water with the initial fecal indicator-positive sample before requiring corrective action. If the State determines that corrective action is appropriate from the initial fecal indicator-positive finding, then no additional sampling would be required. This provision is discussed in Section IV.B.2.a.

a. *Corrective Actions and Treatment Technique Requirements.* To develop the treatment technique requirements, EPA evaluated existing State requirements and the measures available to systems to address fecal contamination. EPA believes that effective corrective actions include correcting significant deficiencies, eliminating the source of contamination, providing an alternate source of safe drinking water, or providing 4-log treatment of viruses. States and systems have the flexibility to take site-specific factors into consideration when implementing these corrective actions.

i. Corrective action technologies. Chemical disinfection technologies are commonly used by both ground water and surface water systems to provide disinfection prior to distribution of drinking water. EPA believes that 4-log inactivation is protective in disinfecting GWSs (see Figure III–1). Under the SWTR, EPA requires at least 4-log removal and/or inactivation of viruses. Since the frequency of viral occurrence and virus concentrations are generally lower in ground water supplies than in surface water supplies, EPA believes the 4-log requirement for GWSs is as protective as the current treatment requirements for surface water supplies. Figure III–1 indicates the range of protection anticipated from the 4-log requirement for GWSs having viral contamination in their source water.

Numerous studies have investigated the efficacy of chemical disinfectants to inactivate viruses. Free chlorine was shown to be able to achieve 4-log inactivation of hepatitis A virus (HAV) at a temperature of 15 degrees Celsius, a pH of 6–9, and a CT of four mg-min/L (USEPA, 1991). Chlorine dioxide achieves 4-log inactivation of HAV at a temperature of 15 degrees Celsius, a pH of 6–9, and a CT of 16.7 mg-min/L (USEPA, 1991). Ozone achieves a 4-log inactivation of poliovirus at a temperature of 15 degrees Celsius, a pH of 6–9, and a CT of 0.6 mg-min/L (USEPA, 1991). Chemical disinfection is a demonstrated technology that can achieve 4-log inactivation of viruses. The CT value needed to provide 4-log inactivation of viruses is dependent on site-specific conditions, including the disinfectant demand, water temperature and pH. States and systems may use existing inactivation (CT) tables (USEPA, 1991) or State-approved alternatives to determine the chemical disinfectant doses required to achieve a 4-log inactivation of viruses.

Membrane filtration technologies can achieve 4-log or greater removal of viruses, as long as the absolute MWCO of the membrane, or alternate parameter that describes the exclusion characteristics of the membrane, is smaller than the diameter of viruses. For instance, reverse osmosis (RO) can achieve greater than 4-log removal of particles (including viruses) larger than 0.5 nm in diameter when the absolute MWCO of the RO membrane is less than 0.5 nm (Jacangelo *et al.*, 1995). In addition, nanofiltration (NF) can achieve greater than 4-log removal of particles with a diameter of 0.5 nm or larger when the absolute MWCO of the NF membrane is 200–400 Daltons. Viruses range in diameter from 20–900 nm. The absolute MWCOs of specific membranes must be determined for the specific membranes to meet these conditions. This rule also allows for other filtration treatment technologies to be used to meet the 4-log treatment requirement.

The GWR proposal explicitly included UV light in the regulatory text as a stand-alone treatment technology that could provide a 4-log virus inactivation. However, data published subsequent to the GWR proposal indicated that some viruses, particularly adenoviruses, are very resistant to UV

light. The GWR proposal was based on information available at the time of the proposal regarding UV doses required to provide a 4-log inactivation of HAV and the design doses achieved by available UV reactors, which are lower than the UV doses needed to achieve 4-log inactivation of adenovirus.

Further, EPA believes that UV reactors must undergo challenge testing to validate the dose level delivered so that effective public health protection is provided in systems using UV disinfection. At present, EPA is unaware of available challenge testing procedures that can be used to validate the performance of UV reactors at dose levels needed for a 4-log inactivation of adenovirus.

The final GWR modifies the proposal by removing the explicit reference to UV as a stand-alone technology to achieve 4-log virus inactivation. EPA is concerned that fecally-contaminated ground water may contain adenoviruses, or other viruses, that are more resistant to UV inactivation than HAV, and currently available testing procedures cannot validate UV reactor performance at the UV dose levels needed for inactivation.

EPA believes that UV technology can be used in a series configuration or in combination with other inactivation or removal technologies to provide a total 4-log treatment of viruses to meet this rule's requirements. EPA also believes that a UV reactor dose verification procedure for 4-log inactivation of a range of viruses may be developed in the future. With the future development of UV validation procedures, it may become feasible for systems to demonstrate that they can achieve 4-log inactivation of viruses with a single UV light reactor. Therefore, this rule allows States to approve and set compliance monitoring and performance parameters for any alternative treatment, including UV light or UV light in combination with another treatment technology, that will ensure that systems continuously meet the 4-log virus treatment requirements. This requirement is both protective of public health and provides systems and States with needed flexibility for site-specific decisions. It ensures protection against known heath risks associated with waterborne viruses; allows systems to make use of technologies that are already in place or are more appropriate for the system's size, location, or configuration; and provides the opportunity for systems to take advantage of future technology developments.

ii. Corrective action time frame. EPA believes that timely correction of source water fecal contamination and significant deficiencies in GWSs is an essential component of the public health measures presented in this rule.

EPA has extended the proposed 90-day deadline for completing corrective actions to 120 days, which includes additional time for a 30-day GWS/State consultation period. In the case of source water fecal contamination, an investigation into the cause of contamination should be conducted during this 30 day period. This consultation allows the State, in discussion with the system, to determine the most appropriate corrective action for the problem identified to ensure public health protection. To reduce burden, the State may specify the corrective action in its significant deficiency notice to the system.

EPA believes that in many situations, a system can complete corrective actions within 120 days because many corrective actions are easy to implement, such as repairing a well seal. Where this is not the case, for example if a system needs to make capital improvements, the GWR allows States to determine an alternate schedule. The State is in the best position to make these case-by-case determinations of the most appropriate schedule to protect public health. The GWR also allows the State to require immediate interim corrective action to protect consumers while longer-term actions are implemented.

There may be cases in which systems and States have thoroughly investigated and cannot determine the cause of fecal contamination of the source water and believe that the source is no longer vulnerable to such contamination. If the State determines based on follow-up monitoring or other evidence that the contamination is unlikely to occur again, the State may consider the source of contamination to be eliminated. EPA considers such a system to be high risk and recommends that States follow up such a determination with assessment source water monitoring as described in Section IV.B.2.b. Commenters supported State discretion in making system-specific decisions. EPA is providing this interpretation in support of this goal.

iii. Discontinuing treatment. If the State determines that the need for 4-log treatment no longer exists, the State may allow a system to discontinue treatment. EPA believes that in certain situations (*i.e.*, consolidation, replacement or rehabilitation of ground water sources, mitigation of source of contamination), where both corrective action has addressed the public health risks and the system has demonstrated to the State that corrective action has been successful (*e.g.*, through source water monitoring or sanitary surveys), it may be appropriate to allow systems to discontinue 4-log treatment of ground water sources. If the State allows a system to discontinue 4-log treatment, the system is then subject to the source water monitoring requirements of this rule.

b. *Monitoring for the Effectiveness and Reliability of Treatment.* All GWSs that provide treatment must routinely monitor the treatment effectiveness to ensure that public health is protected. Because of considerations regarding resources and the technical capacities of small water systems, this rule includes different monitoring requirements for systems of different sizes while still effectively ensuring public health protection. The 1996 Amendments to the SDWA recognized the importance of considering both the special needs of small systems that serve 3,300 people or fewer and the need to ensure equal public health protection to consumers served by small and large PWSs.

EPA believes that it is appropriate for disinfecting systems serving greater than 3,300 people to install and operate continuous disinfection monitoring equipment. These systems will generally have the expertise to operate and maintain the necessary equipment, and continuous monitoring and recording will alleviate some of the monitoring burden for larger systems. Systems serving 3,300 people or fewer are provided the flexibility to use either grab sampling or continuous monitoring. This option is important because some small systems may not have the capacity to purchase, operate, and maintain continuous disinfection monitoring equipment. For all systems, the monitoring must take place at or prior to the first customer to ensure that the required level of treatment has been achieved prior to serving water to the public.

For GWSs that use membrane filtration systems to achieve at least 4-log removal of viruses, the system must monitor the membrane filtration process in accordance with all State-specified monitoring requirements. In addition, the system must operate the membrane filtration in accordance with all State-specified compliance requirements. A GWS that uses membrane filtration is in compliance with the 4-log removal requirement for viruses when:

- The membrane has an absolute MWCO, or alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve 4-log removal of viruses;

• The membrane process is operated in accordance with State-specified compliance requirements; and

• The integrity of the membrane is intact.

To ensure compliance with the virus removal requirements of the GWR in systems that practice membrane filtration, systems must monitor to verify that the membrane filtration is operating as specified and that the membrane is intact. Without these compliance monitoring requirements, failure of membrane filtration may not be detected by the system and consumers may be exposed to potentially fecally contaminated water. This could result in a failure to maintain at least 4-log treatment of viruses.

In cases where 4-log treatment of viruses is interrupted, the requirement that systems must restore 4-log treatment of viruses is consistent with requirements for surface water systems under the SWTR (USEPA, 1989b) and protects public health while providing flexibility for GWSs to address operational issues.

If the State has not approved compliance criteria for the system to use to demonstrate 4-log treatment by the time that the system is required to conduct compliance monitoring, the system should comply with ground water source monitoring in § 141.402 until the State approves compliance criteria for the system to use to demonstrate 4-log treatment. EPA is concerned that systems may inadvertently provide inadequately treated water (*i.e.*, < 4-log treatment) if they are not using State approved compliance criteria.

3. What Were the Key Issues Raised by Commenters on the Proposed GWR Treatment Technique Requirements?

a. *State Consultation Versus Approval.* EPA received many comments related to the State's ability to require the system to implement a specific treatment technique in response to significant deficiencies or source water fecal contamination. The proposed GWR required the system only to consult with the State on the appropriate corrective action option for the system. Several commenters expressed concern that with only a consultation requirement, a system could implement a treatment technique that the State would consider inappropriate or unreliable, such as disinfection by a system that is incapable of reliably operating a disinfection treatment system. To address these concerns, the final GWR requires systems to implement corrective actions in accordance with applicable State plan review processes, or other State guidance or direction, including interim measures, or be in compliance with a State-approved corrective action plan and schedule. EPA believes that existing State plan review and permitting activities, such as those established in accordance with the primacy requirements at § 142.10(b)(5), will ensure that systems implement the most appropriate corrective action.

b. *UV Disinfection.* EPA received comments on the use of UV technology to meet the treatment technique requirements of the GWR. The GWR proposal included UV as a stand-alone treatment to meet the GWR treatment requirements and provided monitoring requirements for systems using UV technology, as well as State-determined performance requirements for UV technology.

Commenters requested more information on the use of UV for virus inactivation, including UV dose tables and criteria to assist States in evaluating UV reactors. Commenters also noted that data published subsequent to the GWR proposal indicated that some viruses, in particular adenoviruses, are very resistant to UV light. Data show that a dose of 186 mJ/cm^2 is required to achieve 4-log inactivation of adenovirus (68 FR 47713, August 11, 2003) (USEPA, 2003c). This information suggests that HAV, the virus considered in the GWR proposal discussion of UV, may not be an appropriate indicator of the virus inactivation performance of UV reactors. EPA agrees that UV reactors may need to provide higher doses than those contemplated in the GWR proposal to achieve 4-log inactivation of viruses. Moreover, there is currently limited information available for States to make determinations regarding performance requirements for UV reactors to ensure that adequate virus inactivation is being achieved.

Further, EPA believes that testing of full-scale UV reactors is necessary to ensure disinfection performance and a consistent level of public health protection. Full-scale testing avoids the significant difficulties encountered in predicting UV reactor disinfection performance based solely on modeled results or the results of testing at a reduced scale. All flow-through UV reactors deliver a distribution of doses due to variations in light intensity within the UV reactor and the different flow paths of particles passing through the reactor. The reactor-delivered dose also varies temporally due to processes such as UV lamp aging and fouling, changes in UV absorbance of the water being treated, and fluctuations in reactor flow rates.

A full-scale test typically involves using a surrogate microorganism. However, EPA is not aware of an available challenge microorganism that allows for full-scale testing of UV reactors to demonstrate a 4-log inactivation of adenovirus. EPA believes that methodologies for challenge testing at doses necessary to inactivate UV-resistant viruses may be developed in the future.

The final GWR does not include specific performance, monitoring, or design requirements related to the use of UV technology. This is based on the comments received regarding the use of UV technology to meet the GWR requirements, new data regarding UV dosages necessary for virus inactivation, and the difficulties in performing full-scale demonstrations of 4-log virus inactivation at those doses.

However, EPA does believe that UV technology may be used in a series configuration or in combination with other inactivation or removal technologies to provide a total 4-log treatment of viruses to meet this rule's requirements. The State has the flexibility to approve treatment alternatives not specified in the rule, which could include UV disinfection. When using an alternative treatment technology, the State must specify monitoring and compliance requirements necessary to ensure that the virus treatment requirements of this rule are being met. The alternative treatment option in this rule could be applied to stand-alone UV disinfection if challenge testing protocols for 4-log virus inactivation are developed in the future.

c. *Corrective Action Time Frame.* EPA requested comment on the appropriateness of the time frame for providing corrective actions. Several commenters suggested that the proposed 90-day corrective action time frame was too short and that systems would not be able to meet this deadline. Some commenters also stated that 90 days would not be sufficient for systems seeking an extension of the 90-day deadline for completing the corrective action to obtain State approval of a plan and schedule within 90 days due to factors outside of the system's control, such as the need to obtain competitive bids or to gain the approval of the local government. On the other hand, several commenters stated that a 90-day corrective action time frame for systems with fecally contaminated source water was too long and would place consumers at an increased risk.

EPA received additional comments opposing the requirement on the State to approve corrective action plans

within the same 90 days required for the system to submit the plans (for systems seeking an extension of the 90-day deadline for completing the corrective action). The commenters pointed out that under the proposed rule, systems could potentially submit plans on the 90th day, leaving insufficient time for the State to review the plans.

The final GWR extends the proposed 90-day deadline for completing corrective actions from 90 to 120 days, which includes additional time for an initial 30-day GWS/State consultation period. This 30-day consultation serves a number of purposes. First, GWSs and States can investigate the cause of contamination. Second, the GWS and State may consult on the most appropriate corrective action. Third, the GWS and State may develop a corrective action plan and schedule that could extend beyond the 120-day period if necessary. This addresses the concerns that GWSs would not be able to complete their corrective action or receive an extension. This consultation period provides the GWS and State the assurance requested by commenters that they not be subject to factors outside of their control. Concerns about corrective action taking too long have been addressed by the provision to require GWSs to do interim corrective action measures at the State's request. In addition, this rule requires States to identify in their primacy application their rules or other authorities to demonstrate that they can ensure that GWSs take the appropriate corrective action, including interim measures, if necessary, pending completion of corrective actions.

EPA believes that the revised process for corrective actions under this rule will (1) Allow the State to ensure that the system is held accountable in a reasonable time frame for implementing corrective actions, and (2) utilize the strengths of existing State plan review processes or other State guidance, requirements, or direction. Systems and States continue to have the flexibility to complete corrective action on a more rapid schedule than 120 days.

D. Providing Notification and Information to the Public

Section 1414(c)(1) of the 1996 SDWA amendments requires that PWSs notify persons served when violations of drinking water standards occur. EPA published a revised Public Notification Rule (PNR) in 2000 (65 FR 25981, May 4, 2000) (USEPA, 2000j). Subsequent EPA drinking water regulations that affect public notification requirements typically include amendments to the PNR as a part of the individual rulemaking. This rule amends the PNR at § 141.202(a) and § 141.203(a) and requires Tier 1 notice for detection of a fecal indicator in a ground water source sample (see § 141.403) and Tier 2 notice for treatment technique violations (see § 141.404). Also, this rule requires Tier 3 notice for monitoring violations (see § 141.403 or § 141.404(b)). In addition, this rule amends the Consumer Confidence Report (CCR) (§ 141.153(b) Appendix A to subpart O) requirements and includes language to be used when informing the public of significant deficiencies and fecal indicator-positive results in ground water source samples. Since the CCR only applies to CWSs, a special notice requirement for uncorrected significant deficiencies is included in the treatment technique section of this rule for NCWSs. The language included in this section parallels language included in the CCR. Table IV–4 summarizes the GWR notification requirements.

The purpose of public notification is to alert customers of potential risks from violations of drinking water standards and to inform them of any steps they should take to avoid or minimize such risks. A PWS is required to give public notice when it fails to comply with existing drinking water regulations, has been granted a variance or exemption from the regulations, or is facing other situations posing a potential risk to public health. Public water systems are required to provide such notices to all persons served by the water system. The PNR divides the public notice requirements into three tiers, based on the seriousness of the violation or situation.

Tier 1 is for violations and situations with significant potential to have serious adverse effects on human health as a result of short-term exposure. Notice is required within 24 hours of the violation. Drinking water regulation Tier 1 notice violation categories and other situations include, but are not limited to, the following:

- An acute violation of the MCL for total coliforms when fecal coliform or *E. coli* are present in the water distribution system, or when the water system fails to analyze the sample for fecal coliforms or *E. coli* when any repeat sample tests positive for coliform (as specified in § 141.21(e));
- Occurrence of waterborne disease outbreaks, or other waterborne emergencies; and
- Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the State either in its regulations or on a case-by-case basis. The State is explicitly authorized to add other violations and situations to the Tier 1 list when necessary to protect public health where short-termexposure is a concern.

Tier 2 is for other violations and situations with the potential to have serious adverse effects on human health. Notice is required within 30 days, with an extension of up to three months permitted at the discretion of the State. Violations requiring a Tier 2 notice include all MCL and treatment technique violations, except where Tier 1 notice is required, and specific monitoring violations when determined by the State.

Tier 3 is for all other violations and situations requiring a public notice not included in Tier 1 and Tier 2. Notice is required within 12 months of the violation and may be included in the Consumer Confidence Report at the option of the water system. Violations requiring a Tier 3 notice are principally monitoring and reporting violations.

1. What Are the Requirements of This Rule?

a. *GWR violations requiring a Tier 1 notice.* A Tier 1 notice is required if a GWS has a ground water source sample collected under § 141.402(a) or § 141.402(b) that is positive for one of the three fecal indicators that are discussed in Section IV.B and is not invalidated by the State.

b. *GWR violations requiring a Tier 2 notice.* A Tier 2 notice is required if:

- A GWS with a significant deficiency or with fecal contamination in the ground water source fails to take corrective action in accordance with the treatment technique requirements in § 141.403(a);
- A GWS fails to comply with a State-approved schedule and plan, including State-specified interim measures, to correct a significant deficiency and/or eliminate fecal contamination in a ground water source at any time after State approval or State direction pursuant to § 141.403(a)(2); or
- A GWS provides 4-log treatment of viruses but fails to maintain 4-log treatment, and the GWS does not restore 4-log treatment within four hours.

c. *GWR violations requiring a Tier 3 notice.* A Tier 3 public notice is required for failure to conduct required ground water source monitoring, including source water monitoring when a system has a total coliform-positive sample in the distribution system (§ 141.402(a)(2)), source water monitoring following a fecal indicator source water positive (§ 141.402(a)(3)), and, if required by the State, assessment source water monitoring (§ 141.402(b)). Additionally,

failure to conduct required compliance monitoring (§ 141.403(b)) requires a Tier 3 public notice.

d. *Special notice informing the public of significant deficiencies and fecal indicator-positives in ground water source samples.* In addition to the public notice requirements of § 141.202, § 141.203, and § 141.204, this rule requires PWSs that use ground water sources to inform customers of an uncorrected significant deficiency and CWSs to inform customers of a fecal indicator-positive ground water source sample that is not invalidated by the State. Under this rule, the GWS must continue to inform the public annually until the significant deficiency is corrected and, in the case of CWSs, the fecal contamination in the ground water source is addressed under § 141.403(a). The State may also direct GWSs to inform the public of corrected significant deficiencies.

The information provided to the public must include the following (as applicable to CWSs and NCWSs as described above): (1) The nature of the uncorrected significant deficiency or fecal contamination (for CWSs), if the source is known, and the date the significant deficiency was identified by the State or the date of the fecal indicator-positive ground water source sample (for CWSs); (2) for CWSs, if the fecal contamination in the ground water source has been addressed under § 141.403(a) and the date of elimination; (3) the State-approved plan and schedule for correction including interim measures, progress to date, and any interim measures completed, for any significant deficiency and for CWSs, fecal contamination in the ground water source that has not been addressed under § 141.403(a); (4) for CWSs, a description of the potential health effects using the health effects language of § 141.153, Appendix A to subpart O, if the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the State; and (5) if directed by the State, notification of corrected deficiencies and how and when they were corrected.

To satisfy these special notification requirements, the GWR requires a CWS to inform the public served by the water system in the CCR. A NCWS must inform the public served by the water system in a manner approved by the State (*e.g.*, posting in conspicuous places in the area served by the water system for a period of time or distributing information directly to the public served by the water system) within 12 months of being notified of a significant deficiency. Systems must continue to inform the public annually until the significant deficiency is corrected and, in the case of CWSs, fecal contamination in the ground water source is addressed in accordance with § 141.403(a). If a significant deficiency is corrected before the next CCR is issued (for CWSs) or within 12 months (for non-CWSs), public notification is not required unless directed by the State.

TABLE IV–4.—SUMMARY OF GWR PUBLIC NOTIFICATION REQUIREMENTS

Systems must comply with the following notification requirements when . . .	Reference
Tier 1 Public Notification	
Triggered source water monitoring sample or assessment source water monitoring sample is positive for *E. coli*, enterococci, or coliphage (and is not invalidated).	§ 141.402(g).
Tier 2 Public Notification	
A system fails to take corrective action following: ■ State direction to take corrective action for a fecal indicator-positive sample, ■ Receipt of laboratory notice of fecal indicator-positive ground water source sample as a result of triggered source water monitoring under § 141.402(a)(3), or ■ Receipt of State written notice of significant deficiency.	§ 141.404(d).
A system fails to comply with a State-approved schedule and plan (including interim measures) related to correcting a significant deficiency and/or eliminating fecal contamination in a ground water source.	§ 141.404(d).
A system that elects to provide such treatment in lieu of triggered source water monitoring fails to maintain 4-log treatment of viruses [NOTE: There is no violation and public notification required if the system restores 4-log treatment within four hours.].	§ 141.404(d).
Tier 3 Public Notification	
A system fails to conduct triggered source water monitoring or assessment source water monitoring.	§ 141.403(d).
A system fails to conduct monitoring to demonstrate compliance with 4-log treatment requirement.	§ 141.403(d).

TABLE IV–4.—SUMMARY OF GWR PUBLIC NOTIFICATION REQUIREMENTS—Continued

Systems must comply with the following notification requirements when . . .	Reference
Special Notification Requirements	
CWSs: System has an uncorrected significant deficiency (or corrected significant deficiency if directed by the State) or a source water fecal indicator-positive sample. System must repeat notice annually until significant deficiency corrected or fecal contamination addressed in accordance with § 141.403(1). ■ Provide notice as part of CCR. ■ If significant deficiency is corrected before the next CCR, notification is not required unless directed by the State. NCWSs: System has an uncorrected significant deficiency (or corrected significant deficiency if directed by the State). System must repeat notice annually until significant deficiency corrected. ■ Provide notice in manner approved by the State for significant deficiencies (*e.g.*, posting in conspicuous places in service area or direct distribution of information to public served). ■ If significant deficiency is corrected within 12 months, notification is not required unless directed by the State.	Notice must include: —nature of significant deficiency or ground water fecal contamination, and date. —if the fecal contamination has been addressed under § 141.403(a), and date. —State-approved plan and schedule, including interim measures completed (if process ongoing). —required fecal indicator-positive language at: —§ 141.403(a)(7)(i). Notice must include: —nature of significant deficiency and date. —State-approved plan and schedule, including interim measures completed (if process ongoing). —§ 141.403(a)(7)(ii).

2. What Is EPA's Rationale for the Public Notice Requirements?

EPA believes that to provide adequate public health protection from fecally contaminated ground water, the public must be informed of both existing and potential significant problems. EPA recognizes that immediate public notification is key to providing effective communication when there is an imminent public health risk. In the proposed rule, EPA considered requiring Tier 1 notice for all violations. The final GWR, however, requires Tier 1 notice only when a ground water source sample tests positive for one of the three fecal indicators that are discussed in Section IV.B. The presence of a fecal indicator in a ground water source sample means that fecal contamination is likely to reach consumers and may have significant potential for serious adverse health effects from a short-term exposure. Other violations of this rule require Tier 2 or Tier 3 notice, depending on the nature of the violation and potential for adverse health effects.

The Agency believes that it is important for the public to be informed when systems are unable to comply with the GWR requirements that are established to protect public health. EPA's intent is for the public to be informed within an appropriate time frame without unnecessary alarm. Under the final GWR, the following treatment technique violations have been changed from Tier 1 to Tier 2 notice:

- Failure to correct a significant deficiency and/or eliminate fecal contamination in a ground water source;
- Failure to be in compliance with a corrective action schedule and plan within 120 days or to comply with the plan and schedule after State approval; and
- Failure to restore 4-log treatment of viruses within four hours.

EPA believes that these violations require Tier 2 notice because of the potential for serious adverse health effects from fecal contamination if treatment technique requirements are not met. Failure to conduct ground water source monitoring or compliance monitoring under this rule requires a Tier 3 notice public notice. EPA believes that the public notification requirements of this rule are protective of public health by providing timely and appropriate public notification of violations and situations that may affect public health.

Public right-to-know was a key tenet of the 1996 Amendments to the SDWA. The final GWR requirements allow the public to become involved in any decision-making process for corrective actions taken by the GWS and provide information for individual health decisions.

Consistent with the requirements for the Consumer Confidence Report (CCR) to include all detected regulated contaminants, the special public information requirements of the GWR require CWSs to include information on any fecal contamination of its ground water sources. In addition to addressing the requirements for CCRs, EPA believes this notice is important in informing individual health decisions. Use of the existing CCR public information process for CWSs minimizes the burden on CWSs. EPA believes that the Tier 1 notice requirements for NCWSs are adequate and appropriate for informing the public of fecal contamination of ground water sources and providing information for individual health decisions so no additional notice is required for fecal contamination at NCWSs.

EPA also believes that the public must be fully informed of uncorrected significant deficiencies because such deficiencies may affect their water supply and pose a health risk. In addition, EPA believes that this notification of uncorrected significant deficiencies will provide an additional incentive to water systems for rapid correction of significant deficiencies. To minimize the burden on CWS the final GWR requires them to use the CCR to report uncorrected significant deficiencies. Because the public served by NCWSs do not receive CCRs, this rule requires States to determine the appropriate method(s) (*e.g.*, posting in conspicuous places, hand delivery) for NCWSs to inform the public of uncorrected significant deficiencies. In order to provide the public with complete information on their water system, GWSs are required to continue informing the public of uncorrected significant deficiencies until corrective actions are completed.

Under the Tier 1 public notice requirements, NCWSs must provide public notice of a fecal indicator-positive source water in a form and

manner designed to reach transient and non-transient users of the PWS. This could include conspicuous posting, hand delivery or other methods approved by the State. This notice would continue until fecal contamination is corrected.

EPA believes that there may be circumstances when the public should be informed of significant deficiencies that have been corrected and that States are in the best position to make a decision to require notification of the public. These circumstances include significant deficiencies that, although corrected, presented a public health risk prior to correction; significant deficiencies that were uncorrected for long periods of time; and significant deficiencies at systems with persistent significant deficiency issues. Notification in these circumstances allows the public served by a PWS to become involved in any decision-making processes for management, operation, and maintenance of the water system and it also provides information for individual health decisions. Notification of corrected significant deficiencies that had been uncorrected for long periods provides closure for the public that has been notified previously of the uncorrected significant deficiency. In addition, notification of corrected significant deficiencies allows a community to better evaluate the management of their system because they will have complete information on significant deficiencies at their system.

3. What Were the Key Issues Raised by Commenters on the Proposed GWR Public Notification Requirements?

a. *Treatment technique violations.* In the proposed GWR, EPA considered Tier 1 notice for the following: (1) Detection of a fecal indicator-positive in a ground water source sample that is not invalidated by the State; (2) failure to correct a State-identified significant deficiency or source water fecal contamination within 90 days or failure to obtain, within the same 90 days, State approval of a plan and schedule for meeting the treatment technique requirement; and (3) failure to perform source water monitoring. In general, commenters responded that Tier 1 notice for failure to correct a significant deficiency within 90 days or in accordance with the State-approved time frame is not warranted. Other commenters stated that only a confirmed fecal indicator-positive sample in the source water of a system that does not provide 4-log treatment of viruses should require Tier 1 notice. A few commenters supported EPA's proposed treatment technique violation Tier 1 notice. However, most commenters suggested that Tier 2 notice, rather than Tier 1 notice, is appropriate for treatment technique violations.

EPA agrees that the public health risk associated with documented fecal contamination warrants a Tier 1 notice. EPA agrees that not all failures to correct a significant deficiency warrant a Tier 1 notice, since not all significant deficiencies will result in an imminent danger to public health. For the specific case of a failure to correct source water fecal contamination, the existing Tier 1 notification requirements allow States to continue to require public notification for as long as fecal contamination is present. The final GWR also requires that CWSs and NCWSs include notice of uncorrected significant deficiencies and that CWSs provide notice of source water fecal contamination for as long as significant deficiencies or fecal contamination remain uncorrected. CWSs must include this in the CCR, and NCWSs will use a form of notification approved by the State.

b. *Monitoring violations.* Some commenters responded that failure to perform any source water monitoring should not require Tier 1 notice but rather Tier 2 notice. Other commenters stated that failure to conduct triggered source water monitoring should require a Tier 1 notice, while failure to conduct assessment source water monitoring should require a Tier 2 notice. In general, commenters believed that requiring a Tier 1 notice for failure to collect a source water sample would unnecessarily alarm the public. Other commenters supported a Tier 3 notice for failure to conduct source water monitoring so that the GWR would be consistent with other monitoring violation notification requirements of § 141.204.

EPA agrees that failure to collect source water samples or conduct compliance monitoring may not warrant a Tier 1 notification since lack of monitoring data does not indicate there is an imminent danger to public health and such notification could unnecessarily alarm the public. Consistent with § 141.204, the final GWR requires a Tier 3 notice for violations of the monitoring requirements, failure to collect ground water source samples, or failure to conduct compliance monitoring. EPA notes that States continue to have the authority to require a Tier 2 notice for monitoring violations if the State determines that this level of notification is warranted.

Some commenters stated that since the TCR governs the quality of water provided to a system's customers, it is inappropriate to require public notice for failure to conduct source water sampling under the GWR. EPA disagrees with the comment and believes that it is appropriate to establish public notification requirements for GWSs that fail to monitor for fecal contamination in their source water because fecal contamination can be a significant health risk. EPA recognizes that the TCR protects against distribution system contamination; however, as part of the GWR risk-targeting strategy, the Agency believes that source water monitoring is an integral component in both assessing potential fecal contamination in the source water and eliminating this contamination before it reaches the distribution systems.

c. *Special notice informing the public of significant deficiencies or a fecal indicator-positive ground water sample.* EPA requested comment on practicable approaches to involve the public in working with their systems to address the results of sanitary surveys or detection of source water fecal contamination. Some commenters suggested publishing the results in a system's CCR, reviewing the results at a public meeting, or posting the results of surveys in a public place for NCWSs. Others supported notifying the public that the results were available and how those results could be obtained. Some commenters noted that significant deficiencies or source water fecal contamination would be corrected rapidly and that involving or informing the public after the correction might not be useful.

EPA believes that adequate opportunities exist for customers to obtain general information on the sanitary survey of their water supplier since the complete sanitary survey report is available from both the State and the PWS upon request. EPA believes that the public served by a GWS should be made aware of uncorrected significant deficiencies and source water fecal contamination. The final GWR uses an existing public information process, the CCR, to inform consumers of water from CWSs of uncorrected significant deficiencies found during sanitary surveys or of source water fecal contamination. NCWSs will use a State approved process such as continuous posting in conspicuous places and hand-delivered notices to inform consumers of uncorrected significant deficiencies. NCWSs will use the State-approved Tier 1 notification process to notify the public of fecal source water contamination. No additional notice of fecal contamination is required for

NCWSs. If directed by the State, GWSs must also provide notification of corrected significant deficiencies.

E. What Are the Reporting and Recordkeeping Requirements for Systems?

The GWR establishes new reporting and recordkeeping requirements for GWSs that are necessary to ensure that systems continue to meet the requirements of the rule and that States have the information needed to perform their oversight responsibilities.

Specifically, the GWR reporting requirements ensure that States are aware of any failure to provide an adequate level of treatment, completed corrective actions, and system decisions that triggered source water monitoring is not necessary based on State criteria.

The recordkeeping requirements of this rule ensure that information is available to States during sanitary surveys or other instances to verify that systems are complying with the requirements of this rule for corrective actions, notice to the public, decisions not to conduct triggered source water monitoring, and invalidation of fecal indicator-positive ground water source samples.

This section discusses the new requirements and the key issues raised by commenters.

1. Reporting Requirements

In addition to the reporting requirements of § 141.31, a GWS must provide the following information to the State (see § 141.405(a)): (1) A GWS conducting compliance monitoring must notify the State as soon as possible, but in no case later than the end of the next business day, any time the system fails to meet any State-specified compliance requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours; (2) a GWS must notify the State within 30 days after completing any corrective action for GWSs with significant deficiencies or source water fecal contamination; and (3) if a GWS is subject to source water monitoring requirements but is not required to monitor its source because it determines using State criteria that a total coliform-positive samples is related to distribution systems conditions pursuant to § 141.402(a)(5)(ii), then the GWS must provide documentation that it met the State criteria to the State within 30 days of the total coliform-positive sample.

2. Recordkeeping Requirements

In addition to the reporting requirements of § 141.31, a GWS must maintain the following information in its records (see § 141.405(b)): (1) Documentation of corrective actions; (2) documentation of notice to the public of (a) An uncorrected significant deficiency, or (b) a fecal indicator-positive ground water source sample that is not invalidated; (3) records of decisions where either (a) The State determines, and documents in writing, that the cause of a total coliform-positive sample collected under routine coliform sampling is directly related to the distribution system, or (b) the GWS determines, according to State criteria, that the cause of a total coliform-positive sample collected under routine coliform sampling directly relates to the distribution system; (4) for consecutive systems, documentation of notification to the wholesale system(s) of total coliform-positive samples that are not invalidated; and (5) for systems required to perform compliance monitoring (a) Records of the lowest daily residual disinfectant value and records of the date and duration of any failure to maintain the State-prescribed minimum residual for a period of more than four hours, and (b) records of State-specified compliance requirements for membrane filtration and of parameters specified by the State for State-approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours.

3. What Were the Key Issues Raised by Commenters on the Proposed GWR Reporting and Recordkeeping Requirements for Systems?

Most commenters agreed with the system recordkeeping and reporting requirements in the proposed rule and that recordkeeping and submittals are appropriate for systems that disinfect. Commenters mentioned that these requirements should be consistent with those required under other regulations, such as the TCR or the Stage 1 DBPR.

EPA agrees that the recordkeeping and reporting for systems under this rule are appropriate and ensure that information is available to the State in performing their oversight responsibilities. The records must be available for review during sanitary surveys and investigations of treatment technique failures. EPA believes that the recordkeeping and reporting requirements for systems under this rule are consistent with those required under other regulations.

Commenters also mentioned that systems should keep documentation of how the system operators determined the proper disinfectant concentration. EPA notes that this is a recordkeeping requirement for the State and is required under this rule.

Others commenters stated that recordkeeping requirements in the proposed rule were unrealistic and excessive for extremely small systems (such as many NCWSs). EPA notes that many of the recordkeeping requirements for systems under this rule are associated with corrective actions and compliance monitoring, and that only systems with significant deficiencies, source water contamination, or source water treatment would be required to keep these records. The records must be available for review during sanitary surveys and investigations of treatment technique failures.

F. What Are the Special Primacy, Reporting, and Recordkeeping Requirements for States?

The GWR establishes new special primacy, reporting, and recordkeeping requirements for States.

With regards to special primacy requirements, 40 CFR part 142, National Primary Drinking Water Regulations Implementation, 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, 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 an application for approval of their program revision.

The special primacy conditions of this rule (§ 142.16(o)) ensure (1) That States have the legal authority to require correction of significant deficiencies and/or source water fecal contamination, as well as the authority to require source water monitoring, (2) that States adopt and implement adequate procedures for sanitary surveys, and that (3) States develop criteria for source water monitoring and treatment technique requirements.

With regards to reporting and recordkeeping, the SDWA establishes requirements that a State or eligible Indian Tribe must meet to assume and maintain primacy for its PWSs. Among others, these requirements include

keeping records and making reports available on activities that EPA requires by regulation.

The reporting requirements of this rule ensure that EPA is notified when the most recent sanitary survey was completed, the date a system completed corrective action, and of systems providing at least 4-log treatment of viruses.

The recordkeeping requirements of this rule ensure that States maintain various records to determine compliance with this rule.

This section discusses these new requirements and the key issues raised by commenters on these requirements.

1. Primacy Requirements

The SDWA established requirements that a State or eligible Indian Tribe must meet to assume and maintain primary enforcement responsibility (*i.e.*, primacy). These requirements include the following:

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

To implement this rule, the State is required to adopt the following revisions to 40 CFR part 141:

- § 141.21—Coliform sampling.
- § 141.28—Certified laboratories.
- § 141.153—Content of the reports.
- § 141.202—Tier 1 Public Notice—Form, manner, and frequency of notice.
- § 141.203—Tier 2 Public Notice—Form, manner, and frequency of notice.
- § 141.204—Tier 3 Public Notice—Form, manner, and frequency of notice.
- Subpart O—Regulated contaminants.
- Subpart Q—Public Notification of Drinking Water Violations, Appendix A, NPDWR Violations and Other Situations Requiring Public Notice.
- Subpart Q—Public Notification of Drinking Water Violations, Appendix B, Standard Health Effects Language for Public Notification.
- Subpart Q—Public Notification of Drinking Water Violations, Appendix C, List of Acronyms Used in Public Notification Regulation.
- Subpart S—Ground Water Rule.

In addition to adopting the basic primacy requirements specified in 40 CFR part 142, States are required to address special primacy conditions pertaining to specific requirements where implementation of the rule involves activities beyond general primacy provisions. The State must include these regulation-specific provisions in an application for approval of their program revision. Under this rule, the special primacy conditions are in the following four categories: Legal Authority, Sanitary Surveys, Source Water Microbial Monitoring, and Treatment Technique Requirements.

The application for approval of a State program revision that will adopt 40 CFR part 141, subpart S, must contain a description of how the State will accomplish these four program requirements.

a. *Legal authority.* The application for primacy must demonstrate that the State has: (i) The authority contained in statute or regulation to ensure that GWSs take the appropriate corrective actions, including interim measures, if necessary, needed to address significant deficiencies; (ii) the authority contained in statute or regulation to ensure that GWSs conduct source water monitoring; (iii) the authority contained in statute or regulation to ensure that GWSs take the appropriate corrective actions, including interim measures, if necessary, to address any source water fecal contamination identified during source water monitoring; and (iv) the authority contained in statute or regulation to ensure that GWSs consult with the State regarding corrective action(s).

b. *State practices or procedures for sanitary surveys.* In addition to the general requirements for sanitary surveys, a primacy application must describe how the State will implement a sanitary survey program and include an evaluation of the following eight sanitary survey components: source; treatment; distribution system; finished water storage; pumps, pump facilities, and controls; monitoring, reporting, and data verification; system management and operation; and operator compliance with State requirements.

The State must conduct sanitary surveys that address the eight sanitary survey components no less frequently than every three years for CWSs and every five years for NCWS.

The State may conduct sanitary surveys once every five years for CWSs if the system meets performance criteria (see Section IV.A.1). In its primacy application, the State must describe how it will determine whether a CWS has an outstanding performance record.

The State must define and describe in its primacy application at least one specific significant deficiency in each of the eight sanitary survey elements.

As a condition of primacy, the State must provide GWSs with written notice describing any significant deficiencies no later than 30 days after the State identifies the significant deficiency. The notice may specify corrective actions and deadlines for completion of corrective actions.

c. *State practices or procedures for source water microbial monitoring.* The State's primacy application must include a description of the following: (i) The criteria the State will use for extending the 24-hour time limit for a system to collect a ground water source sample to comply with the source water monitoring requirements; (ii) the criteria the State or GWS will use to determine that the cause of a total coliform-positive sample is directly related to the distribution system; (iii) the criteria the State will use for determining whether to invalidate a fecal indicator-positive ground water source sample; and (iv) the criteria the State will use to allow systems to conduct source water microbial monitoring at a location after treatment.

d. *State practices or procedures for treatment technique requirements.* As a condition of primacy, the State must verify within 30 days after the GWS has reported to the State that it has completed corrective action that significant deficiencies or source water fecal contamination have been addressed either through written confirmation from GWSs or a site visit by the State. A GWS's written notice may serve as this verification. The State's primacy application must include the following: (i) Notification methods that the States will require NCWSs to use to inform the public of uncorrected significant deficiencies; (ii) the process the State will use to confirm that a GWS achieves at least a 4-log treatment of viruses; (iii) the process the State will use to determine the minimum residual disinfectant concentration; (iv) the State-approved alternative technologies to achieve at least 4-log treatment of viruses; (v) the monitoring and compliance requirements the State will require for GWSs treating to at least 4-log treatment of viruses; (vi) the monitoring, compliance and membrane integrity testing requirements the State will require to demonstrate virus removal for GWSs using membrane filtration technologies; and (vii) the criteria, including public health-based considerations and incorporating on-site investigations and source water

monitoring results, the State will use to determine if a GWS may discontinue 4-log treatment of viruses.

2. Reporting Requirements

States are required to report violations, variance and exemption status, and enforcement actions to EPA according to the provisions of § 142.15. The final GWR adds the following three reporting requirements to these provisions (§ 142.15(c)(7)): (i) The month and year in which the most recent sanitary survey was completed, or for a State that uses a phased review process, the date that the last element of the applicable eight elements was evaluated for each GWS, (ii) the date the GWS completed corrective action, and (iii) all GWSs providing at least 4-log treatment of viruses for a ground water source.

3. Recordkeeping Requirements

The regulation at § 142.14 requires States with primacy to keep various records. This rule requires States to keep the following additional records: (i) Records of written notices of significant deficiencies; (ii) Records of corrective action plans, schedule approvals, and State-specified interim measures; (iii) Records of confirmations that a significant deficiency has been corrected and/or the fecal contamination in the ground water source has been addressed; (iv) Records of State determinations and records of ground water system's documentation for not conducting triggered source water monitoring; (v) Records of invalidations of fecal indicator-positive ground water source samples; (vi) Records of State approvals of source water monitoring plans; (vii) Records of notices of the minimum residual disinfection concentrations (when using chemical disinfection) needed to achieve at least 4-log virus inactivation before or at the first customer; (viii) Records of notices of the State-specified monitoring and compliance requirements (when using membrane filtration or alternative treatment) needed to achieve at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log inactivation and removal) before or at the first customer; (ix) Records of written notices from the GWS that it provides 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 (x) Records of written determinations that the GWS may discontinue 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log inactivation and removal).

4. What Were the Key Issues Raised by Commenters on the Proposed GWR Special Primacy, Reporting, and Recordkeeping Requirements for States?

Many commenters responded to this request for comment and generally indicated that the requirements should be simplified and that a greater level of flexibility be afforded to the States.

Commenters questioned why the States need to identify their approach and rationale for determining the fecal indicators to be used and commented that States, at their discretion, should be able to use any EPA-approved method. Commenters also felt that States should have the latitude to allow different indicators if changes in technologies or laboratory resources prompt an amendment. EPA agrees with these comments, and this rule does not include a requirement regarding selection of a fecal indicator.

Some commenters believe that the GWR should provide specific information on how GWSs can achieve 4-log removal of viruses and how States should evaluate treatment techniques to assure compliance with the rule. In particular, the commenters wanted more information and guidance on how States and GWSs would determine what disinfectant residual level or operational parameters (in the case of membrane filtration or alternative treatment technologies, such as UV) GWSs would have to maintain to ensure that the GWS is achieving 4-log treatment of viruses. The commenters indicated that describing in their primacy package the approach they will use in determining which specific treatment option is appropriate in a given circumstance will be an arduous task.

EPA recognizes that selection and approval of a treatment technique option is system-specific. This rule does not require States to describe in their primacy package the approach they will use in determining which specific treatment option is appropriate in a given circumstance. This rule does require the States to describe any State-approved alternative technologies that GWSs may use to meet the treatment technique requirements. With regard to specific treatment techniques, EPA has recently issued the *Membrane Filtration Guidance Manual* (USEPA, 2005a) and is developing an ultraviolet disinfection guidance manual. EPA intends to develop a GWR Corrective Action guidance for further information regarding corrective actions and treatment techniques for GWSs.

Commenters indicated that a State should not have to describe ''how it will consult'' with water suppliers regarding treatment requirements. EPA believes that the process requiring PWS consultation with the State prior to implementing corrective action is important in ensuring that appropriate corrections occur. EPA recognizes that States have a long history of consulting with water systems, so the Agency removed this provision from the special primacy requirements in this rule. Instead, the GWR requires that States identify the authority that they have to ensure consultation, which ensures that corrective actions occur, as necessary.

G. Variances and Exemptions

Section 1415 of the SDWA allows States to grant variances from NPDWRs under certain conditions; section 1416 establishes the conditions under which States may grant exemptions to MCL or treatment technique requirements. These conditions and EPA's view on their applicability to the GWR are summarized as follows:

1. Variances

Section 1415 of the SDWA specifies two provisions under which general variances to treatment technique requirements may be granted:

(1) A State that has primacy may grant a variance to a PWS from any requirement to use a specified treatment technique for a contaminant if the PWS demonstrates to the satisfaction of the State that the treatment technique is not necessary to protect public health because of the nature of the PWS's raw water source. EPA may prescribe monitoring and other requirements as conditions of the variance (section 1415(a)(1)(B)).

(2) EPA may grant a variance from any treatment technique requirement upon a showing by any person that an alternative treatment technique not included in such requirement is at least as efficient in lowering the level of the contaminant (section 1415(a)(3)).

EPA does not believe that the variance provision under the SDWA at 1415(a)(1)(B) is applicable to GWSs under this rule. As discussed above, the regulation employs a targeted approach whereby corrective action is required only for those systems that have the most risk '' those systems that have found fecal contamination in their source water as indicated by source water monitoring, or have been found to be susceptible to contamination as indicated by a significant deficiency from a sanitary survey. Thus, the treatment technique requirements account for the nature of the PWS raw

water source. The GWR does not require the use of disinfection, nor does it compel the system to address the raw water source if, for example, an alternate source of drinking water is available.

With respect to the variances authorized under 1415(a)(3), EPA notes that this provision is unlikely to be used because the four treatment techniques provided in the GWR cover a broad range of options and States can approve any alternative treatment technologies. Given this broad range of treatment technique options, it is unlikely that a system could demonstrate to EPA that an alternative treatment technique not included in the regulation is at least as efficient in lowering the level of the contaminant of concern.

Section 1415(e) of the SDWA describes small PWS variances, but these cannot be granted for a treatment technique for a microbial contaminant. Hence, small PWS variances are not allowed for the GWR.

2. Exemptions

Under SDWA section 1416(a), a State may exempt any PWS from a treatment technique requirement upon a finding that (1) due to compelling factors (which may include economic factors such as qualification of the PWS as serving a disadvantaged community), the PWS is unable to comply with the requirement or implement measures to develop an alternative source of water supply; (2) the PWS was in operation on the effective date of the treatment technique requirement, or for a PWS that was not in operation by that date, no reasonable alternative source of drinking water is available to the new PWS; (3) the exemption will not result in an unreasonable risk to health; and (4) management or restructuring changes (or both) cannot reasonably result in compliance with the Act or improve the quality of drinking water.

EPA believes that granting an exemption to the treatment requirements of the GWR would result in an unreasonable risk to health. As described in section III.C, microbial contamination causes acute health effects, which may be severe in sensitive subpopulations. Moreover, the additional treatment requirements of the GWR are targeted to PWSs with the highest degree of risk. Due to these factors, EPA does not support the granting exemptions from the GWR.

V. Explanation of Extent of GWR

A. Mixed Systems

This rule applies to PWSs (CWSs and NCWSs) that use ground water in whole or in part (except GWUDI systems), unless all ground water is commingled with surface water before treatment at the surface water treatment plant is applied, in which case surface water treatment regulations apply. This means that the treatment technique requirements of the GWR for significant deficiencies apply to any system using both ground water and surface water that has a significant deficiency identified past the point of surface water treatment, unless the State determines that the significant deficiency is in a portion of the system served solely by surface water. EPA believes that the same level of public health protection provided by this rule to persons served solely by ground water must be provided to persons served by ground water supplies in mixed systems.

EPA received comments regarding the applicability of the proposed GWR to systems that serve both ground water and surface water. Commenters noted that the requirements for these ''mixed systems'' were not explicit for the individual rule components such as sanitary surveys and triggered source water monitoring. For example, commenters specifically noted that the proposed GWR did not address how to conduct the triggered source water monitoring requirement after a total coliform-positive under the TCR was detected in systems where ground water and surface water are blended in the distribution system.

EPA has included more explicit regulatory language that describes how ''mixed systems'' must comply with individual components of this rule to assist PWSs in understanding and implementing the GWR provisions. There are approximately 3,700 mixed systems in the U.S. This rule explicitly addresses general applicability and the applicability of specific GWR components to mixed systems. The complexity and variety of configurations and operations in these mixed systems do not allow for all the possible scenarios to be addressed within a regulatory framework, so States will have the discretion to make a site-specific determination whether a significant deficiency is in a portion of the system served solely by surface water.

EPA will provide further information through implementation guidance and other non-regulatory approaches to assist States and water systems in meeting the intent of this rule, to target GWSs that are at risk of fecal contamination and to require these systems to take corrective action to protect public health. In some cases, it may be possible to identify customers or portions of the distribution system in mixed systems served solely by surface water or ground water. In other cases, it may not be possible or may be transitory due to complex and/or variable system hydraulic conditions.

B. Cross-Connection Control

EPA is concerned about fecal contamination entering distribution systems; however, cross-connection control requirements are not a part of this rule, though the proposal contained cross-connection consideration. The *Stage 2 Microbial and Disinfection Byproducts Federal Advisory Committee's Agreement in Principle* (65 FR 83015, December 2000) (USEPA, 2000b) states that cross-connections and backflow in distribution systems represent a significant public health risk and that EPA should initiate a process to address cross-connection control and backflow prevention requirements as part of the six-year review of the TCR. EPA has published its intent to consider such requirements as part of the revisions to the TCR (67 FR 19030, April 17, 2002) (USEPA, 2002b).

VI. Implementation

This section describes the regulations and other procedures and policies that States must adopt, as well as the requirements that public GWSs would have to meet to implement this rule. Also discussed are the compliance deadlines for these requirements.

States must continue to meet all other conditions of primacy at 40 CFR part 142. Section 1413(a)(1) of the 1996 SDWA Amendments provides two years (plus more time if the Region approves) after promulgation of the final GWR for the State to adopt drinking water regulations that are no less stringent than the final GWR in order to obtain primacy for the GWR.

GWSs must continue to meet all other applicable requirements of 40 CFR part 141. The SDWA as amended in 1996 (see section 1412(b)(10)) provides three years after promulgation for compliance with new regulatory requirements. Accordingly, the GWR requirements that apply to the PWS directly, specifically the requirements found under subpart S of 40 CFR part 141 (source water monitoring, corrective actions and treatment technique requirements, compliance monitoring, recordkeeping and reporting, and public notice and public information), take effect three years after promulgation. The State may, in the case of an individual system, provide additional time of up to two years for capital improvements, if necessary, in accordance with the statute.

This rule includes conditions of primacy at 40 CFR part 142 under which States will have until December 31, 2012 to complete the initial sanitary survey cycle for CWSs, except those meet performance criteria, and until December 31, 2014 to complete the initial sanitary survey cycle for all NCWSs and CWSs that meet performance criteria (refer to Section IV.A.1 for criteria). These sanitary survey implementation deadlines provide time for States to adopt the rule and obtain primacy (two to four years allowed by the SDWA at 1413(a)(1)). In addition, systems are given three years to comply with drinking water regulations by the SDWA at (1412(b)(10)). Finally, States need three to five years to complete the first cycle of sanitary surveys because there are many GWSs and States have limited resources.

The GWR places the same sanitary survey frequency requirements on GWSs as is currently required of surface water systems under 40 CFR part 141 subpart H.

GWSs must comply with all applicable requirements beginning December 1, 2009 unless otherwise noted.

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

This section summarizes the Health Risk Reduction and Cost Analysis (HRRCA) in support of the final GWR. This analysis has been revised and updated from the HRRCA prepared for the proposal as required by section 1412(b)(3)(C) of the SDWA. In addition, under Executive Order 12866, Regulatory Planning and Review, EPA must estimate the costs and benefits of this rule in an Economic Analysis (EA). EPA has prepared an EA (USEPA, 2006d) to comply with the requirements of this order and to update the SDWA HRRCA. The EA document for the GWR is available in the docket and is also published on the government's Web site *http://www.regulations.gov*.

The HRRCA consists of seven elements as follows: (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 alternatives; (5) effects of the contaminant on the general population and sensitive subpopulations including infants, children, pregnant women, elderly, and immunocompromised; (6) increased health risks that may occur as a result of compliance; and (7) other relevant factors such as uncertainties in the analysis. A summary of these elements is provided in this section of the preamble, and a complete discussion can be found in the GWR EA (USEPA, 2006d).

Both the benefits and the costs discussed in this section are presented as annualized present values in 2003 dollars. This process allows comparison of cost and benefit streams that are variable over a given time period and differs from the GWR proposal (USEPA, 2000a), which only used an annual estimate. The time frame used for both benefit and cost comparisons in this rule is 25 years. This time interval accounts for early rule implementation activities (*e.g.*, States adopting the criteria of the regulation) and the time for different types of compliance actions to be realized up through year 25 following rule promulgation (*e.g.*, identification and correction of sanitary survey deficiencies, identification of wells that are fecally contaminated and subsequent corrective action). The Agency 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. The GWR EA (USEPA, 2006d) also shows the undiscounted stream of both benefits and costs over the 25 year time frame.

The quantified benefits are calculated based only on endemic, acute disease illness, and death from some viral, but not bacterial, contamination of PWS wells. EPA was able to monetize only this subset of total benefits which were compared to the total costs of this rule. The total benefits, both quantified and nonquantified, are estimated using illness and death data as well as non-health benefits such as avoided costs (*e.g.*, restaurant closures) due to outbreaks. Furthermore, the total health benefits are estimated based on a full range of health effects, including acute and chronic illness and endemic and epidemic disease from both bacteria and virus contamination. EPA believes that the quantified benefits for this rule underestimate reduction in risk because the Agency was only able to calculate a subset of the total benefits; peer reviewers of the GWR benefit analysis agree that the quantified benefits are biased low. The costs of the rule stem mostly from the sanitary survey and the correction of significant deficiencies as well as the triggered source water monitoring and corrective action provisions described earlier in this preamble.

This section of the preamble includes 12 elements as follows: (A) Rationale for choosing a different alternative from the proposed alternative, (B) occurrence and risk analyses that support this rule, (C) both quantified and nonquantified benefits, (D) both quantified and nonquantified costs, (E) potential impact on households, (F) incremental costs and benefits, (G) benefits from simultaneous reduction of co-occurring contaminants, (H) increases in risk due to other contaminants, (I) effects on the general population and special subgroups, (J) uncertainties in risk, benefit, and cost estimates, (K) benefit/cost determination, and (L) major comments and responses. Section VII.F presents the benefits and costs for the four regulatory alternatives that were considered in this rule. Table VII–1 provides a summary of monetized benefits and costs for each GWR regulatory alternative.

TABLE VII–1.—MONETIZED BENEFITS AND COSTS FOR GWR REGULATORY ALTERNATIVES

[Millions, 2003$]

Rule alternative	3% Discount rate		7% Discount rate	
	Mean	5th–95th Percentiles	Mean	5th–95th Percentiles
National GWR Benefits				
Enhanced COI:				
Risk-Targeted Approach	$19.7	$6.5–$45.4	$16.8	$5.5–$38.6
Sanitary Survey	3.6	0.9–9.3	2.9	0.7–7.5
Multi-barrier Approach	21.3	7.1–48.7	18.2	6.0–41.6

TABLE VII–1.—MONETIZED BENEFITS AND COSTS FOR GWR REGULATORY ALTERNATIVES—Continued

[Millions, 2003$]

Rule alternative	3% Discount rate		7% Discount rate	
	Mean	5th–95th Percentiles	Mean	5th–95th Percentiles
Across the Board Disinfection	70.2	18.3–177.0	61.9	16.1–156.3
Traditional COI:				
Risk-Targeted Approach	10.0	2.2–27.0	8.6	1.9–22.9
Sanitary Survey	1.9	0.3–5.5	1.5	0.2–4.5
Multi-barrier Approach	10.8	2.5–28.9	9.3	2.1–24.8
Across the Board Disinfection	35.5	6.5–102.4	31.5	5.7–90.8
National GWR Costs				
Risk-Targeted Approach	61.8	45.2–81.4	62.3	46.1–81.6
Sanitary Survey	15.3	11.8–19.2	15.3	11.9–19.0
Multi-barrier Approach	67.9	49.4–89.5	69.4	51.0–90.6
Across the Board Disinfection	686.4	636.8–735.4	665.3	612.3–717.0

A. How Has the Final Rule Alternative Changed From the Proposed Rule Alternative?

The primary elements of the GWR alternative that EPA proposed were sanitary surveys, triggered source water monitoring, hydrogeologic sensitivity analyses (HSAs), routine monitoring, corrective action, and compliance monitoring. This alternative was termed ''multi-barrier approach.'' After the proposal, EPA considered comments received as discussed in section II.C of this preamble. This review resulted in the Agency choosing a different final rule alternative, Alternative 2, or the ''risk-targeted approach.'' EPA believes that the final rule is a logical outgrowth of the proposed rule, that it is supported by comments, and that it provides public health benefits while apportioning costs in a more flexible targeted manner.

EPA continues to believe that the elements of the multi-barrier approach are important. At first, EPA attempted to redesign the multi-barrier approach to resolve the issues raised by commenters. In this redesigned structure, HSAs were optional and routine monitoring (renamed assessment source water monitoring) was a required up-front monitoring program limited to 1 year of monthly samples. EPA has estimated the costs and benefits for this variation of the multi-barrier approach in the final EA (Alternative 3). However, EPA ultimately determined that the structure of this variation of the multi-barrier approach was too restrictive to achieve the full potential benefits of an assessment source water monitoring program. In addition, it did not provide sufficient flexibility to States, which was a major theme of the comments EPA received. Therefore, EPA decided to redesign the source water monitoring provision by making assessment source water monitoring an option that States can require as they see fit. The purpose of this optional requirement is to target source water monitoring to systems that the States believe are at a higher risk for microbial contamination. EPA believes that States are in the best position to assess which systems would most benefit from a comprehensive source water monitoring program. EPA recommends that States use HSAs as one tool to identify high risk systems for assessment source water monitoring. The risk-targeted approach of the final rule contains sanitary surveys, triggered source water monitoring, optional assessment source water monitoring, corrective action, and compliance monitoring.

For the Economic Analysis of the final rule alternative, EPA did not include potential costs and benefits of assessment source water monitoring. This is because assessment source water monitoring is an optional requirement under the final GWR. Thus, the EA considers quantified costs and benefits only of sanitary surveys, triggered source water monitoring, corrective action, and compliance monitoring. Throughout the EA, the final rule alternative is listed as Alternative 2—the risk-targeted approach. A discussion of the costs and benefits for the regulatory alternatives considered may be found in Chapter 8 of the EA (USEPA, 2006d).

B. Analyses That Support This Rule

EPA estimates national viral and fecal indicator occurrence based on data from several studies. The following discussion summarizes EPA's occurrence and risk analyses that support this rule.

1. Occurrence Analysis

a. *Study selection.* As discussed in Section III.C.3 of this preamble and in the NODA, EPA examined data from 24 studies of pathogen and fecal indicator occurrence in ground water wells that supply PWSs (USEPA, 2006e). EPA selected 15 of these studies to use in the risk assessment analysis to estimate national viral and fecal indicator occurrence in ground water. The *Occurrence and Monitoring Document for the Final Ground Water Rule* (USEPA, 2006b) provides a detailed discussion of each occurrence study evaluated.

To assist study selection and occurrence modeling, EPA convened a two-day statistical workshop in May 2005. The core workgroup included expert participants from several government agencies and private consulting firms working as U.S. government advisors. A summary of the workgroup proceedings, including a list of all participants, is included in the final docket for this rulemaking. The charge to the workgroup was to consider how to improve modeling of viral and indicator occurrence. The statisticians strongly recommended that EPA make use of all the available data unless there were known quality assurance problems with a data set or the well contamination scenario was outside the normal operating range of U.S. PWS wells.

After the workshop, EPA followed through on the workgroup's recommendations and used all available data sets having enterovirus and fecal indicator occurrence in ground water source(s) from PWS wells in the United States with some exceptions. Of the 16 studies described in the proposed GWR, EPA did not use data from five studies to inform the national occurrence

estimates for this rule. EPA did not use the data set of alluvial wells from Missouri that were substantially affected by severe Mississippi River flooding (Vaughn, 1996). Data from a California study (Yates *et al.*, 1999) were deleted from further consideration because data were available only by well and not by sample, so the probability of viruses detected by individual assays could not be assessed. Data from the Whittier, California study (Yanko *et al.*, 1999) were not used because the study author, in comment on the proposal, suggested that the observed somatic coliphage occurrence was not due to fecal contamination. EPA did not use data from Honolulu, Hawaii (Fujioka and Yoneyama, 2001) because the wells were not sampled for pathogenic viruses and because *E. coli* are endemic in tropical ecosystems and not simply indicators of fecal origin. EPA did not use data from the U.S.-Mexico Border study because the human virus data were never reported in written form.

Of the seven studies that became available since proposal and described in the NODA, EPA did not use four studies to inform national occurrence estimates. EPA did not use the data from the set of wells developed by Karim *et al.* (2003; 2004), because these 20 wells are also included in Abbaszadegan *et al.* (2003). EPA did not have sufficient information to distinguish which of the 20 wells from Karim (2003; 2004) were the same wells from Abbaszadegan *et al.* (2003) and, therefore, only used the larger data set. EPA did not use the National Field Study data (USEPA, 2006f) because the data set includes both PWS and domestic wells, and insufficient information is available to identify which wells are PWS wells. Also, the National Field Study data set (USEPA, 2006f) included virus cell culture measurements using smaller sample volumes than all of the other data sets. EPA did not use data from La Crosse, Wisconsin (Borchardt *et al.*, 2004) because this was a small study of four wells (and two other wells sampled once only) in one locality which, although not regulated as GWUDI, were under investigation to determine if that regulatory determination was correct. EPA did not use data from another small study of two wells in Missoula, Montana because of the size of the data set. In addition, EPA added one study of 38 wells from Helena, Montana that was submitted to EPA in response to the NODA.

b. *Description of occurrence data used to characterize national viral and indicator occurrence.* Table VII–2 shows the 15 studies used to inform national occurrence estimates for viruses and indicators. One data set (Lieberman *et al.*, 2002), targeted wells based on presence of total coliforms and other indicators of vulnerability to fecal contamination. Another data set (Abbaszadegan *et al.*, 2003), targeted a representation of wells throughout the United States based on hydrogeological conditions, but excluded any wells that were poorly constructed, ground water under the direct influence of surface water (GWUDI), or without well logs. Other studies sampled a subset of wells in a particular State, region, or hydrogeological setting. Most of the studies were designed to capture subsets of the total PWS well population. EPA excluded data from wells that States had identified as being GWUDI. Only a couple of the studies included such wells in their sample set (Lieberman *et al.*, 2002, Atherholt *et al.*, 2003). PWS using wells with GWUDI are required to meet the same treatment technique requirements for pathogens that pertain surface water supplies and are not subject to the requirements of this rule. EPA's analysis to develop national estimates for virus and indicator frequency of occurrence in wells made no attempt to weight any of the studies to compensate for any perceived over- or under-representation of the subset as compared with the total population.

TABLE VII–2.—LIST OF STUDIES USED IN NATIONAL OCCURRENCE ANALYSIS

Lieberman *et al.*, 2002 (multiple States).
Abbaszadegan, *et al.*, 2003 (multiple States).
Lindsey *et al.*, 2002 (Pennsylvania Non-community Wells).
Francy *et al.*, 2004 (Southeast Michigan).
Atherholt *et al.*, 2003 (New Jersey).
Davis and Witt, 2000 (Missouri Ozark Plateau #1).
Femmer, 2000 (Missouri Ozark Plateau #2).
USEPA *et al.*, 1998d (Wisconsin Migrant Worker Camp).
Doherty, 1998 (New England).
Battigelli, 1999 (Three-State Study: Wisconsin).
Banks *et al.*, 2001 (Three-State Study: Maryland).
Banks and Battigelli, 2002 (Three-State Study: Maryland).
Minnesota DOH, 2000 (Three-State Study: Minnesota).
USEPA, 1998a (EPA Vulnerability Study).
Miller and Meek, 2006 (Montana).

Using enterovirus cell culture and *E. coli* data from the 15 studies, EPA modeled virus and fecal indicator (*E. coli*) occurrence in ground water. EPA believes that enterovirus cell culture measurements provide the best available basis for estimating pathogenic viral occurrence since it captures viruses that are alive and infectious. However, because the cell culture procedure only captures a portion of the types of pathogenic viruses that may actually occur in well water, use of this metric underestimates total viral occurrence. EPA did not use PWS samples assayed using PCR methods to estimate national viral occurrence for this rule because PCR methods cannot discriminate between infectious and non-infectious viruses. Three of the 15 studies included viral concentration data (Lieberman *et al.*, 2002, Abbaszadegan, *et al.*, 2003 and Lindsey *et al.*, 2002). EPA used data from these studies to inform national estimates for viral concentrations among wells modeled to have viral occurrence. However, since the sampling sites from Lieberman *et al.*, 2002 were selected because they had a history of total coliform contamination or other evidence of vulnerability (whereas the sample sites from the other two studies had no such site selection bias), EPA only used viral concentration data from Lieberman *et al.*, 2002 for a small portion of wells in the U.S.

EPA used data on the indicator *E. coli* to inform estimates of fecal contamination occurrence. Indicator data is important because illness can result from consuming ground water with fecal contamination in the absence of identified viruses. EPA chose to use *E. coli* as the indicator organism to inform national fecal contamination occurrence for several reasons. First, analysis using two or more indicator organisms becomes increasingly complex. Second, substantial variability among studies in choice of indicators, indicator assay method, sample volumes and, in the case of coliphage, bacterial host and host range, adds uncertainty when data sets are combined. Third, for any one indicator other than *E. coli,* the number of assays with consistency of measurement is small. Fourth and most important, EPA believes that *E. coli* will be the most likely fecal indicator used when PWS implement the GWR and therefore national estimates of *E. coli* occurrence can be used to inform potential cost implications for implementing the GWR.

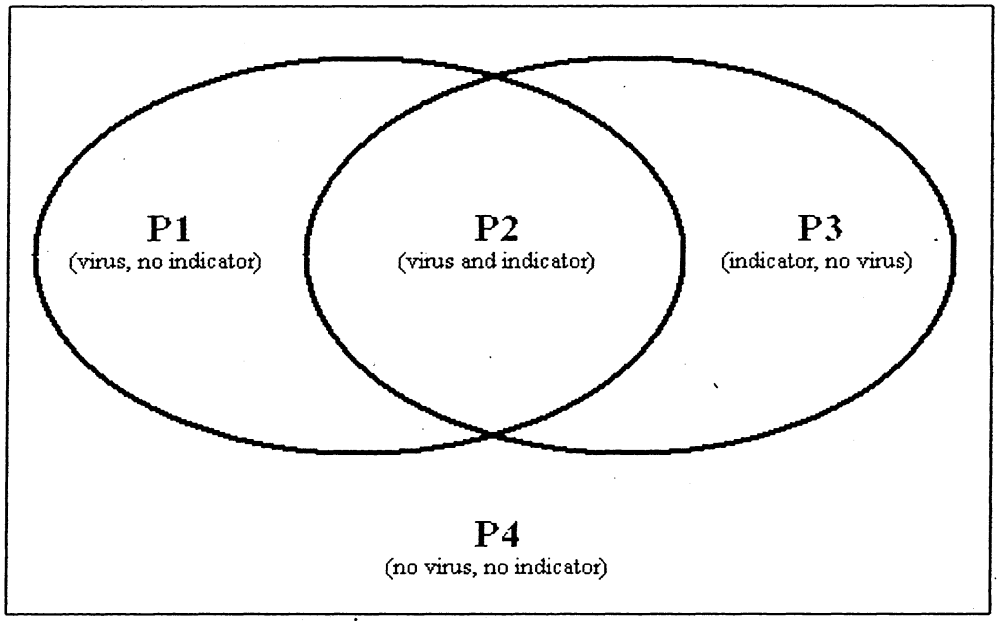
c. *How data were used to estimate national occurrence of viral and fecal contamination.* Data from each of 15 studies were combined into one single data set used to determine the probabilities of wells having anytime viral (indicated by enterovirus cell culture) or fecal indicator (indicated by *E. coli*) contamination. The results of this effort led naturally to a combined analysis, which also modeled co-occurrence of viruses and *E. coli.* This combined model serves as the basis of EPA's national quantitative occurrence estimates.

EPA's occurrence model includes four categories of wells:

- Wells with no *E. coli* occurrence, but some virus occurrence,
- Wells with both *E. coli* and virus occurrence,
- Wells with no virus, but some *E. coli* occurrence, and
- Wells with neither *E. coli* nor virus occurrence.

The fractions of wells falling into these four categories are named P1, P2, P3, and P4, respectively. The categories and parameters P1 through P4 are illustrated in the Venn diagram of Figure VII–1.

Figure VII-1: Categories of Indicator and Viral Classification Among PWS Wells in U.S.



Because fecal contamination is intermittent, viruses and *E. coli* will only be present some fraction of time in a contaminated well. These fractions will vary from well to well and EPA has modeled these different fractions as distributions. One parameter pair describes the distribution for viruses and another parameter pair describes the distribution for *E. coli*. These four parameters, together with the fractions of wells falling into the four categories, are the parameters estimated in the national occurrence model.

The *Economic Analysis for the Final Ground Water Rule* describes the statistical methods used to estimate model parameters (USEPA, 2006d). That document details the statistical model, estimation methods, and summary results. The GWR EA also includes a number of Exhibits that describe the central estimates (means) and their uncertainties.

Central estimates for key parameters are as follows:

- P1 = percentage of wells having virus, but no *E. coli* = 10 percent
- P2 = percentage of wells having both virus and *E. coli* = 16 percent
- P3 = percentage of wells having *E. coli*, but no virus = 10 percent
- P4 = percentage of wells having no virus and no *E. coli* = 64 percent
- On average, wells with some virus occurrence have detectable concentrations 11 percent of the time.
- On average, wells with some *E. coli* occurrence have detectable concentrations 14 percent of the time.

EPA attempted to evaluate occurrence based on the hydrogeologic characteristics of the aquifer. However, because very few data sets allowed for differentiation of viral or indicator presence among sensitive versus non-sensitive wells, no significant difference in viral or indicator presence could be discerned from the limited data. Therefore, the same P1, P2, P3, and P4 estimates were assumed for all wells, without regard to aquifer sensitivity.

Although EPA could not stratify the available viral occurrence data between wells drawn from sensitive or non-sensitive aquifers, EPA was able to discern two classifications of well type according to overall vulnerability characteristics (more and less vulnerable wells). The data from Lieberman *et al.*, 2002 were used to represent virus concentrations in more vulnerable wells and the combined data from Abbaszadegan *et al.*, 2003 and Lindsey *et al.*, 2002 were used to represent concentrations in less vulnerable wells.

EPA used acute and non-acute TCR maximum contaminant level (MCL) violation data to estimate the percent of wells considered more vulnerable. Based on this data, EPA estimated that about 2.5 percent of wells in the U.S., which have modeled viral presence, would have viral concentrations like the non-GWUDI wells in Lieberman *et al.*, 2002 (more vulnerable). Similarly, EPA estimated that about 97.5 percent of the wells in the U.S. (100—2.5 percent) which have modeled viral presence would have concentrations like those of Abbaszadegan *et al.* (2003) and Lindsey *et al.* (2002) (less vulnerable).

2. Risk Analyses

a. *Baseline risk estimates.* The framework for developing the estimates of baseline risk from consumption of contaminated ground water is in accordance with the standard framework detailed in the *EPA Policy for Risk Characterization* (USEPA, 1995a), EPA's *Guidance for Risk Characterization* (USEPA, 1995b), and EPA's *Policy for Use of Probabilistic Analysis in Risk Assessment* (USEPA,

1997c). A complete discussion of EPA's risk analyses in support of this rule can be found in the GWR EA (USEPA, 2006d). The discussion below is an overview of the analyses, focusing on how information on occurrence, exposure, and dose-response is combined to produce estimates of health risk.

EPA's occurrence model predicts the fraction of wells that have some degree of viral contamination. The model also predicts degree of contamination, in terms of the varying fractions of time that viruses can be detected. In the probabilistic risk analysis, Monte Carlo techniques are used to simulate large numbers of wells with differing fractions of time that virus is present.

In addition to assigning different fractions of time, the risk model also assigns different concentration levels to the simulated contaminated wells. Each well is assigned one concentration value and this is treated as the well's concentration whenever the well has virus present. EPA does this by sampling from the actual virus concentrations that were observed in the occurrence studies. Viral concentrations among more vulnerable wells are sampled from the measured values of non-GWUDI wells in the Lieberman *et al.*, 2002, study. Concentrations in less vulnerable wells are sampled from those measured in the Abbaszadegan, *et al.*, 2003 and Lindsey *et al.*, 2002 studies.

EPA's risk model then estimates exposure levels, or doses, for consumers of the contaminated well water. A consumer's dose on a day when virus is present depends on the virus concentration, the level of disinfection employed by the water system, and the volume of tap water that the consumer ingests. For systems that do not disinfect, the tap water is assumed to have the same virus concentration as the source water. In contrast, properly operating systems that disinfect are assumed to inactivate 99 percent (2-log) to more than 99.99 percent (4-log) of viral pathogens, depending on the disinfection practices employed. A consumer's daily dose is computed as the product of the tap water concentration, the fraction of viral pathogens NOT inactivated and the volume of water ingested.

Next, the consumer's daily dose is translated to risk of infection via EPA's dose-response modeling. EPA's risk model applies the calculated dose, based on viral cell culture measurement, for both Type A and Type B viruses. Daily probabilities of infection are then derived on the basis of the daily dose, according to dose-response models. Annual probabilities of infection are then derived from the daily estimates, based on the number of days per year in which a virus is expected to be present.

Next, morbidity factors (risk of illness given infection), secondary spread of illness to other individuals, and mortality factors (risk of premature death given an illness), derived from the literature, are used to estimate the annual probability for illness and premature death. EPA's risk assessment model includes variability and uncertainty ranges for morbidity and mortality to account for different effects in different subpopulations.

b. *Risk reduction estimates.* The methodology for estimating the reduction in risk for the regulatory alternatives builds upon the approach and assumptions used to establish the baseline risk. The primary difference between the modeling for estimating the baseline risk model and the modeling for estimating the risk reduction from a given regulatory alternative is that the latter incorporates a change in the concentration of viral pathogens reaching the finished drinking water of the exposed population. These changes reflect either a reduction in pathogen concentration between source water and finished water due to disinfection or the elimination of the pathogen from other non-treatment corrective actions addressing the source water contamination. In addition to accounting for the magnitude of pathogen exposure reduction, an important component of the risk reduction modeling is to account for the timing of when those reductions occur over a 25 year analysis timeframe following promulgation of the rule.

For the baseline risk analysis, each well in the simulation process is designated as either having a virus present at some time or never having a virus present. For those wells having some viral occurrence, values are assigned for the virus concentration and the fraction of time that virus occurs. The risk reduction part of the model uses the exact same simulated wells as those generated in the baseline risk part of the model.

For the sake of efficiency in implementing the simulation modeling process, those wells designated as never having a virus present are recognized as having zero risk reduction potential and are counted as such in the model outputs, but are not run through the detailed steps of the risk reduction model.

For those wells that do have a virus present, the risk reduction model answers the following three questions:

(1) Is a corrective action performed on this well as a result of the regulatory alternative being considered?

(2) What is the finished water virus concentration following corrective action?

(3) In what year following rule implementation is the corrective action performed?

The risk reduction model then processes the reduced virus concentrations through the dose-response functions for infectivity and the morbidity and mortality factors as in the baseline risk assessment.

Estimates of cases avoided, calculated for all of the individual wells, are then aggregated across all wells to arrive at the total national estimates of risk reduction. In addition, some of the assumptions and data used in the risk reduction model are uncertain and are therefore input as uncertainty distributions. As a result of the uncertainty reflected in those inputs, together with the uncertainty reflected in other inputs to the baseline risk model that are also carried into the risk reduction model, the output of the model is a range of values of cases avoided. The range is used by EPA to determine the expected value and the 90 percent confidence bounds on that expected value.

The GWR EA (USEPA, 2006d) describes in more detail the specific assumptions and inputs—including considerations of uncertainty—that are used to model risk reduction for each of the four rule options at the individual well level and the aggregation of those well level estimates to obtain the overall national estimates of risk reduction.

C. What Are the Benefits of the GWR?

The quantified benefits of this rule result from reductions in endemic acute viral illness and death from two groups of viruses (called Type A and Type B). Type A virus is represented by rotavirus and is highly infectious but has essentially only mild health effects. Type B virus is represented by enterovirus or echovirus (a member of the enterovirus group) and is moderately infectious, but can have severe health consequences though the majority of illnesses from Type B viruses are also mild. Additionally, the quantified benefits are based only on endemic, acute illness that occurs as a result of virus in PWS wells under normal operating conditions. Illnesses due to treatment interruptions or failures or to distribution system deficiencies are not quantified. Bacterial illnesses and deaths avoided are also not quantified.

As shown in Table VII–3 below, the annualized present value of the quantified benefits of this rule are $19.7 million (using a three percent discount rate and an enhanced cost-of-illness value that includes lost unpaid labor (*e.g.*, household production) and leisure time for people within and outside the paid labor force), with a 90 percent confidence interval of $6.5 to $45.4 million. Using traditional cost-of-illness values at the same discount rate, the annualized present value of the quantified benefits of the rule are $10.0 million, with a 90 percent confidence interval of $2.2 to $27.0 million. At a seven percent discount rate and the enhanced cost-of-illness value, the annualized present value of the quantified benefits are $16.8 million, with a 90 percent confidence interval of $5.5 to $38.6 million. Using the traditional cost-of-illness values, the annualized present value of the quantified benefits are $8.6 million, with a 90 percent confidence interval of $1.9 to $22.9 million at a seven percent discount rate.

TABLE VII–3.—SUMMARY OF ANNUALIZED PRESENT VALUE QUANTIFIED BENEFITS

[$Millions, 2003$]

System type	Annualized benefits at three percent discount rate			Annualized benefits at seven percent discount rate		
	Mean	90 Percent confidence bound		Mean	90 Percent confidence bound	
		Lower (5th %ile)	Upper (95th %ile)		Lower (5th %ile)	Upper (95th %ile)
Enhanced COI:						
CWSs	$16.0	$5.4	$37.0	$13.7	$4.6	$31.6
NTNCWSs	0.9	0.3	2.2	0.8	0.2	1.8
TNCWSs	2.7	0.8	6.2	2.3	0.7	5.1
Total	19.7	6.5	45.4	16.8	5.5	38.6
Traditional COI:						
CWSs	8.2	1.9	22.3	7.1	1.6	19.1
NTNCWSs	0.5	0.1	1.3	0.4	0.1	1.0
TNCWSs	1.3	0.3	3.4	1.1	0.2	2.8
Total	10.0	2.2	27.0	8.6	1.9	22.9

Note: Estimates are derived from independent model runs and, therefore, detail may not add to total. Values are for endemic viral illnesses and deaths avoided over the 25-year period, expressed in annualized dollars. See VII.C.4 for additional rule benefits.

1. Calculation of Baseline Health Risk

As part of the quantitative analysis to determine the GWR benefits, EPA estimated the ''baseline risk'' (pre-GWR)—the number of people becoming ill and/or dying each year from Type A (represented by rotavirus) and Type B (represented by enterovirus or echovirus) viral infection due to consumption of ground water from public water supplies (see Table VII–4). The risk analysis uses these two viruses as surrogates for waterborne viruses. The annual estimated number of viral illnesses from exposure to Type A and Type B viruses ranges from about 33,000 to 476,000 cases, with a mean of approximately 185,000 cases. EPA estimates that about 0.3 to 11 deaths per year (mean of three deaths) prior to this rule as a result of exposure to viruses. These numbers are the ''baseline'' used to estimate the health risk reduction and their associated monetized value of risk reduction due to implementation of this rule. As discussed earlier, bacterial illnesses and deaths are not considered in the baseline, and only endemic, acute viral illnesses from the two surrogate viruses are considered.

TABLE VII–4.—ESTIMATES OF BASELINE VIRAL ILLNESSES AND DEATHS DUE TO CONTAMINATION OF GROUND WATER SYSTEMS

Virus type	Illnesses per year		Deaths per year	
	Mean	5th–95th Percentiles	Mean	5th–95th Percentiles
Type A (rotavirus)	175,168	32,652–435,381	1.2	0.2–2.9
Type B (enterovirus or echovirus)	10,018	501–40,718	2.0	0.0–8.1
Total	185,186	33,153–476,099	3.2	0.3–11.0

2. Calculation of Avoided Illnesses and Deaths

The GWR requirements are projected to result in a significant reduction in exposure to fecal contamination. EPA used a risk assessment model to estimate the avoided viral illnesses and deaths. The risk assessment model estimates reductions in baseline incidence considering the effects of the sanitary survey and triggered source water monitoring. Assessment source water monitoring is optional and is not included in this analysis (see Section VII J.10). Table VII–5a shows the calculated viral illnesses and deaths avoided due to the GWR. The rule is expected to avoid (mean value) approximately 42,000 viral illnesses and one viral death annually (averaged over 25 years). Details of the assumptions and methodology used in the model are described in the GWR EA (USEPA, 2006d). Table VII–5b shows the

calculated viral illnesses and deaths avoided due to the GWR by system type. More detailed information about the GWR benefits assessment and all data and analyses used in predicting those benefits can be found in the GWR EA (USEPA, 2006d).

TABLE VII–5A.—SUMMARY OF ANNUAL VIRAL ILLNESSES AND DEATHS AVOIDED FOR THE GWR

Virus type	Illnesses avoided per year		Deaths avoided per year	
	Mean	5th–95th Percentiles	Mean	5th–95th Percentiles
Type A (rotavirus)	39,442	10,093–79,925	0.3	0.1–0.5
Type B (enterovirus or echovirus)	2,426	181–8,114	0.5	0.0–1.6
Total	41,868	10,274–88,039	0.7	0.1–2.1

Note: Details may not add to totals due to independent rounding and independent statistical analyses.
Source: GWR Illness Model.

TABLE VII–5B.—SUMMARY OF ANNUAL AVOIDED VIRAL ILLNESSES AND DEATHS BY SYSTEM TYPE

System type	Illnesses avoided per year		Deaths avoided per year	
	Mean	5th–95th Percentiles	Mean	5th–95th Percentiles
CWSs	32,031	8,704–68,994	0.6	0.1–1.8
NTNCWSs	2,094	533–4,308	0.03	0.0–0.1
TNCWSs	7,743	1,037–14,738	0.1	0.01–0.2
Total	41,868	10,274–88,039	0.7	0.1–2.1

Note: Estimates are derived from independent model runs, and, therefore, detail may not add to total. Values are endemic, acute viral illnesses and deaths avoided following full implementation of the GWR and only accounts for rotavirus and echovirus.
Source: Derived from GWR model output.

3. Derivation of Quantified Benefits

EPA quantified the benefits for the GWR based on reductions in the risk of endemic, acute viral illness as explained in Section VII.B.2. Next, EPA monetized benefits for nonfatal viral illnesses and mortalities avoided by the GWR. Table VII–3 shows the estimated monetized value for viral illnesses and deaths avoided by the GWR.

Benefits for nonfatal cases of endemic, acute viral illness were calculated using a cost-of-illness (COI) approach. Traditional COI valuations focus on medical costs and lost work time and leave out significant categories of benefits, specifically, the reduced utility from being sick (*i.e.*, lost personal or nonwork time, including activities such as child care, homemaking, community service, time spent with family, and recreation), although some COI studies also include an estimate for unpaid labor (household production) valued at an estimated wage rate designed to reflect the market value of such labor (*e.g.*, median wage for household domestic labor).

Ideally, a comprehensive willingness to pay (WTP) estimate would be used that includes all categories of loss in a single number. However, a review of the literature indicated that the available studies were not suitable for valuing acute viral illness; hence, estimates from this literature are inappropriate for use in this analysis. Instead, EPA presents two COI estimates: a traditional approach that only includes valuation for medical costs and lost work time (including some portion of unpaid household production) and an enhanced approach that also factors in valuations for lost unpaid work time for employed people, reduced utility (or sense of well-being) associated with decreased enjoyment of time spent in non-work activities, and lost productivity at work on days when workers are ill but go to work anyway. The first two categories of loss are estimated by multiplying the average wage rate by the number of non-work waking hours. The third category is estimated by multiplying all waking hours (work and non-work) by 30 percent of the wage rate for days when subjects are ill but report for work anyway.

The computation of COI involves two broad categories of costs—direct and indirect medical costs. All costs are updated to a common year (2003) used as the starting point for projecting benefits into future time periods. For Type A viruses, each cost component has a separate estimate made based on age and the health state of the individual (healthy or immunocompromised). For Type B viruses, cost components have separate estimates based both on age and on the type of care required (*i.e.*, no medical care, outpatient care, or inpatient care). Chapter 5 of the GWR EA (USEPA, 2006d) has a detailed breakout of both Type A and Type B COI estimates.

For both the Enhanced COI and Traditional COI, the direct cost for a case of Type A or Type B viral illness is derived by summing the costs of outpatient and inpatient care (in 2003$). Outpatient care consists of an initial physician visit ($114.55) and the product of the cost of each follow-up visit ($66.18) and the number of follow-up visits. Multiplying this sum by the percentage of patients that utilize outpatient services yields the weighted unit cost of outpatient care. The cost of inpatient care consists of the costs of the initial doctor visit in the hospital ($152.87), any follow-up visits ($52.25), and the hospital charges (calculated on a per day basis, with costs ranging from $1,007 per day for Type A illnesses to $4,870 per day for a severe case of Type B illness). As with outpatient costs, multiplying the sum of doctor visits and hospital charges by the percentage of patients who require inpatient care yields the weighted unit cost of inpatient care.

The sum of the weighted unit costs of outpatient and inpatient care equals the weighted direct costs. The weighted direct medical costs per case of Type A viral illness ranges from an average cost of $0 (for healthy patients, five years old

and up requiring no medical care) to $4,486 (for immunocompromised patients younger than five years old). The weighted direct medical costs per case of Type B viral illness range from an average of $0 (for patients requiring no medical care) to $23,431 (for patients less than one month old requiring inpatient care).

Total indirect cost is the sum of the value of patient days lost, the value of productivity lost, and the value of care giver days lost. For the Enhanced COI, the total indirect cost associated with a case of Type A viral illness ranges from an average of $103 (for healthy patients 16 years old and older) to $2,136 (for immunocompromised patients under two years of age). Indirect costs associated with cases of Type B viral illness range from $336 (for patients 16 years old and older requiring no medical care) to $2,990 (for patients under 16 years of age requiring inpatient care).

For the Traditional COI, the total indirect cost associated with a case of Type A viral illness ranges from an average of $39 (for healthy patients 16 years old and older) to $426 (for immunocompromised patients two years of age and younger). Indirect costs associated with cases of Type B viral illness range from $126 (for patients 16 years old and older requiring no medical care) to $596 (for patients requiring inpatient care).

The valuation of children's time presents unique problems. The best approach when valuing children's health effects is the use of child-specific valuations of these effects. For direct costs, EPA has used such valuations. Indirect costs, however, prove more challenging. As noted in the *Children's Health Valuation Handbook* (USEPA, 2003c), ''[children's] time lost to sickness also has value, although no direct measure exists for this loss.'' In this instance, the Handbook states that, ''as a second-best option, * * * transfer benefit values estimated for adults to children.'' The Enhanced COI uses this guideline, in conjuncture with Executive Order 13045 (''Protection of Children from Environmental Health Risks and Safety Risks''), and assumes a day lost due to illness (lost patient day) for the duration of illness for patients younger than 16 years to be valued at $199.36 (based on the median post-tax wage). In contrast, the Traditional COI assigns no lost patient day value for children under 16 years of age because this approach assigns a monetary value only to lost wages (or lost unpaid work time for adults not in the paid labor market). Both the Traditional and Enhanced COI approaches assume that a caregiver stays home with these children, introducing additional lost caregiver days for each lost patient day. The number of days lost entirely to illness, either by the adult patient or caregiver, is multiplied by $227.79 (for the Enhanced COI) or $85.12 (for the Traditional COI), the average value of a lost day.

In addition, for days when an individual is well enough to work but still experiencing symptoms, such as diarrhea, the Enhanced COI estimate also includes a 30 percent loss of work and leisure productivity (*i.e.* 30 percent of the wage rate times 16 hours) based on a study of giardiasis illness (Harrington *et al.*, 1985). In the Traditional COI analysis, productivity losses are not included for either work or nonwork time. No productivity losses are assigned to children under 16 years of age under either the Traditional or Enhanced COI approaches.

The Agency believes that losses in productivity and lost leisure time are unquestionably present and that these categories have positive value; consequently, the Traditional COI estimate understates the true value of these loss categories. However, using the wage rate to estimate the loss of utility during non-work hours may understate or overstate the value of this loss, depending on severity of illness and other factors. Similarly, using 30 percent of the wage rate to estimate the value of lost productivity in work and leisure when a person is still experiencing symptoms but is well enough to go to work may understate or overstate benefits. EPA notes that these estimates should not be regarded as upper and lower bounds. In particular, the Enhanced COI estimate may not be an upper bound, because it may not fully incorporate the value of pain and suffering.

As with the avoided mortality valuation, the real wages used in the COI estimates were increased by a real income growth factor that varies by year, but is the equivalent of about 1.8 percent per year over the 25-year period. This approach of adjusting for real income growth was recommended by the SAB (USEPA, 2000d) because the median real wage is expected to grow each year (by approximately 1.8 percent). Correspondingly, the real income growth factor of the COI estimates increases by the equivalent of 1.8 percent per year (except for medical costs, which are not directly tied to wages).

Reductions in mortalities were monetized using EPA's standard methodology for monetizing mortality risk reduction. This methodology is based on a distribution of value of statistical life (VSL) estimates from 26 labor market and stated preference studies. For this analysis, EPA incorporated the Weibell Distribution into the benefit model Monte-Carlo simulation and updated the VSLs to 2003 dollars. The updated mean VSL in 2003 dollars is $7.4 million. A real income growth factor was applied to these estimates of approximately 1.8 percent per year for the 25-year time span following implementation. Income elasticity for VSL was estimated as a triangular distribution that ranged from 0.08 to 1.00, with a mode of 0.40. VSL values for the 25-year time span are shown in the GWR EA in Exhibit B.6 (USEPA, 2006d). A more detailed discussion of these studies and the VSL estimate can be found in EPA's *Guidelines for Preparing Economic Analyses* (USEPA, 2000c).

4. Nonquantifiable Benefits

There are substantial benefits attributable to the GWR that are not quantified as part of this rulemaking because of data limitations. The GWR quantifies only the endemic, acute illnesses and deaths due to rotavirus and enterovirus. By reducing bacterial and other viral illnesses and deaths, this rule provides significant health benefits beyond the monetized benefit estimates. Chronic illnesses (such as diabetes, dilated cardiomyopathy, and reduced kidney function), kidney failure, and hypertension (*e.g.*, Garg *et al.*, 2005) resulting from waterborne viral and bacterial pathogens are also not quantified but provide additional benefits, although such cases are likely to be relatively rare. Additional health benefits will accrue from preventing outbreaks, reducing periods with insufficient disinfection, and minimizing contaminant infiltration into distribution systems.

This rule will also result in non-health benefits such as avoided outbreak response costs, increased information gained through source water monitoring that will in turn provide benefits to the systems and their customers, and reduced uncertainty regarding drinking water safety, which may lead to reduced costs for averting behaviors.

In addition, the optional assessment source water monitoring provision will provide additional benefits similar to those already described (*i.e.* reduction in viral and bacterial illness). However, EPA was not able to quantify either the benefits or costs of this program because EPA does not know the extent to which States will use the option or the manner in which they will implement it. Because this provision could potentially

increase both benefits and cost, a more complete discussion can be found in the Section VII.J.10 of this preamble.

EPA believes that, collectively, these benefits, both health and non-health, significantly exceed those which EPA was able to quantify and are a major basis for supporting the preferred regulatory alternative. A qualitative discussion of these nonquantified benefits is included in Section 5.4 of the GWR EA (USEPA, 2006d); a summary of this discussion appears below.

a. *Decreased incidence of illness from bacteria.* In addition to reducing the number of illnesses and deaths due to drinking water related to some viral illnesses, the ground water source monitoring and corrective actions taken under the GWR will also reduce the number of illness and deaths due to bacteria in drinking water. EPA was unable to quantify the benefits from preventing bacterial illness; however, EPA provides a rough estimate of illnesses and deaths prevented through:

- Estimating potential bacterial illnesses avoided;
- Estimating a mortality rate for waterborne bacterial illness; and
- Estimating potential annual deaths avoided by the GWR.

The first of the analytical steps applies the ratio of waterborne disease outbreak incidence rates between bacteria and viruses to the quantified viral cases avoided to estimate bacterial cases avoided. The second analytical step derives mortality rates for types of bacterial illness associated with waterborne disease outbreaks. The third analytical step combines the first two steps to devise a rough estimate of annual bacterial deaths avoided. EPA estimates that total quantified benefits could increase by a factor of five if EPA was able to account for additional deaths and hospitalizations caused by bacterial illness being avoided (*i.e.*, not even considering the value of reduced non-fatal non-hospitalization caused bacterial illnesses). More information on this calculation can be found in Chapter 5 of the GWR EA (USEPA, 2006d).

b. *Decreased illness from other viruses.* Quantified benefits accrue from endemic, acute illnesses associated with rotavirus (a Type A virus) and enterovirus or echovirus (a Type B virus) as discussed previously. Nonquantified health benefits attributable to viruses include decreased incidence of gastroenteritis caused by other Type A viruses such as norovirus, astrovirus, and adenovirus; decreased incidence of other acute disease endpoints (*e.g.*, hepatitis and conjunctivitis) caused by types of viruses not modeled in the quantified benefits analysis; and decreased incidence of chronic illness associated with Type B virus (*e.g.*, diabetes and dilated cardiomyopathy).

The health effects of norovirus (the most common Type A virus) illness include acute onset of nausea, vomiting, abdominal cramps, and diarrhea (USEPA, 2006d). EPA believes that nausea and vomiting associated with norovirus, typically absent in rotavirus illness, suggest that the norovirus disease burden (*e.g.*, number of productive days lost) associated with PWS wells is important, especially for adults with whom norovirus disease is quite prevalent. EPA believes that if norovirus were included in the quantified benefits, there would be significantly greater monetized benefits for Type A viruses, because monetized rotavirus disease burden (the only Type A virus modeled) provides only a small benefit for adults since most adults are immune to rotavirus.

Other acute and chronic viral illnesses can be acquired from consuming ground water contaminated with other Type A or Type B viruses, but the Agency was unable to quantify or monetize them. These include severe, acute illnesses such as hepatitis A; milder, acute illnesses such as conjunctivitis; and severe chronic illnesses such as diabetes and dilated cardiomyopathy. Most chronic illnesses are costly to treat. Lifetime costs associated with a new case of diabetes, for example, assuming an average illness duration of 30 years, are estimated at $227,032 using a three percent discount rate and $143,733 using a seven percent discount rate (year 2003 dollars). For dilated cardiomyopathy, the lifetime (21 year average) cost is $61,117 (seven percent discount rate, year 2003 dollars). These illnesses are discussed in further detail in the GWR EA (USEPA, 2006d).

c. *Other nonquantifiable benefits.* Other nonquantified health benefits include decreased incidence of waterborne disease outbreaks and epidemic illness and decreased illness through minimizing treatment failures or fewer episodes with inadequate treatment. The nonquantified non-health benefits include improved perception of ground water quality and perception about reduced risk associated with PWS wells, potential reduced use of bottle water and point-of-use devices, reduced time spent on averting behavior such as obtaining alternative water supplies, and avoided costs associated with outbreak response.

Pathogenic protozoa can occur in PWS wells, typically when such systems are misclassified and are not recognized as GWUDI systems. In PWSs with elevated ground water temperatures, *Naegleria fowleri* can colonize the distribution system, well, well gravel-pack, or aquifer. *N. fowleri* is fatal when inhaled (and treatment is not timely) and two five-year old boys died in the same week from exposure via a GWS in Arizona (Marciano-Cabral *et al.*, 2003). *N. fowleri* is inactivated by disinfection, so corrective action implemented as the result of this rule that includes disinfection may prevent death from this organism. However, the benefits from avoiding these deaths are nonquantified. Cryptosporidiosis and giardiasis outbreaks in sensitive PWS wells have also occurred (see Section III.C.2). Sanitary surveys and additional monitoring under the GWR combined with existing source water assessments and Long Term 2 Surface Water Treatment Rule (LT2ESWTR) (71 FR 654, January 5, 2006) (USEPA, 2006i) implementation can, in combination, minimize the likelihood of misclassification of PWS wells (as non-GWUDI) and reduce the likelihood of outbreaks associated with such misclassification. This rule only qualitatively considers the benefits of identifying misclassified PWS wells.

Several nonhealth benefits from this rule were also recognized by EPA but were not monetized. The nonhealth benefits of this rule include avoided outbreak response costs (such as the costs of providing public health warnings, boiling drinking water and providing alternative supplies, remediation and repair, and testing and laboratory costs). Expenses associated with outbreaks can be 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 $43 million in Canadian dollars (approximately $32 million in U.S. dollars) (Livernois, 2002). The author believed that this was a conservative estimate.

5. How Have the Benefits Changed Since the Proposal?

The estimated annual quantified benefits for the GWR have changed from $205 million (year 2000 dollars, both at 3 percent and 7 percent discount rates) to $19.7 million (year 2003 dollars, at 3 percent) using enhanced cost-of-illness estimates and $10.0 million (year 2003 dollars, at 3 percent) using traditional cost-of-illness estimates (these are $16.8 and $8.6 using a 7 percent discount rate). The proposal only included the enhanced cost-of-illness measure. The change in quantified benefits is due to

changes in both the economic analysis estimates (*e.g.*, interpretation of occurrence and other data) and GWR provisions. However, changes in the economic analysis estimates are the dominant factor in explaining the large change in benefits from the proposal.

Estimates in the GWR EA that were changed and that most influenced the change in the quantified benefit estimate include:

- Frequency and duration of viral occurrence in wells;
- Percentage of wells associated with high versus low viral concentrations;
- Efficiency by which virally contaminated wells are identified and prescribed corrective action;
- Severity of symptoms associated with predicted illnesses
- Monetized value of illnesses avoided; and
- Using net present values and then annualizing benefits.

EPA believes that the changes made in the GWR EA since proposal substantially improve upon the scientific basis for the quantified benefits, a major issue raised by public comments (see Section VII.J of this preamble for further discussion of public comments). Chapter 5 of the GWR EA describes the basis for the analysis (USEPA, 2006d).

Changes in the rule provisions also impacted the final benefit estimate but these changes are not as significant as the changes made in the economic analysis. In addition, the benefits (as well as costs) for the optional assessment source water monitoring and additional fecal indicator sampling following triggered source water monitoring are not included in the final rule analysis. These potential impacts are discussed in Section VII.J.10.

Another major change in the GWR EA since proposal is a more thorough analysis of the nonquantified benefits. EPA's analysis of the potential benefits from avoided bacterial illness suggests that the nonquantified benefits may exceed the quantified benefits by a factor of five (see Chapter 5.4 of the GWR EA for a full description of nonquantified benefits, USEPA, 2006d).

D. What Are the Costs of the GWR?

1. Summary of Quantified Costs

In estimating the costs of this rule, the Agency considered impacts on public water systems and on States. Table VII–6 summarizes these costs in terms of annualized present value: $61.8 million (using a three percent discount rate) and $62.3 million (using a seven percent discount rate). Most costs occur early in the implementation schedule, therefore the values do not differ much using different discount rates.

To calculate the national costs of compliance, the Agency used a Monte-Carlo simulation model specifically developed for the GWR. The main advantage of this modeling approach is that in addition to providing average compliance costs, it also estimates the range of costs within each PWS size and category. It also allows the Agency to capture the variability and uncertainty in areas such as PWS configuration, current treatment in-place, source water quality, existing State requirements, unit costs of treatment technologies, and compliance forecasts. The 90 percent confidence bounds shown in Table VII–6 reflect the quantified uncertainties.

Table VII-6: Total Annualized Present Value Costs ($Millions, 2003$)

Discount Rate	Systems			States			Total		
	Mean Value	90 Percent Confidence Bound		Mean Value	90 Percent Confidence Bound		Mean Value	90 Percent Confidence Bound	
		Lower (5th %ile)	Upper (95th %ile)		Lower (5th %ile)	Upper (95th %ile)		Lower (5th %ile)	Upper (95th %ile)
3 percent	$ 50.0	$ 34.3	$ 68.8	$ 11.8	$ 10.9	$ 12.6	$ 61.8	$ 45.2	$ 81.4
7 percent	$ 50.6	$ 35.2	$ 69.0	$ 11.7	$ 10.9	$ 12.6	$ 62.3	$ 46.1	$ 81.6

Notes: Detail may not add to totals due to independent rounding.

Table VII–6 shows the estimated annualized present value costs of this rule. Drinking water utilities will incur approximately 81 percent of the rule's costs. States will incur the remaining costs of the rule. In addition to the mean estimates of costs, the Agency calculated 90 percent confidence intervals by considering, for example, the uncertainty in the mean unit technology costs. Table VII–7 shows the undiscounted capital costs and all one-time costs for both water systems and States. The derivation of these cost numbers can be found in Chapter 6 of the GWR EA (USEPA, 2006d). The itemized costs of this rule are presented below for systems and States, respectively.

Table VII-7: Total Initial Capital and One-Time Costs ($Millions, 2003$)

	PWSs Serving ≤10,000			PWSs Serving > 10,000			Total		
		90 Percent Confidence Bound			90 Percent Confidence Bound			90 Percent Confidence Bound	
	Mean Value	Lower (5th %ile)	Upper (95th %ile)	Mean Value	Lower (5th %ile)	Upper (95th %ile)	Mean Value	Lower (5th %ile)	Upper (95th %ile)
CWS Total Initial Capital	$ 79	$ 29	$ 158	$ 62	$ 24	$ 117	$ 141	$ 53	$ 275
NTNCWS Total Initial Capital	$ 31	$ 12	$ 60	$ 0	$ 0	$ 1	$ 31	$ 12	$ 61
TNCWS Total Initial Capital	$ 173	$ 64	$ 339	$ 1	$ 0	$ 2	$ 174	$ 64	$ 341
Total Initial PWS Capital Costs	$ 283	$ 105	$ 556	$ 64	$ 24	$ 120	$ 346	$ 129	$ 676
CWS Implementation Costs	$ 5	$ 5	$ 5	$ 0	$ 0	$ 0	$ 5	$ 5	$ 5
NTNCWS Implementation Costs	$ 2	$ 2	$ 2	$ 0	$ 0	$ 0	$ 2	$ 2	$ 2
TNCWS Implementation Costs	$ 9	$ 9	$ 9	$ 0	$ 0	$ 0	$ 9	$ 9	$ 9
Total One-Time PWS Costs	$ 16	$ 16	$ 16	$ 0	$ 0	$ 0	$ 17	$ 17	$ 17
State Start-Up Cost							$ 13	$ 13	$ 13
Total State One-Time Costs							$ 13	$ 13	$ 13

Notes: Detail may not add to totals due to independent rounding.
The mean and confidence bounds are equal for both systems and state implementation costs because EPA derived these costs from point estimates.

2. Derivation of Quantified Costs

a. *Summary of Baseline Estimate.* To quantify the effects of the rule, it is necessary to have a baseline against which to compare the set of regulatory requirements. The baseline is a characterization of the industry and its operations under the conditions expected to exist before systems make changes to meet requirements of this rule. As discussed in Section IV of this preamble, the regulatory requirements can be system, entry point, or well level requirements. These requirements, to a large extent, depend upon the levels of existing protection from microbial risks, e.g., disinfection levels. Table VII–8a presents the major baseline information for this rule. The number of entry points or wells varies by system size, with larger systems generally having more entry points. Chapter 4 of the GWR EA for this rule provides a detailed description of the GWR baselines (USEPA, 2006d).

b. *Rule Implications.* To calculate the cost impact of each rule alternative on GWSs, the Agency estimated how many systems and their associated entry points to distribution systems and wells would be affected by the various rule requirements based on national fecal indicator occurrence information, as discussed in Section VII.B.1. The Agency developed compliance forecast estimates that predict the number of systems, entry points, or wells that incur costs to comply with each regulatory requirement. Table VII–8b shows these numbers broken down by system type and size category. Chapter 6 of the GWR EA for this rule provides further description of the estimates of rule implications (USEPA, 2006d).

c. *System Costs.* This rule is estimated to cost public GWSs $50.0 million annually using a three percent discount rate ($50.6 million annually using a seven percent discount rate). The cost impacts to systems complying with the GWR stem from implementing the rule, assisting with sanitary surveys, performing source water and compliance monitoring, and performing corrective actions. Not every system is expected to incur all of these costs because the compliance activities for systems depend on the results from sanitary surveys, analysis of total coliform samples under the TCR, and source water monitoring.

The estimated costs for each of the rule requirements are summarized in Table VII–8c with a mean, upper bound, and lower bound. The mean and confidence bounds are equal for some of the costs because EPA derived these costs from point estimates. The total annualized costs to systems are presented in Table VII–9 by system size and type. The detailed calculation of these cost numbers are presented in Chapter 6 of the GWR EA (USEPA, 2006d).

To analyze the different rule components, the Agency had to distinguish between correction of significant deficiencies identified during sanitary surveys and the corrective actions that result from fecal indicator-positive ground water source samples. It was not possible to estimate costs for all conceivable corrective actions that a system may potentially encounter on a national level due to system-to-system variability. As a result, the Agency estimated costs for representative corrective actions that may be implemented to address significant deficiencies identified by sanitary surveys and source water fecal contamination, respectively. Table VII–10 shows the representative corrective actions.

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Table VII-8a: GWR Baselines: Number of Systems, Entry Points, and Wells

System Size	Total Number of Systems	Number of Entry Points per System	Number of Wells per System	Number of Wells per Entry Point	Entry Points with at least 4 logs of Viral Disinfection	Entry Points with less than 4 logs of Viral Disinfection	Entry Points without Disinfection
	A	B	C	D = C/B	E	F	G
Community Water Systems (CWSs)							
<100	12,843	1.3	1.5	1.1	3,996	3,689	9,168
101-500	14,358	1.6	2.0	1.2	8,873	8,191	6,343
501-1,000	4,649	2.0	2.3	1.2	3,547	3,274	2,262
1,001-3,300	5,910	2.4	3.1	1.3	5,378	4,964	4,002
3,301-10K	2,884	3.2	4.6	1.4	3,547	3,274	2,459
10,001-50K	1,444	5.6	9.8	1.7	3,856	3,559	698
50,001-100K	167	11.3	16.1	1.4	583	538	770
100,001-1 Million	103	12.4	49.9	4.0	545	503	227
> 1 Million	3	11.4	49.9	4.4	34	-	-
Nontransient Noncommunity Water Systems (NTNCWSs)							
<100	9,456	1.0	1.5	1.5	850	1,892	6,714
101-500	6,758	1.0	2.0	2.0	608	1,352	4,798
501-1,000	1,894	1.0	2.3	2.3	170	379	1,345
1,001-3,300	715	1.0	3.1	3.1	64	143	508
3,301-10K	73	1.0	4.6	4.6	7	15	52
10,001-50K	10	1.0	9.8	9.8	1	2	7
50,001-100K	1	1.0	16.1	16.1	0	0	1
100,001-1 Million	1	1.0	49.9	49.9	0	0	1
> 1 Million	-	1.0	49.9	49.9	-	-	-
Transient Noncommunity Water Systems (TNCWSs)							
<100	64,448	1.0	1.5	1.5	1,160	10,441	52,847
101-500	18,993	1.0	2.0	2.0	342	3,077	15,574
501-1,000	1,940	1.0	2.3	2.3	35	314	1,591
1,001-3,300	585	1.0	3.1	3.1	11	95	480
3,301-10K	74	1.0	4.6	4.6	1	12	61
10,001-50K	19	1.0	9.8	9.8	0	3	16
50,001-100K	1	1.0	16.1	16.1	0	0	1
100,001-1 Million	1	1.0	49.9	49.9	0	0	1
> 1 Million	-	1.0	49.9	49.9	-	-	-

Table VII-8b: Summary of Rule Implications

System Size	Systems Receiving Sanitary Survey	Systems with Corrective Actions for Significant Deficiencies	Entry Points with Triggered Monitoring	Entry Points with Corrective Actions for Triggered Monitoring	Entry Points with Viral Disinfection Increased from less than 4 logs to 4 logs	Previously Non-disinfecting Entry Points Taking Corrective Action	Entry Points with Incremental Compliance Monitoring
	A	B	C	D	E	F	G*
Community Water Systems (CWSs)							
<100	12,843	2,181	12,797	1,249	358	891	248
101-500	14,358	2,444	14,819	1,625	917	709	292
501-1,000	4,649	789	5,578	608	360	248	105
1,001-3,300	5,910	1,001	8,910	712	396	317	130
3,301-10K	2,884	492	5,638	617	353	264	111
10,001-50K	1,444	245	4,357	655	548	107	54
50,001-100K	167	28	1,295	226	93	133	46
100,001-1 Million	103	18	749	136	94	42	20
> 1 Million	3	-	-	-	-	-	-
Nontransient Noncommunity Water Systems (NTNCWSs)							
<100	9,456	1,608	8,609	687	150	537	149
101-500	6,758	1,148	6,149	533	119	415	170
501-1,000	1,894	322	1,724	149	33	117	50
1,001-3,300	715	121	651	86	19	67	27
3,301-10K	73	12	66	10	2	8	3
10,001-50K	10	2	9	2	0	1	1
50,001-100K	1	0	1	0	0	0	0
100,001-1 Million	1	0	1	0	0	0	0
> 1 Million	-	-	-	-	-	-	-
Transient Noncommunity Water Systems (TNCWSs)							
<100	64,448	10,990	63,295	6,915	1,143	5,772	1,602
101-500	18,993	3,234	18,648	2,026	337	1,689	696
501-1,000	1,940	329	1,905	208	35	174	73
1,001-3,300	585	99	574	76	12	63	26
3,301-10K	74	13	73	12	2	10	4
10,001-50K	19	3	19	3	1	3	1
50,001-100K	1	0	1	0	0	0	0
100,001-1 Million	1	0	1	0	0	0	0
> 1 Million	-	-	-	-	-	-	-

*G indicates number of entry points with treatment corrective actions. F-G indicates non treatment corrective actions

Table VII-8c: Annualized Costs for Meeting Each of the GWR Provisions to Systems and States ($Millions, 2003$)

		Rule Implementation & Annual Administration	Sanitary Surveys	Corrective Actions for Significant Deficiencies	Triggered Monitoring	Corrective Actions for Triggered Monitoring	Compliance Monitoring	Total Costs
		A	B	C	D	E	F	G
				3%				
Systems	Mean	$0.93	$0.21	$8.46	$5.44	$25.64	$9.35	$50.02
	Lower Bound (5th %ile)	$0.93	$0.11	$5.74	$5.32	$14.90	$3.02	$34.28
	Upper Bound (95th %ile)	$0.93	$0.31	$11.60	$5.56	$38.39	$16.97	$68.76
States	Mean	$9.20	$1.45	$0.56	$0.09	$0.46	$0.00	$11.77
	Lower Bound (5th %ile)	$9.20	$0.66	$0.52	$0.06	$0.32	$0.00	$10.87
	Upper Bound (95th %ile)	$9.20	$2.23	$0.61	$0.12	$0.61	$0.01	$12.64
Total	Mean	$10.13	$1.66	$9.02	$5.52	$26.10	$9.36	$61.79
	Lower Bound (5th %ile)	$10.13	$0.77	$6.25	$5.38	$15.22	$3.02	$45.15
	Upper Bound (95th %ile)	$10.13	$2.54	$12.21	$5.67	$39.00	$16.98	$81.41
				7%				
Systems	Mean	$1.33	$0.20	$8.13	$5.39	$27.20	$8.32	$50.57
	Lower Bound (5th %ile)	$1.33	$0.10	$5.51	$5.27	$15.89	$2.65	$35.22
	Upper Bound (95th %ile)	$1.33	$0.30	$11.14	$5.51	$40.96	$15.17	$69.00
States	Mean	$9.18	$1.39	$0.54	$0.10	$0.52	$0.00	$11.74
	Lower Bound (5th %ile)	$9.18	$0.63	$0.50	$0.07	$0.36	$0.00	$10.87
	Upper Bound (95th %ile)	$9.18	$2.14	$0.59	$0.13	$0.69	$0.01	$12.61
Total	Mean	$10.51	$1.59	$8.67	$5.48	$27.72	$8.32	$62.31
	Lower Bound (5th %ile)	$10.51	$0.74	$6.01	$5.34	$16.26	$2.65	$46.09
	Upper Bound (95th %ile)	$10.51	$2.44	$11.73	$5.64	$41.65	$15.18	$81.61

Table VII-9: Total Annualized Costs to Systems by System Size and Type ($Millions, 2003$)

System Size (Population Served)	At 3%			At 7%		
	Mean Value	90 Percent Confidence Bound		Mean Value	90 Percent Confidence Bound	
		Lower (5th %ile)	Upper (95th %ile)		Lower (5th %ile)	Upper (95th %ile)
Community Water Systems (CWSs)						
<100	$ 2.91	$ 2.13	$ 3.69	$ 2.91	$ 2.16	$ 3.72
101-500	$ 3.61	$ 2.54	$ 4.94	$ 3.59	$ 2.60	$ 4.83
501-1,000	$ 1.45	$ 0.99	$ 1.98	$ 1.44	$ 1.00	$ 1.94
1,001-3,300	$ 1.96	$ 1.29	$ 2.76	$ 1.94	$ 1.30	$ 2.69
3,301-10K	$ 2.23	$ 1.40	$ 3.26	$ 2.26	$ 1.49	$ 3.25
10,001-50K	$ 2.85	$ 1.87	$ 4.06	$ 3.05	$ 2.05	$ 4.41
50,001-100K	$ 1.78	$ 1.01	$ 2.73	$ 1.88	$ 1.11	$ 2.84
100,001-1M	$ 1.89	$ 1.14	$ 2.89	$ 2.12	$ 1.31	$ 3.18
>1 Million	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00	$ 0.00
All Sizes	$ 18.67	$ 12.39	$ 26.31	$ 19.19	$ 13.03	$ 26.87
Nontransient Noncommunity Water Systems (NTNCWSs)						
<100	$ 1.77	$ 1.34	$ 2.27	$ 1.78	$ 1.34	$ 2.26
101-500	$ 1.86	$ 1.21	$ 2.60	$ 1.83	$ 1.23	$ 2.53
501-1,000	$ 0.67	$ 0.43	$ 0.97	$ 0.66	$ 0.42	$ 0.94
1,001-3,300	$ 0.46	$ 0.28	$ 0.68	$ 0.46	$ 0.28	$ 0.67
3,301-10K	$ 0.10	$ 0.05	$ 0.16	$ 0.10	$ 0.06	$ 0.17
10,001-50K	$ 0.04	$ 0.02	$ 0.07	$ 0.04	$ 0.02	$ 0.07
50,001-100K	$ 0.01	$ 0.00	$ 0.01	$ 0.01	$ 0.00	$ 0.01
100,001-1M	$ 0.01	$ 0.00	$ 0.01	$ 0.01	$ 0.00	$ 0.02
>1 Million	$ -	$ -	$ -	$ -	$ -	$ -
All Sizes	$ 4.91	$ 3.33	$ 6.77	$ 4.89	$ 3.36	$ 6.68
Transient Noncommunity Water Systems (TNCWSs)						
<100	$ 17.74	$ 12.87	$ 23.27	$ 17.86	$ 13.11	$ 23.44
101-500	$ 7.07	$ 4.75	$ 9.95	$ 7.00	$ 4.76	$ 9.61
501-1,000	$ 0.98	$ 0.58	$ 1.45	$ 0.96	$ 0.59	$ 1.38
1,001-3,300	$ 0.42	$ 0.25	$ 0.63	$ 0.42	$ 0.26	$ 0.63
3,301-10K	$ 0.13	$ 0.07	$ 0.21	$ 0.14	$ 0.07	$ 0.22
10,001-50K	$ 0.08	$ 0.04	$ 0.14	$ 0.09	$ 0.04	$ 0.15
50,001-100K	$ 0.01	$ 0.00	$ 0.01	$ 0.01	$ 0.00	$ 0.01
100,001-1M	$ 0.01	$ 0.01	$ 0.02	$ 0.01	$ 0.01	$ 0.02
>1 Million	$ -	$ -	$ -	$ -	$ -	$ -
All Sizes	$ 26.44	$ 18.56	$ 35.68	$ 26.49	$ 18.84	$ 35.46
TOTAL	$ 50.02	$ 34.28	$ 68.76	$ 50.57	$ 35.22	$ 69.00

Notes: Detail may not be consistent with summary presentations due to independent statistical analysis.

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Because the exact timing and distribution of problems among systems that may be identified by the sanitary surveys is not known, an average annual GWS cost of correcting significant defects is calculated by summing the cost of correcting all significant deficiencies over the 25-year period of analysis and apportioning them evenly over the period during which they are performed.

For entry points with fecal indicator-positive ground water source samples (from triggered source water monitoring), systems must perform corrective action to comply with the GWR. For cost estimation purposes, the model assumes that for every source water positive sample, at least one additional sample will also be positive (*i.e.*, corrective action ultimately follows every source water positive) (see Chapter 6 of GWR EA (USEPA, 2006d) for a complete discussion of this assumption). For non-disinfecting systems, the model assigns one representative nontreatment corrective action or one disinfection/treatment corrective action (Table VII–10). The cost model assigns nondisinfecting entry points that need to take corrective actions to the treatment category using the current proportion of all entry points providing treatment for different size categories. The current proportion is a range of the estimated existing percentages of treatment entry points among the entry points with less than 4-log disinfection and without disinfection.

For nontreatment corrective actions to comply with the GWR, the cost model assigns equal proportions of entry points to high and low cost scenarios and then assigns a representative corrective action according to the corresponding percentages in that scenario. For entry points predicted to use treatment corrective actions, the cost model assigns one of the possible treatment technologies based on the relative percentage of CWSs currently engaged in those treatment practices. Finally, for entry points that require corrective actions because of source water fecal contamination (from

triggered source water monitoring) and already disinfect, but the disinfection does not achieve at least a 4-log treatment of viruses before or at the first customer, the compliance forecast assigns a corrective action that either increases the dose for hypochlorination or chlorine gas or adds storage. More information regarding the compliance forecasts of corrective actions can be found in Chapter 6 of the GWR EA (USEPA, 2006d).

TABLE VII–10.—REPRESENTATIVE CORRECTIVE ACTIONS

	Representative corrective actions	Note
For Significant Deficiencies at Source Identified by Sanitary Survey.	Replace a Sanitary Well Seal	Low cost option.
	Rehabilitate an Existing Well	High cost option.
For Entry Points with a Fecal Indicator-Positive Ground Water Source Sample.	Non-Treatment Options Rehabilitate an Existing Well Drill a New Well Purchase Water Eliminate Source of Contamination	Interim disinfection is included for costing.
	Treatment Options Disinfection Alternatives or Nanofiltration	Chlorine gas and hypochlorite will be most likely choices for large and small systems, respectively.

In addition to the treatment technique costs, EPA estimated the cost for systems to conduct monitoring. It is important to remember that triggered source water monitoring applies only to systems that do not achieve 4-log treatment of viruses. Compliance monitoring applies to systems that currently provide 4-log treatment of viruses, or those that install treatment as a result of this rule. Assessment source water monitoring is optional and is not included in either the cost or benefit estimates (see Section VII.J.10).

The triggered source water monitoring costs are calculated based on the cost of the test and the operator's time to collect and transport the sample. GWSs have to collect a ground water source sample and analyze it for the selected indicator organism when the system experiences a total coliform-positive under the TCR. If the indicator sample is positive, the system either takes five additional samples or does corrective action immediately. If any of the additional samples is positive, the system must implement a corrective action. Specific issues regarding the monitoring cost estimate are described in Section VII.C.3 of this preamble. The GWR EA has a more detailed discussion of the monitoring cost analysis (USEPA, 2006d).

The cost of compliance monitoring varies with system size. Compliance monitoring is required for any system that currently provides 4-log treatment of viruses or installs treatment as a result of complying with this rule's treatment technique requirements. EPA assumes that systems with treatment technology in place prior to the GWR promulgation incur minimal additional capital or operation and maintenance (O&M) costs for compliance monitoring because GWSs should already have a monitoring program in place and has not included them in the cost analysis. However, the Agency does include costs for systems to notify the State that they achieve at least 4-log treatment of viruses or to notify the State in case of system failure.

For those systems adding a technology that provides 4-log treatment of viruses as a corrective action for source water fecal contamination, EPA assumes that monitoring equipment will also be installed to perform compliance monitoring. The cost varies by system size because the monitoring requirements vary by size category. A more detailed explanation of compliance monitoring schemes is discussed in Section IV.C.

d. *State costs.* As indicated in Table VII–6, EPA estimates that States will incur less than $11.8 million in annualized costs due to the additional sanitary survey requirements in this rule (including increased frequency of sanitary surveys), tracking monitoring information, reviewing action plans, data management, and other activities. Along with system costs, State costs are also summarized in Table VII–8c.

States will incur administrative costs while implementing the GWR. These implementation costs are not directly required by specific provisions of GWR alternatives, but are necessary for States to ensure the provisions of the GWR are properly carried out. States will also be required to spend time responding to PWSs whose ground water sources are found to be fecally contaminated, or have significant deficiencies. These costs include time to review plans and specifications, prepare violation letters, and enter data. States will need to allocate time for their staff to establish and then maintain the programs necessary to comply with the GWR, including developing and adopting State regulations, modifying data management systems to track newly required system reports to the States, and providing ongoing technical assistance to GWSs. For those GWR requirements that include monitoring with a laboratory method not currently required by the State, the State must devote a portion of its staff time to certifying laboratories for the new analytical method. Time requirements for a variety of State agency activities and responses are estimated in Chapter 6 of the GWR EA (USEPA, 2006d).

In addition to these one-time costs, States will use resources to continue activities for the implementation of the GWR unrelated to any specific provision. States with primacy enforcement responsibilities have recordkeeping (§ 142.14) and reporting (§ 142.15) requirements associated with primacy enforcement and must coordinate with EPA for review of the State primacy program. States must also continue to train their personnel and PWS staff, maintain laboratory certifications, and report system compliance information to the Safe Drinking Water Information System (SDWIS).

3. Nonquantifiable Costs

Although EPA has quantified the significant costs of the GWR, there are some costs that the Agency did not quantify. Overall, EPA believes that these nonquantified costs are much smaller than the nonquantified benefits. These nonquantified costs result from uncertainties surrounding rule assumptions and from modeling assumptions. For example, EPA estimated that some systems may need to acquire land if they need to build a treatment facility or drill a new well. This was not considered for most systems because EPA expects that the majority of the technologies that

systems will use to comply with this rule will fit within the existing plant footprint. In addition, if the cost of land is prohibitive, a system may choose another lower cost alternative such as connecting to another source. EPA has also not quantified costs for systems already using disinfection to conduct compliance monitoring because EPA believes that such systems are already incurring these costs.

In addition, the optional assessment source water monitoring provision was not included in the quantitative cost analysis. EPA was not able to quantify either the benefits or costs of this program. Because this provision could potentially increase both benefits and cost, a more complete discussion can be found in Section VII.J of this preamble. Due to lack of information, EPA was unable to quantify the costs (as well as benefits) from the correction of sanitary survey deficiencies in distribution systems and treatment plants. This is discussed in Section VII.J of this preamble.

Also, the Agency did not include the costs for taking five additional samples following a positive source water sample. However, EPA overestimated the cost of triggered source water monitoring because it assumed all systems would take an additional sample beyond the current TCR requirements. However, many small systems (and most GWSs are small) will be able to use one of their TCR repeat samples to also comply with the GWR. Overall, the impact of not including the five additional sample cost (approximately $200,000 per year) is much smaller compared to the overestimate of a few million dollars associated with the initial fecal indicator sampling cost already conducted for TCR monitoring.

4. How Have the Costs Changed Since the Proposal?

The estimated annual quantified costs for the GWR have changed from $183 million and $199 million (year 2000 dollars at proposal, using three and seven percent discount rates, respectively) to $61.8 million and $62.3 million (year 2003 dollars, using three and seven percent discount rates, respectively). The change in quantified costs is due to changes in both the economic analysis estimates (*e.g.*, interpretation of occurrence and other data) and GWR provisions. However, changes in the economic analysis estimates are the dominant factor in explaining the large change in costs from the proposal. The major changes in economic analysis estimates include the following:

- The number of significant deficiencies and corrective actions in wells from sanitary survey provisions;
- State costs for the incremental changes to existing sanitary survey programs;
- The total coliform-positive samples under the TCR and the number of triggered source water monitoring samples required under the GWR;
- The frequency and duration of fecal indicator occurrence in wells;
- The efficiency by which fecally contaminated wells are identified and therefore performing a corrective action;
- Compliance forecasts include a higher percentage of non-treatment corrective actions; and
- Using net present values and then annualizing costs.

EPA believes that the changes made in the GWR EA since proposal substantially improve the basis for quantifying the GWR costs with more available data, a major issue raised by public comments (see Section VII.L of this preamble for further discussion of major public comments).

Changes in the rule provisions also impacted the final cost estimate but these changes are not as significant as the changes made in the economic analysis. In addition, the costs (as well as benefits) for optional assessment source water monitoring and additional fecal indicator sampling following triggered source water monitoring are not included in the final rule analysis. These potential impacts are discussed in Section VII.J.

Another major change in the Economic Analysis since the proposed GWR is a more thorough analysis of the nonquantified costs. Chapter 6 of the GWR EA describes the basis for the analysis (USEPA, 2006d). Rule changes can be found in Section VII.A of this preamble.

E. What Is the Potential Impact of the GWR on Households?

This analysis considers the potential increase in a household's water bill if a CWS passed the entire cost increase resulting from this 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.

The household cost analysis only considers the impact on CWSs. State costs and costs to TNCWSs and NTNCWSs are not included in this analysis since their costs are not passed through directly to households. Table VII–11 presents the mean expected increases in annual household costs for all CWSs, including those systems that do not have to take corrective action for significant deficiencies or source water fecal contamination. Table VII–11 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.

As shown in Table VII–11, the mean annual household costs for systems (including those that do not add treatment) range from $0.21 to $16.54 (systems serving fewer households generally have higher average annual household costs). Household costs for the subset of systems that take corrective actions range from $0.45 to $52.38. EPA estimates that, as a whole, households subject to the GWR face minimal increases in their annual costs. The lowest increases in household costs are for those served by larger systems due to significant economies of scale and because many already disinfect. Approximately 66 percent of the households potentially affected by the GWR are customers of systems that serve at least 10,000 people. Households served by small systems that take corrective actions will face the greatest increases in annual costs.

Table VII-11: Summary of Annual Per-Household Costs for the GWR (2003$/Year)

Systems Size (Population Served)	Households	Mean	Median	90th Percentile
All Community Water Systems (CWSs)				
<100	289,222	$ 16.54	$ 2.81	$ 9.31
101-500	1,303,890	$ 3.51	$ 0.64	$ 6.11
501-1,000	1,278,081	$ 0.97	$ 0.16	$ 1.70
1,001-3,300	4,196,105	$ 0.37	$ 0.04	$ 0.61
3,301-10K	6,271,380	$ 0.27	$ 0.03	$ 0.43
10,001-50K	11,468,813	$ 0.21	$ 0.04	$ 0.49
50,001-100K	4,204,584	$ 0.34	$ 0.10	$ 1.02
>100,000	9,755,817	$ 0.21	$ 0.04	$ 0.62
Corrective Action Community Water Systems (CWSs)				
<100	70,563	$ 52.38	$ 18.99	$ 82.21
101-500	312,484	$ 12.00	$ 4.52	$ 25.76
501-1,000	302,557	$ 3.23	$ 1.33	$ 6.56
1,001-3,300	919,133	$ 1.33	$ 0.47	$ 2.59
3,301-10K	1,487,159	$ 0.80	$ 0.25	$ 2.18
10,001-50K	2,871,250	$ 0.45	$ 0.18	$ 1.18
50,001-100K	1,215,544	$ 0.53	$ 0.26	$ 1.36
>100,000	2,283,144	$ 0.68	$ 0.39	$ 1.65

Source: GWR model output.

F. What Are the Incremental Costs and Benefits of the GWR?

The GWR regulatory alternatives achieve increasing levels of benefits at increasing levels of costs. The regulatory alternatives for this rule, in rank order of increasing costs and benefits are as follows:

- Alternative 1: Sanitary Survey and Corrective Action.
- Alternative 2: Risk-Targeted Approach.
- Alternative 3: Multi-Barrier Approach.
- Alternative 4: Across-the-Board Disinfection.

More information about the alternatives is provided in the GWR EA (USEPA, 2006d).

Incremental costs and benefits are those that are incurred or realized in reducing viral illnesses and deaths from one alternative to the next more stringent alternative. Estimates of incremental costs and benefits are useful in considering the economic efficiency of different regulatory alternatives considered by the Agency. Generally, the goal of an incremental analysis is to identify the regulatory alternatives where net social benefits are maximized. However, the usefulness of this analysis is constrained when major benefits and/or costs are not quantified or not monetized as in the case with the GWR. Also, as pointed out by the Environmental Economics Advisory Committee of the Science Advisory Board, efficiency is not the only appropriate criterion for social decisionmaking (USEPA, 2000d).

For the GWR, presentation of incremental quantitative benefit and cost comparisons may be unrepresentative of the true net benefits of the rule because a significant portion of the rule's potential benefits are not quantified, particularly bacterial illness and deaths (see Section VII.C.4).

Table VII–12a and Table VII–12b present the four regulatory alternatives in order of increasing level of reduction in waterborne pathogens or increasing level of protection from illness. All values are annualized mean present values expressed in year 2003 dollars. The lower and upper bounds of a 90 percent confidence interval are shown below the mean numbers. As shown in Tables VII–12a and b, incremental net benefits for all alternatives are negative. The nonquantified bacterial illness benefits would add benefits to all alternatives without any increase in costs. EPA estimated that the total benefits could increase by more than a factor of five by accounting for additional deaths and hospitalizations caused by reduced bacterial illness alone. These nonquantified benefits have a significant positive impact on the incremental benefits and incremental net benefits. Both Alternative 3 and Alternative 2 could have positive incremental net benefits if the bacterial benefits are considered. The next highest alternative, Alternative 4, has such highly negative incremental net benefits, and the difference is so substantial, that nonquantified benefits would be unlikely to compensate. However, comparisons between Alternative 4 and the other alternatives may be between two separate sets of benefits, in the sense that they may be distributed to somewhat different populations.

TABLE VII–12a.—INCREMENTAL NET BENEFITS BY RULE ALTERNATIVE—ENHANCED COI

[Annualized Present Value Mean, $Millions, 2003$]

Rule alternatives	Annual quantified costs	Annual quantified benefits (enhanced COI)	Incremental costs	Incremental benefits*	Incremental net benefits*
	A	B	C	D	E = D – C
Three Percent Discount Rate (in dollars)					
Alternative 1: Sanitary Survey and Corrective Action	15.3 (11.8–19.2)	3.6 (0.9–9.3)	15.3	3.6	–11.7
Final Rule: Risk-targeted Approach**	61.8 (45.2–81.4)	19.7 (6.5–45.4)	46.5	16.1	–30.4
Alternative 3: Multi-Barrier Approach	67.9 (49.4–89.5)	21.3 (7.1–48.7)	6.1	1.6	–4.5
Alternative 4: Across-the-Board Disinfection	686.4 (636.8–735.4)	70.2 (18.3–177.0)	618.5	48.9	–569.6
Seven Percent Discount Rate (in dollars)					
Alternative 1: Sanitary Survey and Corrective Action	15.3 (11.9–19.0)	2.9 (0.7–7.5)	15.3	2.9	–12.4
Final Rule: Risk-targeted Approach**	62.3 (46.1–81.6)	16.8 (5.5–38.6)	47.0	13.9	–33.1
Alternative 3: Multi-Barrier Approach	69.4 (51.0–90.6)	18.2 (6.0–41.6)	7.1	1.4	–5.7
Alternative 4: Across-the-Board Disinfection	665.3 (612.3–717.0)	61.9 (16.1–156.3)	595.9	43.8	–552.2

*Does not include significant nonquantified benefits. See GWR EA Section 5.4 (USEPA, 2006d).
**Benefits and costs are also not included for optional assessment source water monitoring.

TABLE VII–12b.—INCREMENTAL NET BENEFITS BY RULE ALTERNATIVE—TRADITIONAL COI

[Annualized Present Value Mean, $Millions, 2003$]

Rule alternatives	Annual quantified costs	Annual quantified benefits (traditional COI)	Incremental costs	Incremental benefits*	Incremental net benefits*
	A	B	C	D	E = D – C
Three Percent Discount Rate (in dollars)					
Alternative 1: Sanitary Survey and Corrective Action	15.3 (11.8–19.2)	1.9 (0.3–5.5)	15.3	1.9	–13.5
Final Rule: Risk-targeted Approach**	61.8 (45.2–81.4)	10.0 (2.2–27.0)	46.5	8.2	–38.3
Alternative 3: Multi-Barrier Approach	67.9 (49.4–89.5)	10.8 (2.5–28.9)	6.1	0.8	–5.3
Alternative 4: Across-the-Board Disinfection	686.4 (636.8–735.4)	35.5 (6.5–102.4)	618.5	24.7	–593.8
Seven Percent Discount Rate (in dollars)					
Alternative 1: Sanitary Survey and Corrective Action	15.3 (11.9–19.0)	1.5 (0.2–4.5)	15.3	1.5	–13.8
Final Rule: Risk-targeted Approach**	62.3 (46.1–81.6)	8.6 (1.9–23.0)	47.0	7.1	–39.9
Alternative 3: Multi-Barrier Approch	69.4 (51.0–90.6)	9.3 (2.1–24.8)	7.1	0.7	–6.4
Alternative 4: Across-the-Board Disinfection	665.3 (612.3–717.0)	31.5 (5.7–90.8)	595.9	22.2	–573.7

*Does not include significant nonquantified benefits. See GWR EA Section 5.4 (USEPA, 2006d).
**Benefits and costs are also not included for optional assessment source water monitoring.

Notes: The Traditional COI only includes valuation for medical costs and lost work time (including some portion of unpaid household production and caregiver time for sick children). The Enhanced COI also factors in valuations for lost personal time (non-worktime) such as child care and homemaking (to the extent not covered by the traditional COI), time with family, and recreation, and lost productivity at work on days when workers are ill but go to work anyway.

Source: Chapter 8 of the GWR EA (USEPA, 2006d). Ranges in parentheses are the 90 percent confidence bounds.

G. Are There Any Benefits From Simultaneous Reduction of Co-Occurring Contaminants?

As discussed in Section VII.B.2, the GWR is expected to reduce not only viral illnesses and deaths (the monetized rule benefit) but also bacterial illnesses and deaths. This rule is also expected to decrease the risk of outbreaks that would reduce illnesses and deaths and other outbreak-related costs. Additional health benefits of this rule include the reduction in illnesses and deaths associated with reduced incidence of upsets or failures among disinfecting supplies and reduced incidence of distribution system contamination among disinfecting and non-disinfecting systems. EPA anticipates reductions in disease incidence in these areas to result from the sanitary survey provisions and the treatment and monitoring provisions pertaining to disinfected supplies.

If a system chooses to install treatment, it may choose a technology that would also address other drinking water contaminants. If a system had an iron or manganese problem, for example, the addition of an oxidant and filtration could treat this problem as well as fecal contamination. Also, some membrane technologies installed to remove bacteria or viruses can reduce or eliminate many other drinking water contaminants, including arsenic. EPA recognizes that some systems will choose these more expensive treatment technologies. EPA has included them in the decision tree in the cost analysis, but no estimate of the additional benefit from reducing co-occurring contaminants has been made.

H. Is There Any Increase in Risk From Other Contaminants?

It is unlikely that the GWR will result in a significant increase in risk from other contaminants, although adding disinfection to currently non-disinfecting systems could result in some increased risk. When disinfection is first introduced into a previously undisinfected system, the disinfectant can react with pipe scale, causing increased risk from some contaminants and other water quality problems. Contaminants that could be released include lead, copper, and arsenic. It 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.

Using a chemical 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 recently published final *Stage 2* DBPR (USEPA, 2006g). In general, GWSs 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. For the most part, GWSs with high levels of TOC in their ground water source are located in States that already require GWSs to disinfect, therefore decreasing the chance that significant disinfection byproduct problems would result from this rule.

I. What Are the Effects of the Contaminant on the General Population and Groups Within the General Population That Are Identified as Likely To Be at Greater Risk of Adverse Health Effects?

EPA estimates that the average annual baseline illnesses and deaths associated with viruses in ground water are about 185,000 and 3, respectively (Table VII–4). The general population typically experiences GI illness when exposed to waterborne viral and bacterial pathogens, although other severe diseases such as kidney failure can also occur. Sensitive subpopulation exposure to these pathogens can result in more severe illness than in the general population, and sometimes death.

Examples of sensitive subpopulations include pregnant women, infants, elderly (over 65), cancer patients, and AIDS patients (Gerba *et al.*, 1996). Gerba estimates that these groups represent almost 20 percent of the U.S. population. The purpose of this section is to discuss the potential health effects associated with sensitive population groups, especially children, pregnant women, and the elderly.

1. Risk of Acute Viral Illness to Children and Pregnant Women

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 mellitis (CDC, 1997; Modlin, 1997; Melnick, 1996; Cherry, 1995; Berlin *et al.*, 1993; Smith, 1970; Dalldorf and Melnick, 1965). 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, 2000e).

a. *Children's Environmental Health.* To comply with Executive Order 13045, EPA calculated the baseline risk and reduction of risk from waterborne viral illness and death for children as a result of this rule. To address the disproportionate risk of waterborne viral illness and death affecting children, EPA used age-specific morbidity data in the risk assessment. The risk assessment first estimated the proportion of the population that falls into several age categories for which data are available for two model viruses: Type A (represented by rotavirus data) and Type B (represented by enterovirus or echovirus data).

While bacterial illnesses are not addressed in the quantified benefits analysis, EPA believes that the nonquantified benefits associated with consumption of undisinfected bacterially contaminated PWS well water could be significant in sensitive subpopulations. In an alternative analysis to the quantified benefits calculation, EPA estimated that roughly 16,805 bacterial illnesses and 11 bacterial deaths annually could be avoided in the general population. See Section 5.4.3 of the GWR EA for details of the analysis (USEPA, 2006d). Children and the elderly are particularly vulnerable to kidney failure (hemolytic uremic syndrome) caused by the 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).

Type A viruses of high infectivity (Type A, *e.g.*, rotavirus) disproportionately affect children less than three years of age. Thus, the age categories used in the hazard analysis were less than three years of age and greater than three years of age. Based on rotavirus data, it was assumed that 10 to

88 percent of children less than three years old would become ill once infected with high infectivity viruses and that 10 to 50 percent of the population over three years of age would become ill.

For viruses of low-to-medium infectivity (Type B, *e.g.*, echovirus), children are again disproportionately at risk of becoming ill once infected. For this virus type, the age categories used in the hazard analysis were less than five years of age, five to 19 years of age, and greater than 19 years of age. Based on echovirus data, EPA estimated that 50 to 78 percent of children less than five years old would become ill once infected with low-to-medium infectivity viruses, 12 to 57 percent of children five to 19 years of age and 12 to 33 percent of people over 19 years of age would become ill once infected.

In addition to illness, EPA also considered child mortality attributable to waterborne viral illness. For viruses of high infectivity (Type A), EPA estimates 0.00057 to 0.00073 percent of the ill population (including children) will die (Tucker *et al.*, 1998). This value, based on rotavirus data from children less than five years of age (20 deaths from 2,730,000 to 3,500,000 illnesses), was applied to individuals of all ages because data for older individuals are not available. For low-to-medium infectivity viruses (Type B), EPA estimates that 0.92 percent of children less than one month of age who become ill will die based on data from Jenista *et al.* (1984), Modlin (1986) and Kaplan *et al.* (1983). For those individuals greater than one month in age, 0.02 percent who become ill will die based on the EPA assumption that one percent of enterovirus illnesses are severe and two percent of severe illnesses result in death. The low-to-medium infectivity viruses result in a higher mortality rate than the high infectivity viruses because they can cause more serious health effects.

To estimate the benefits to children from this rule, the Agency calculated the number of endemic, acute viral illnesses and deaths avoided after rule implementation for children less than five years old and for children ages five through 15 years old. Table VII–13 shows the estimates for annual illnesses avoided in young children due to this rule. Overall, this rule will result in about 2,780 fewer endemic, acute viral illnesses per year caused by Type A (represented by rotavirus data) and Type B (represented by enterovirus or echovirus data) viruses and 0.06 deaths in children less than five years of age. For older children aged five to 15 years of age, this rule will result in 4,856 fewer acute illnesses per year (see Chapter 5 of the GWR EA (USEPA, 2006d)). In addition to endemic, acute viral illnesses avoided, EPA estimates that there will be fewer deaths (less than one death) in children of all ages.

Of the total annual avoided gastrointestinal illnesses predicted as the result of this rule, approximately 18 percent (7,636) of the mean annual illnesses avoided occur in children aged 15 years or younger. Children are disproportionately represented in the average annual number of illnesses avoided. Because children are often likely to be exposed via exposure pathways other than water in schools and day care centers (including fomites, respiratory, dermal, and person-to-person), the waterborne proportion probably does not dominate in total exposure but it may represent a significant fraction. More serious waterborne illnesses, such as hemolytic uremic syndrome (kidney failure), disproportionately affect children but this calculation only considers gastrointestinal illness.

TABLE VII–13.—ANNUAL VIRAL ILLNESSES AVOIDED BY THE GWR IN CHILDREN, THE ELDERLY, AND THE IMMUNOCOMPROMISED

Virus type	Health effect	Infants and young children <5 years old	Elderly adults >65 years old	Immunocompromised (all ages)	Total sensitive subgroups
Type A (Rotavirus)	Illness	2,588	Illness: 5,559	Illness: 126	Illness: 8,465.
	Death	0.02			
Type B (Enterovirus or Echovirus)	Illness	191	Deaths: 0.10	Deaths: 0.002	Deaths: 0.15.
	Death	0.04			

Note: Detail may not sum due to independent statistical analyses and rounding. The figures presented represent only the quantifiable benefits of the GWR. The nonquantified benefits are expected to comprise a significant portion of the overall benefits of the GWR and are presented in Section 5.4 of the GWR EA (USEPA, 2006d). The immunocompromised population includes bone marrow transplant recipients, AIDS patients, and organ transplant patients.

Source: Number of Illnesses Avoided, Deaths Avoided, and Annual Benefits from GWR Model Output.

2. Risk of Viral Illness to the Elderly and Immunocompromised

The elderly are particularly at risk from diarrheal diseases (Glass *et al.*, 2000), such as those associated with waterborne microbial pathogens. Fifty-three 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 GWS resulted in four deaths, all among the elderly. One death occurred from hemolytic uremic syndrome (kidney failure); the others from gastrointestinal illness. Table VII–13 shows that this rule's estimates for avoided viral illnesses and deaths per year in the elderly population (> 65 years old) are approximately 5,559 and 0.1, respectively.

Most epidemiological studies focus on nursing homes because the cluster of individuals improves data collection. Nursing home populations are typically, but not exclusively, elderly. Gerba *et al.* (1996) compiled data to show that, for the various waterborne microbial pathogens, nursing home mortality rates are significantly higher than in the general population. In Gideon, Missouri, a waterborne *Salmonella typhimurium* outbreak (Angulo *et al.*, 1997) resulted in seven deaths from gastrointestinal illness, all among nursing home residents.

Hospitalizations due to diarrheal disease are higher in the elderly (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).

For another significant sensitive subpopulation, the immunocompromised, Gerba *et al.* (1996) summarized 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. Table VII–13 shows that this rule's estimates for avoided illnesses and deaths in the immunocompromised groups (all ages) are approximately 126 and 0.002, respectively.

Overall, this rule will provide protection from waterborne viral and bacterial illness to both the general population and sensitive subpopulations. To capture the impact of the rule on both populations, the Agency considered the different severities of illness when valuing reductions in illness that will result from this rule.

J. What Are the Uncertainties in the Risk, Benefit, and Cost Estimates for the GWR?

Many uncertain values are used to derive estimates of baseline risk, risk reductions, and costs of this rule. Most, but not all, of these are mathematically modeled so that a ''realization'' is selected for them in each ''uncertainty iteration'' of EPA's probabilistic economic analysis. These uncertainties then propagate through the derivation of final estimates so the total uncertainty of those final estimates can be understood. Each of those uncertainties, or the assumption that is made by not modeling it mathematically, is summarized in Sections 5.6 (for benefits) and 6.7 (for costs) in the GWR EA (USEPA, 2006d) for its importance and tendency to contribute systematically to an over-or understatement of the final estimate. The paragraphs that follow discuss the most important of these uncertain quantities.

1. The Baseline Numbers of Ground Water Systems, Populations Served, and Associated Disinfection Practice

The baseline number of systems is uncertain because of data limitations in the Safe Drinking Water Information System (SDWIS). For example, some systems use both ground and surface water, but because of other regulatory requirements, they are labeled in SDWIS as surface water systems. In addition, the SDWIS data on NCWSs do not reflect a consistent reporting convention for population served. Some States may report the population served by TNCWSs over the course of a year, while others may report the population served on an average day. For example, a State park may report the population served yearly instead of daily. Thus, SDWIS data may, in some cases, overestimate the daily population served. Also, SDWIS does not require States to provide information on current disinfection practices, resulting in uncertainty in the percentage of disinfecting systems providing 4-log or greater virus treatment. Although these different factors influencing the baseline estimates are uncertain, EPA believes that their relative degree of uncertainty in influencing the estimates within the GWR EA is small compared to other uncertain components of the Economic Analysis, so these are not treated probabilistically in the analysis.

2. The Numbers of Wells Designated as More Versus Less Vulnerable

For the purposes of the GWR EA, contaminated wells are classified as more or less vulnerable, which determines the assumptions used for the concentrations of virus as discussed in Section VII.B.1.c of this preamble. The numbers of systems falling into these two categories is uncertain and is also modeled as an uncertain variable.

3. The Baseline Occurrence of Viruses and *E. coli* in Ground Water Wells

EPA's occurrence analysis is based on monitoring data from over 1,200 public drinking water supply wells that were tested for culturable virus, *E. coli,* or both. Compiled from 15 ground water surveys that were designed for different purposes, these wells are believed to be representative of ground water wells. Although the number of wells is large, the number of assays per well is small, and most wells were sampled only once for either virus or *E. coli.* Because of the limited amount of data, these data do not provide precise occurrence estimates. EPA's analysis recognizes the limitations of the data, producing a large ''uncertainty sample'' of estimates that are consistent with the data. This uncertainty sample is an input to the probabilistic economic analysis, where these uncertainties are combined with the uncertainties of other inputs to portray total uncertainty in the GWR cost and benefit estimates. EPA's occurrence model includes concentration differences between more and less vulnerable wells, but applies the same hit rate model to both types of wells. Also, because of data limitations, EPA was unable to make an assessment of aquifer sensitivity as part of the final rule and, therefore, no difference in hit rates or concentration levels between sensitive and nonsensitive wells is assumed. The GWR EA addresses uncertainty about these assumptions in a qualitative discussion (USEPA, 2006d).

4. For the Sanitary Survey Provisions, the Percentage of Systems Identified as Having Significant Deficiencies, the Percentage of These Deficiencies That Are Corrected, and State Costs for Conducting Surveys

For the sanitary survey provisions, EPA estimated the impacts associated with well deficiencies. EPA used data from the 1998 ASDWA survey to estimate the percentage of wells with deficiencies (ASDWA, 1997). To estimate benefits, EPA assumed that if a correction of a well defect occurred at a virally contaminated well, some, but not all of these virally contaminated wells would no longer have viral contamination. EPA used an uncertainty distribution for this estimate.

To estimate costs for significant deficiencies detected at or near the source, EPA chose two representative corrective actions to use in the cost model: replacement of a sanitary well seal or rehabilitation of an existing well. Because the corrections of significant deficiencies are dependent upon the deficiencies defined as significant by States and the conditions of specific systems, both of which are highly variable, EPA used a high and low scenario to bound the cost estimates. The low-cost scenario assumes a greater percentage of the systems with significant deficiencies will have deficiencies that are less expensive to correct (*e.g.*, more systems will have to replace their sanitary well seal than will have to perform a complete rehabilitation of their well). This high/low bounding provides an estimate of the uncertainty with respect to the percentages of each type of defect to be corrected.

While the sanitary survey provisions will also result in identification and correction for deficiencies associated with treatment or distribution system deficiencies, due to insufficient data, EPA did not quantify either costs or benefits for these types of deficiencies. In the GWR EA, EPA qualitatively discusses these impacts (USEPA, 2006d).

Finally, EPA assumes that most States are already conducting sanitary surveys that include the eight required elements, and that many States are already conducting sanitary surveys for GWSs that meet the frequency requirements in the GWR, so EPA estimated incremental costs for these activities in only a relatively small subset of States.

5. The Predicted Rates at Which Virally Contaminated (and Non-Contaminated) Wells Will Be Required To Take Action After Finding *E. coli* Ground Water Sources

EPA's occurrence model estimates the percentage of wells that have only virus present, both *E. coli* and virus present, or only *E. coli* present. The occurrence model also includes parameters that describe how often contaminated wells actually have the contaminant present. For example, some contaminated wells have *E. coli* present less than one percent of the time, while others have *E. coli* present more than 10 percent of the time (some of which will also have sometime viral presence). When *E. coli*-contaminated wells are tested for the first time, those with frequent *E. coli* occurrence are the most likely to be identified as contaminated. As these problems are addressed and corrected, there should be fewer and fewer wells with frequent *E. coli* occurrence (as well as viral occurrence since a fraction of *E. coli* wells will also have sometime viral presence; see Section III.C.2 for further elaboration). This diminishing rate of fecal contamination identification is included in the GWR EA (USEPA, 2006d). Uncertainty about the diminishing rate is due to uncertainty about the EPA's estimates of how often *E. coli* occurs in contaminated wells. As with other key uncertain inputs, this uncertainty is represented by an uncertainty sample of the relevant parameters. Again, EPA assumes no difference based on vulnerability or sensitivity. The GWR EA qualitatively discusses uncertainty of this assumption (USEPA, 2006d).

Undisinfected wells are subjected to triggered source water monitoring. The rate at which triggered source water monitoring identifies a well as fecally-contaminated depends on both the fraction of time that *E. coli* is present in the well and the frequency at which the well is sampled. Data verification (DV) data on total coliform occurrence in distribution systems provide the basis for estimates of sampling frequency in different types and sizes of systems. Although the data are limited, EPA has not modeled these as uncertain estimates. Compared to other uncertain parameters, these have relatively little uncertainty and are expected to make only minor contributions to the total uncertainty in the GWR EA.

EPA also did not consider the cost impacts of additional fecal indicator sampling following triggered source water monitoring on corrective action costs. The analysis assumes that for every triggered source water monitoring positive, at least one additional fecal indicator sample will also be positive, resulting in corrective action. The rationale for this assumption is explained in Chapter 6 of the GWR EA. However, it is possible that some systems will not have a positive additional fecal indicator sample and will therefore not incur costs for corrective action. Accounting for this would reduce the costs of the rule associated with corrective actions and, to the extent that these systems actually do have viral or bacterial pathogens present, would reduce the benefits of the rule as well.

EPA assumes that the occurrence of fecal contamination will remain constant throughout the implementation of the rule. However, this might not be the case if increased development results in fecal contamination of a larger number of aquifers in areas served by GWSs or if other rules, such as Concentrated Animal Feeding Operations (CAFO) and Class V Underground Injections Control (UIC) Well regulations, result in decreased fecal contamination. This uncertainty is not mathematically modeled in the GWR Economic Analysis.

6. The Infectivity of Echovirus and Rotavirus Used To Represent Viruses That Occur in Ground Water

EPA does not have dose-response data for all viruses associated with previous ground water disease outbreaks. For viral illness, the Agency used echovirus and rotavirus as surrogates for all pathogenic viruses from fecal contamination that can be found in ground water. By using these two viruses, the Agency is capturing the effects of both high infectivity (Type A) viruses that cause mild illness and low-to-medium infectivity (Type B) viruses that may cause more severe illness but not the range of infectivity within each type. Further, there is additional uncertainty in the dose-response functions used, even for these two viruses. The dose-response relationship was modeled in two steps. First, infectivity, or the percentage of people in the different age groups who become infected after exposure to a given quantity of water with a given concentration of viruses, was estimated. Then morbidity, or the percentage of infected people who actually become ill, was estimated. EPA models uncertainty for morbidity within different age categories and differences in morbidity across different age categories (variability).

7. The Costs of Illnesses Due to Ingestion of Contaminated Ground Water

There is also uncertainty in the valuation of risk reduction benefits. For this analysis, EPA used a cost of illness (COI) approach based on the direct medical care costs as well as the indirect costs of becoming ill. However, there is uncertainty in these estimates and variability in the COI across populations and geographic regions.

8. The Costs of Taking Action After Finding *E. coli* in Ground Water Sources

EPA recognizes that there are both variability and uncertainty in unit cost estimates for treatment. Variability is expected in the actual costs that will be experienced by different water systems with similar flows installing the same treatment technology. Otherwise similar systems may experience different capital and/or O&M costs due to site-specific factors. Inputs to unit costs such as water quality conditions, labor rates, and land costs can be highly variable and increase the system-to-system variability in unit costs. In developing the unit cost estimates, there is insufficient information to fully characterize what the distribution of this variability will be on a national scale for all of the treatments and all possible conditions.

The unit costs for the GWR EA are developed as average or representative estimates of what these unit costs will be nationally. That is, in developing unit costs, design criteria for the technologies were selected to represent typical, or average, conditions for the universe of systems. As a result, there is uncertainty inherent in these unit cost estimates since they are based on independent assumptions with supporting data and vendor quotes, where available, rather than on a detailed aggregation of State, regional, or local estimates based on actual field conditions. EPA quantifies the uncertainty in these national average unit cost factors for specific technologies. The percentage uncertainty bounds used to characterize unit costs were developed based on input from engineering professionals and reflect recommendations from the National Drinking Water Advisory Council (NDWAC, 2001) in its review of the national cost estimation methodology for the Arsenic Rule. EPA believes that the uncertainties in capital and O&M costs for a given treatment technology are independent of one another and that uncertainties across all technologies are independent.

9. Nonquantifiable Benefits

A major uncertainty concerns the number of baseline bacterial illnesses caused by ground water contamination. The bacterial risk could not be modeled because of the lack of occurrence and dose-response data; therefore, the Agency was unable to include these benefits in the primary analysis. Many other nonquantifiable endpoints (as discussed in Section VII.C.4 of this preamble and in the GWR EA Chapter 5 (USEPA, 2006d) cause further uncertainty. In summary, the quantified benefits may be small as compared with the total benefits. EPA's analysis of benefits from avoided bacterial illnesses and deaths suggests that these benefits could exceed the monetized benefits by a factor of five.

10. Optional Assessment Source Water Monitoring

The Agency was not able to estimate the benefits or costs resulting from the optional assessment source water monitoring program. States can determine which systems they deem most vulnerable to fecal contamination and require these systems to conduct assessment source water monitoring. Systems would incur additional costs from monitoring and reporting results as well as any corrective action associated with fecal indicator-positives. States would incur additional costs for determining what systems would be required to monitor, assisting systems with corrective action decisions, and recordkeeping. The types of illnesses avoided would be similar to those already described in this preamble such as reduced viral and bacterial illness.

11. Corrective Actions and Significant Deficiencies

The Agency also did not develop costs for corrective actions for all conceivable significant deficiencies that a system may encounter. Instead, representative actions that span the range of low cost to expensive actions were used as shown in Table VII–10. The corrective actions that are a result of significant deficiencies identified during sanitary surveys do not include the ones performed within the treatment plant or in the distribution system due to lack of adequate data. Exclusion of these costs from the cost analysis results in an underestimate of potential rule costs, though the magnitude of the underestimate is unknown. Data limitations also exclude quantifying any benefits that may be realized from these corrective actions. More information regarding these costs and benefits can be found in the GWR EA (USEPA, 2006d) (see Chapter 6.6 for cost and Chapter 5.4.7 and 5.4.8 for benefits).

12. Uncertainty Summary

Overall, EPA recognizes that there is uncertainty in various parts of its estimates. The Agency has, however, been careful to use the best available data to account for uncertainty quantitatively when possible, and to avoid any consistent biases in assumptions and the use of data. The primary known bias is that some benefits and costs have not been quantified, and therefore are not included in the quantitative comparison of regulatory alternatives. However, as explained above and in the EA, EPA believes that the nonquantified benefits are significantly greater than the quantified benefits. In summary, EPA believes that the analyses presented represent a solid foundation for the decisions made for this rule.

K. What Is the Benefit/Cost Determination for the GWR?

As required by the SDWA, at the time of proposal, the Agency determined that the benefits of this rule justify the costs. In making this determination, EPA considered both 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.

For the final rule, as shown in Table VII–14, for the regulatory alternative being finalized in this rule, the annualized mean quantified benefits are approximately $20 million ($10 million using traditional cost-of-illness values) and the annualized mean quantified costs are approximately $62 million using a three percent discount rate ($17/$9 million and $62 million, respectively, using a seven percent discount rate). Overall, the GWR will reduce the risk of fecal contamination reaching the consumer. The monetized costs of these provisions were compared to the monetized benefits that result from the reduction in some viral illnesses and deaths. In addition, other non-monetized benefits further justify the costs of this rule. For example, including bacterial illness would significantly increase the benefits without any increases in costs.

Table VII–15 shows the net benefits for this rule as well as the three regulatory alternatives considered. The net benefits include only the monetized values (*i.e.*, nonquantified costs and benefits are not considered). The nonquantified benefits are likely to be significantly greater than the quantified benefits (and also much greater that the nonquantified costs). Thus, the net benefits of each of the options may be higher than shown in these estimates. Nonquantified costs are also not included.

TABLE VII–14.—ESTIMATED ANNUALIZED NATIONAL BENEFITS AND COSTS FOR THE GWR

[$Millions, 2003$]

	3% Discount rate			7% Discount rate		
	Mean	90 percent confidence bound		Mean	90 percent confidence bound	
		Lower (5th %ile)	Upper (95th %ile)		Lower (5th %ile)	Upper (95th %ile)
Enhanced COI:						
Benefits	$19.7	$6.5	$45.4	$16.8	$5.5	$38.6
Costs	61.8	45.2	81.4	62.3	46.1	81.6
Net Benefits	−42.1	Note 1	Note 1	−45.5	Note 1	Note 1
Traditional COI:						
Benefits	10.0	2.2	27.0	8.6	1.9	22.9
Costs	61.8	45.2	81.4	62.3	46.1	81.6
Net Benefits	−51.8	Note 1	Note 1	−53.7	Note 1	Note 1
Nonquantified Benefits	Decreased incidence of other acute viral disease endpoints. Decreased incidence of bacterial illness and death. Decreased incidence of chronic bacterial or viral illness sequellae.					

TABLE VII–14.—ESTIMATED ANNUALIZED NATIONAL BENEFITS AND COSTS FOR THE GWR—Continued

[$Millions, 2003$]

	3% Discount rate			7% Discount rate		
	Mean	90 percent confidence bound		Mean	90 percent confidence bound	
		Lower (5th %ile)	Upper (95th %ile)		Lower (5th %ile)	Upper (95th %ile)
	Decreased incidence of waterborne disease outbreaks and epidemic illness. Decreased illness through minimizing treatment failures or fewer episodes with inadequate treatment. Potential decreased use of bottled water and point-of-use devices (material costs). Decreased time spent on averting behavior. Avoided costs associated with outbreak response. Perceived improvement in drinking water quality and reduction in risk associated with ingestion. Benefits from optional Assessment Source Water Monitoring. Benefits from correction of sanitary survey deficiencies identified in the distribution systems and treatment plant.					
Nonquantified Costs	Costs for optional Assessment Source Water Monitoring. Costs from correction of sanitary survey deficiencies identified in the distribution systems and treatment plant. Some land costs depending on the treatment technology. Cost for five additional samples but this is small compared to the overestimate of cost for the initial fecal-indicator sample that systems would take. Costs for compliance monitoring at some systems that already disinfect.					

Note 1: Because benefits and costs are calculated using different model modules, bounds are not calculated on net benefits.

Note 2: The Traditional COI only includes valuation for medical costs and lost work time (including some portion of unpaid household production). The Enhanced COI also factors in valuations for lost personal time (non-worktime) such as child care and homemaking (to the extent not covered by the traditional COI), time with family, and recreation, and lost productivity at work on days when workers are ill but go to work anyway.

TABLE VII–15.—ANNUALIZED NET BENEFITS ($MILLIONS, 2003$) BY REGULATORY ALTERNATIVE

Rule alternative	Annualized value	
	3% discount rate (dollars)	7% discount rate (dollars)
Enhanced COI:		
Alternative 1	−11.7	−12.4
Final Rule	−42.1	−45.5
Alternative 3	−46.6	−51.2
Alternative 4	−616.2	−603.4
Traditional COI:		
Alternative 1	−13.5	−13.8
Final Rule	−51.8	−53.7
Alternative 3	−57.1	−60.1
Alternative 4	−650.9	−633.8
Nonquantified Benefits	Decreased incidence of other acute viral disease endpoints. Decreased incidence of bacterial illness and death. Decreased incidence of chronic bacterial or viral illness sequellae. Decreased incidence of waterborne disease outbreaks and epidemic illness. Decreased illness through minimizing treatment failures or fewer episodes with inadequate treatment. Potential decreased use of bottled water and point-of-use devices (material costs). Decreased time spent on averting behavior. Avoided costs associated with outbreak response. Perceived improvement in drinking water quality and reduction in risk associated with ingestion. Benefits from optional Assessment Source Water Monitoring. Benefits from correction of sanitary survey deficiencies identified in the distribution systems and treatment plant.	
Nonquantified Costs	Costs for optional Assessment Source Water Monitoring. Costs from correction of sanitary survey deficiencies identified in the distribution systems and treatment plant. Some land costs depending on the treatment technology. Cost for five additional samples but this is small compared to the overestimate of cost for the initial fecal-indicator sample that systems would take. Cost for compliance monitoring at some systems that already disinfect.	

In addition to examining the net benefits of this rule, the Agency used several other techniques to compare benefits and costs. For example, Table VII–16 shows the cost of the rule per viral illness avoided. This cost effectiveness measure is another way of examining the benefits and costs of the rule but should not be used to compare alternatives because an alternative with the lowest cost per illness avoided may not result in the greatest net benefits. The cost effectiveness analysis, as with the net benefits, is limited because the Agency was able to only partially quantify and monetize the benefits of the GWR. This rule achieves the lowest cost per viral illness avoided. Additional information about this analysis and other methods used to compare benefits and costs can be found in Chapter 8 of the GWR EA (USEPA, 2006d).

TABLE VII–16.—COST PER CASE OF VIRAL ILLNESS OR DEATH AVOIDED BY REGULATORY ALTERNATIVE

[2003$]

Rule alternative	Cost per viral illness avoided	
	3% (dollars)	7% (dollars)
Alternative 1	2,045	2,044
Final Rule	1,476	1,488
Alternative 3	1,495	1,527
Alternative 4	4,420	4,284

Note: Calculated using mean costs of illness avoided.

Overall, the measures described above are very close for the Final Rule and Alternative 3 and EPA believes that the nonquantified benefits of the rule would result in positive net benefits for either option. The Final Rule allows States to implement the assessment source water monitoring provision, which would have been mandatory if EPA had chosen Alternative 3, on a voluntary basis. The final GWR is more flexible, targeted, and protective than Alternative 3 (see Section VII.A of this preamble and Chapter 8 of the GWR EA (USEPA, 2006d) for more details). The level at which additional costs will be incurred and benefits realized under the voluntary provision is dependent on the rate at which States elect to adopt the provisions, and thus is not quantified as part of the Economic Analysis.

L. What Were Some of the Major Comments Received on the Economic Analysis and What Are EPA's Responses?

1. Costs

EPA requested comment on all aspects of cost analysis for the proposed GWR, particularly on the flow estimate for NTNCWSs and TNCWSs and handling mixed systems. In addition to these two issues, EPA also received numerous comments on the following analyses: sanitary survey costs, estimate of treatment baseline, costs of corrective actions, and compliance costs for small systems or NCWSs.

a. *Flow estimate for NTNCWSs and TNCWSs.* EPA received a few comments on NTNCWS and TNCWS flow estimates. Some commenters indicated that the alternative approach described in the preamble of the proposed rule would lead to greater disparities from the true values. The other commenters supported using the alternative approach. For this rule, EPA continues to apply the CWS regression equations to NCWSs, recognizing that this may overestimate flow and, therefore, costs. This overestimate is addressed as part of the uncertainties, which is discussed in Chapter 4 of the GWR EA (USEPA, 2006d). Further discussion of the alternative approach is also presented there.

b. *Mixed systems.* EPA received comments that regulatory impacts on mixed systems were not adequately characterized because either their costs were underestimated or the methodology for deriving the costs was unclear. Since the available data was insufficient to directly account for ground water entry points in mixed systems, EPA based the cost estimate for mixed systems on the primarily ground water mixed system inventory report. Primarily ground water mixed systems are systems using ground water for more than 50 percent of their source water; the remainder of their source water is surface water. The primarily ground water-mixed CWSs identified by this calculation were added to the solely GWS inventory to produce the total baseline number of GWSs used in the economic analysis. Because NTNCWSs and TNCWSs are typically a single building or located in a small area, a simplifying assumption was made for this analysis that all NCWSs draw from a single source water type.

The total baseline number of GWSs is treated as ground water-only systems throughout subsequent analyses. This methodology, treating mixed systems as ground water-only systems, may overestimate costs and benefits (*i.e.*, some surface water entry points are now counted as ground water entry points). However, the ground water entry points in the excluded mixed surface water inventory (those mixed systems using less than 50 percent ground water) are not included in the analysis, potentially underestimating costs and benefits. The contrasting over- and under-accounting for ground water entry points are expected to offset one another to some extent in the cost and benefit analyses. Data are not available to quantify the direction or magnitude of the final effect on overall national cost estimates, but the effect is expected to be small. Chapter 4 of the GWR EA (USEPA, 2006d) contains a detailed description of the methodology for impact analysis of mixed systems.

c. *Sanitary survey costs.* EPA received comments that the sanitary survey costs were inadequately estimated because of lack of considerations of the surveys currently performed by States and travel times needed for conducting surveys. The sanitary survey cost estimates used in this rule analysis have been updated based on data that became available after the proposed GWR. For the proposed GWR, EPA used the same unit costs as the ones used in a previous economic analysis (IESWTR) for estimating costs of full sanitary surveys. Fifty percent of full survey costs was applied to all systems as the incremental costs resulting from the GWR sanitary survey provision. This percentage was used to account for the more comprehensive survey coverage (*i.e.*, evaluation of eight elements) under the GWR than under existing requirements of the TCR.

For the final rule, EPA revised its cost analysis for conducting sanitary surveys

based on new information from States. First, EPA revised its estimates for conducting full sanitary surveys specifically for GWSs with and without treatment. Second, EPA estimated the number of additional full sanitary costs (including travel time costs) that would result from the higher frequency of sanitary surveys required under the GWR, over the number that is currently being implemented. This number of additional sanitary surveys was multiplied by the sanitary survey unit costs to estimate national costs for this effect.

Third, for those sanitary surveys already being conducted, EPA estimated the percentage of systems for which sanitary surveys would need to be increased in scope to ensure that all 8 elements were being implemented. Because all States currently have sanitary surveys in place under the IESWTR, TCR, or other State programs, most States are now conducting sanitary surveys at the frequencies and scope required by the GWR. The revised sanitary survey costs thus assume no incremental unit costs in most States and are substantially lower than the estimates costed for the proposed GWR. Chapter 6 of the GWR EA (USEPA, 2006d) contains a detailed discussion of sanitary survey costing assumptions.

d. *Treatment baseline.* EPA received comments that the percentage of disinfecting systems currently achieving 4-log virus inactivation was overestimated. For the proposed rule, EPA based the estimate of systems achieving 4-log inactivation (77 percent) on the data from the AWWA disinfection survey for community GWSs. EPA recognizes the limited data resources; AWWA data was the only source available on a national level and the disinfection rate estimate used in the proposed rule is likely to bias high due to relatively small sample size and question complexity for the survey.

In the final GWR EA, EPA re-evaluated the AWWA data and made a conservative assumption that those community GWSs providing insufficient information for the CT calculation in the AWWA survey are not currently achieving 4-log virus inactivation. As a result, the 4-log disinfection rate was revised downward to 52 percent. A similar change was made for NCWSs. Chapter 4 of the GWR EA (USEPA, 2006d) provides the detailed discussion of current disinfection rates.

e. *Corrective action costs.* EPA received comments that corrective action costs were underestimated, especially the costs for installing disinfection units. The commenters questioned the cost estimates of the additional land required and the addition of storage tanks for achieving sufficient CT values for 4-log virus inactivation. EPA believes that the unit costs of technologies provided in the *Technology and Cost Document for the Final Ground Water Rule* (USEPA, 2006h) (T&C document) are adequate to derive the costs for complying with the GWR corrective action provisions because the costs were derived using the best available published data, vendor estimates and best professional judgment.

EPA understands that some technologies used to comply with this rule will not fit within the existing plant footprints for some systems. When land costs become expensive, systems have the flexibility to consider other non-treatment options such as well rehabilitation or purchasing water. EPA further recognizes the land costs as part of nonquantified costs in the GWR EA (USEPA, 2006d).

The T&C document presents the unit costs of disinfection apart from the unit costs for storage tanks because consultation with the field experts indicates that some systems have existing storage tanks or certain lengths of pipes before the first costumers. Systems that do not have existing storage tanks will need to consider the costs for them in cases when they would need to meet the CT values for 4-log inactivation of viruses. The detention times in existing facilities could be sufficient for achieving the 4-log CT values with disinfectant doses within a typical range. For these cases, EPA assumes that no additional storage will be required for installing disinfection or that an increase of disinfectant doses will be feasible for increasing viral disinfection levels to 4-logs.

EPA also recognizes that disinfection and conducting compliance monitoring may not be preferred by some systems (particularly for small systems) because of distribution system size and configuration or operational complexity (including compliance monitoring) and costs. After further consultation with State representatives, EPA revised the compliance forecasts for this rule by lowering the percentages of systems taking treatment actions (and raising percentages of systems taking non-treatment actions) and adding a range of estimates to quantify the uncertainty around the compliance forecasts. The consultation also resulted in the addition of interim disinfection for systems taking corrective actions due to a fecal indicator-positive ground water source sample. This is because some immediate protection measures may have to be in place prior to completing corrective actions. Chapter 6 of the GWR EA (USEPA, 2006d) contains a detailed discussion of the corrective action costs.

f. *Compliance costs for small systems or NCWSs.* Some commenters questioned whether EPA appropriately considered the costs to small systems. As part of the GWR regulatory development process, EPA participated in extensive consultations with small system representatives to develop risk-based rule requirements that would minimize the time and financial burden on small systems. To address concerns over the potential cost of additional monitoring for small systems, the GWR leverages the existing TCR monitoring framework to the extent possible (*e.g.*, by using the results of the TCR monitoring to determine if triggered source water monitoring is required and by allowing small systems to use TCR repeat samples to satisfy GWR requirements). In addition, the implementation schedule for the sanitary survey requirement is staggered (*e.g.*, every three to five years for CWSs and every five years for NCWSs), providing some relief for small systems since there are many more small NCWSs than CWSs. In addition to the targeted requirements for minimizing small systems burden, financial assistance to small systems may be available from programs administered by EPA or other Federal agencies (*http://www.epa.gov/safewater/dwsrf/index.html*).

Some commenters noted that systems may break into smaller units to fall below SDWA regulatory thresholds. Specifically, they noted that if a system is no longer classified as a PWS, it would be able to opt out of the GWR requirements. However, EPA believes that systems would most likely consolidate with other systems to defray costs rather than split up and lose economies of scale and put the public health at risk. Systems would also have to consider the transaction costs associated with dissolving into smaller units such as drilling new wells and separating distribution systems.

EPA also received a number of comments questioning if the Agency considered the costs to NCWSs (*i.e.*, NTNCWSs and TNCWSs). EPA did consider the costs to NTNCWSs and TNCWSs. The baseline number of systems subject to GWR requirements was derived from all CWSs, NTNCWSs, and TNCWSs listed in the SDWIS inventory. The new occurrence database also includes NCWSs. Costs were estimated by system size and type corresponding to applicable GWR requirements and schedules and typical operating characteristics (*e.g.*, population served, treatment in place,

flows, etc.). Detailed descriptions of all costing procedures are presented in the GWR EA (USEPA, 2006d). More specifically, NTNCWS and TNCWS cost estimates are presented by system size in Exhibit 6.40 of the GWR EA.

2. Benefits

a. *Use of occurrence data in risk assessment.* Some commenters questioned the basis for EPA using the data from the Lieberman *et al.* (2002) and Abbaszadegan (Abbaszadegan, 2002 and Abbaszadegan *et al.*, 1999a–c and 2003) studies to represent national microbial occurrence in the risk assessment. Issues raised included use of the studies to represent all CWSs and NCWSs on a national level, use of the Abbaszadegan *et al.* data set to represent ''properly constructed wells,'' and use of the Lieberman data set to represent ''poorly constructed wells.''

Upon re-examination of all available occurrence data, EPA has made several changes to the occurrence analysis used to support the risk assessment. The Agency has made changes to achieve better representation of viral and fecal indicator occurrence among all PWS wells in the U.S. as described in Section VII.B.

Data from all the studies used in the occurrence analysis of the GWR EA were cited in the NODA (USEPA, 2006e) and made publicly available. EPA believes that use of occurrence data from the cited studies in Section VII.A rather than using only the two studies used in the GWR EA under the proposal (Lieberman *et al.*, 2002; Abbaszadegan, 2002 and Abbaszadegan *et al.*, 1999a–c and 2003) provides a better national estimate of intermittent enterovirus occurrence in support of the GWR risk assessment.

Under the proposed rule, EPA used the Lieberman *et al.* (2002) data set to estimate enteric virus occurrence for poorly constructed wells and the Abbaszadegan (Abbaszadegan, 2002; Abbaszadegan *et al.*, 1999a–c and 2003) data set to estimate enteric virus occurrence in properly constructed wells. In this rule, due to data limitations, EPA assumes the same enterovirus occurrence and percent time of viral presence (as described in Section VII.B of this preamble) for all wells.

In this rule, EPA uses the terminology ''more vulnerable'' and ''less vulnerable'' wells as categories for differing enteric virus concentration assumptions in differing groups of wells. Since the wells sampled from the Lieberman *et al.* (2002) data were selected because of likely vulnerability to fecal contamination, the enteric virus concentration data from Lieberman *et al.* (2002) is assumed to be characteristic of ''more vulnerable'' wells. Since the wells from the Abbaszadegan *et al.* (2002) and Lindsey *et al.* (2002) studies were not selected with a bias toward greater likelihood of fecal contamination, enteric viral concentrations from these two studies were assumed to be characteristic of ''less vulnerable'' wells. A more complete description of this analysis is available in Chapters 4 and 5 of the GWR EA (USEPA, 2006d).

b. *Variability and uncertainty.* Some commenters suggested that EPA could do more to address uncertainty and variability when calculating the benefits of this rule. As a result of these comments, EPA re-evaluated the data used to support the proposed GWR and the newer data published since the proposal. EPA determined that the values and/or analysis used in the proposed rule should be revised to better capture variability and uncertainty. The following discussion describes the significant changes that were made in the analysis supporting this rule as a result of the public comments and EPA's re-analysis.

EPA has significantly revised its modeling of virus and indicator (*E. coli*) occurrence in ground water sources of drinking water in response to public comments. Section VII.B describes additional surveys and their use to produce a national assessment of occurrence. The modeling framework features probabilistic treatments of both variability and uncertainty.

In this rule, EPA modified the mathematical expression that describes the human challenge studies with infectious rotavirus (infectivity of the virus). The purpose of the challenge study was to determine the rotavirus dose required to cause infection in humans. Previously, EPA used an approximation to the exact Beta-Poisson distribution in describing the dose-response data to simplify the Monte-Carlo simulation computational requirements. EPA's primary analysis now recognizes that the approximation is poor for some combinations of dose and parameter values and when used to predict low dose risk. As a result, EPA is using the exact expression for this rule. In an alternative analysis, EPA utilizes only data from the lowest dose used in the study. That dose (0.9 infectious units) is nearest the most relevant environmental number ingested: exactly one infectious unit. An exponential dose-response model is applied in the alternative analysis and the small number of subjects (seven exposed at this dose) results in considerable uncertainty about the model parameter.

In this rule, EPA maintains as its primary analysis a Beta-Poisson dose-response model (Pareto approximation) utilizing the full echovirus data set but now includes an alternative analysis in which an exponential model is utilized with data from all but the two highest dose levels. Subjects who were not infected at the high dose levels demonstrate that different individuals have different levels of susceptibility (a feature of the Beta-Poisson model), but without the high dose data, the remaining subjects appear equally susceptible (a feature of the exponential model). The alternative analysis predicts significantly lower risk at environmental exposure levels. EPA's two analyses demonstrate considerable uncertainty with respect to model and data selection.

In this rule, EPA revised the morbidity value for rotavirus illness in adults. The Agency now recognizes that the variability in this value is considerable and has included a range of uncertainty in the morbidity estimate. Because of limited data on common source rotavirus outbreaks involving adults, under the proposal, EPA had assumed that most adults remain immune due to multiple repeat infections, or if infected, do not often become ill. Under the proposal, EPA used a low value for the adult rotavirus morbidity rate (0.10). However, EPA re-examined the Ward *et al.* (1986) data and concluded that one-half of the subjects in the dose-response study became ill after infection. Also, since the proposal, Griffin *et al.* (2002) analyzed previous outbreaks and identified one rotavirus genotype that is associated with outbreaks involving adults in the U.S. This new knowledge suggests that the morbidity value for adults can be much more variable than previously believed depending on which rotavirus genotype is consumed. EPA now uses a range in the rotavirus adult morbidity value from 0.10–0.50 and a uniform distribution. The distribution selected reflects the variability among rotavirus genotypes.

EPA obtained additional echovirus (Type B) morbidity data to improve the analysis described in the proposal. The proposal used only Echovirus type 30 morbidity data from the Seattle Virus Watch Study (Hall *et al.*, 1970) based on the assumption that data from a single strain would minimize variability among the general population. In this rule, EPA uses multiple echovirus serotype data from both the Seattle and New York Virus Watch Studies (Kogon *et al.*, 1969) to determine the range of

morbidity rates in the general population.

c. *Are the benefits and the data used to estimate the benefits of the GWR sufficient to justify regulatory action?* EPA received several comments that addressed the calculation of benefits. Most commenters questioned whether the GWR benefits are sufficient to justify regulatory action. In particular, comments suggested that the probability of an outbreak is low and there is no linkage between undisinfected ground water and waterborne disease. EPA also received several comments about the overall lack of information suitable for estimating health benefits.

In general, EPA recognizes that the health effects data available for use in calculating GWR benefits are limited because there are no national epidemiological studies to identify waterborne disease from ground water nor is there any national system for reporting waterborne disease once it is identified.

EPA has substantially revised its benefits analysis to use a combination of measured data, calculated values, and reasonable assumptions to make predictions about benefits. The benefits determined for the GWR are based on measurement of pathogenic enteric viruses in public drinking water wells, so these data are directly applicable to making predictions about possible avoided illnesses due to elimination of these pathogens from the drinking water supply. Furthermore, it should be recognized that, in the benefits calculation, EPA does not assume that pathogen occurrence automatically results in illness in all individuals consuming water from that drinking water supply well. EPA used dose-response data from human feeding studies to determine the probability that an individual would become infected by consuming water with a range of pathogen concentrations. For echovirus (one of the enteroviruses), illness rates and ranges were determined from epidemiology studies on the general population. For rotavirus, illness rates and ranges were determined from epidemiology studies on the general population and from the symptomatic response to infection in human challenge studies.

d. *Transparency of regulatory impact analysis.* Some commenters expressed that the Regulatory Impact Analysis for the proposed GWR (USEPA, 2000f) did not provide a clear description of the critical assumptions underlying the cost and benefit analysis.

EPA believes that it has made the GWR EA for the final rule more transparent than the analysis done for the proposal. Changes include (1) Expanded text on the basis for most of the assumptions used in the analysis, (2) expanded text and new diagrams describing how the different steps in the analysis are combined to produce an aggregate analysis, and (3) expanded text on how the nonquantified benefits complement the quantified benefits analysis.

3. Risk Management

a. *What is EPA's response to comments that EPA chose the wrong option and that the benefits do not justify the cost or that the rule is not cost-effective?* Consistent with EPA's statutory requirements, the Agency carefully considered benefits and costs in proposing and promulgating the GWR. The Agency's decision for the final rule is described in VII.A. The Agency believes that this rule provides benefits at a cost that is justified. In making decisions for the final rule, EPA considered both quantified and nonquantified benefits and costs as well as the other components of the Health Risk Reduction and Cost Analysis (HRRCA) outlined in section 1412(b)(3)(C) of the SDWA.

In the proposal, the Multi-Barrier approach (Regulatory Alternative 3) had net benefits similar to the proposed regulatory Alternative 2, Sanitary Survey and Triggered Monitoring. However, the Multi-Barrier approach provided a greater reduction in illnesses and deaths, especially to children. After an exhaustive review of the benefits and cost estimates used in the proposal resulting from public comments, peer review, and the NDWAC Arsenic Review panel, the Agency updated both the benefit and cost analysis for each rule option. The risk-targeted approach, which was selected for the final rule, has lower net benefits than Alternative 1, but more than Alternatives 3 and 4. EPA believes that the additional benefits realized under Alternative 2 justify its selection over Alternative 1, despite the lower net benefits.

Other commenters noted that the proposed rule is not cost-effective. The mean cost per viral illness avoided for the final rule ranges from $1,476 to $1,488, at three percent and seven percent discount rates respectively. These represent the lowest values of all alternatives considered and are much lower than either Alternative 1 or Alternative 4. Thus, Alternative 2 is the most cost-effective rule alternative by this measure.

b. *Did the Agency consider that some systems may have negative net benefits, and did the Agency conduct an incremental analysis by system size and type?* Some commenters noted that the costs may exceed benefits for smaller size systems. EPA agrees that for some drinking water regulations the costs may exceed the benefits because the populations served by these systems are much smaller. Generally, large systems benefit from economies of scale which eases the relative impact on these systems. In addition, many GWR benefits remain nonquantified.

Other commenters suggested that EPA should exclude or set different standards for small systems based on benefit and cost analysis, including incremental analysis, by system size or type. However, the SDWA does not generally provide a basis for establishing tailored drinking water standards as these commenters suggest. Rather, the SDWA is designed to ensure uniform levels of public health protection across the country (except as specifically provided for in variances from the standard).

Thus EPA disagrees with the suggestion that the level of the final standard be altered to address system size or type. However, as discussed in detail in the preamble of this rule, the rule provides flexibility that reduces burden on small systems and reflects individual system conditions. Financial and technical assistance is also available through various funding authorities. Regarding affordability, variances based on affordability are not allowed by the SDWA for regulations addressing microbial contamination, and as a result EPA did not conduct an affordability analysis. However, EPA has considered the SAB review of the Arsenic Rule and the suggestions of the NDWAC Arsenic Cost Working Group regarding the further disaggregation of the analyses. The NDWAC group recommended calculation and presentation of cost information in multiple size categories, which is done in the GWR EA (USEPA, 2006d).

In addition, the Agency took many steps to reduce the burden on small systems where possible. More information regarding this effort can be found in Chapter 6 of the GWR EA (USEPA, 2006d).

VIII. Statutory and Executive Order Reviews

A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 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 EO 12866 and any changes made in

response to OMB recommendations have been documented in the docket for this action.

In addition, EPA has prepared an analysis of the potential costs and benefits associated with this action. This analysis is contained in the *Economic Analysis for the Final Ground Water Rule* (USEPA, 2006d). A copy of the analysis is available in the docket for this action and the analysis is briefly summarized in Section VII of this preamble.

B. Paperwork Reduction Act

The Office of Management and Budget (OMB) has approved the information collection requirements contained in this rule under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control number 2040–0271.

The information collected as a result of this rule will allow the States and EPA to make decisions and evaluate compliance with the rule. For the first three years after the promulgation of the GWR, the major information requirements are for States and PWSs to prepare for implementation of the rule. The information collection requirements are described in 40 CFR part 141, for systems, and part 142, for States, and are mandatory. The information collected is not confidential.

EPA estimates that the annual burden on PWSs and States for reporting and recordkeeping will be 385,264 hours. This annual burden is based on an estimate that 57 States and territories will each need to provide one response each year with an average of 2,193 hours per response, and that 49,110 systems will each provide two responses each year with an average of 2.6 hours per response. The total reporting and recordkeeping cost over the three-year period of the Information Collection Request is $30,274,266 (labor costs) (USEPA, 2006a). It should be noted, however, that much of the paperwork burden of the rule will be incurred only after the three-year time horizon covered in this analysis. Subsequent ICR submissions will address future burden for activities such as triggered and compliance monitoring. There are no operation, maintenance or capital costs estimated for the first three years. The labor burden is estimated for the following activities: reading and understanding the rule, planning, training, and meeting primacy requirements. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

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. In addition, EPA is amending the table in 40 CFR part 9 of currently approved OMB control numbers for various regulations to list the regulatory citations for the information requirements contained in this rule.

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 U.S.C. 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 final GWR on small entities, EPA considered defining ''small entities'' in its regulatory flexibility assessments under the RFA to be public water systems serving 10,000 or fewer persons. 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 Small Business Administration (SBA), and finalized the alternative definition in the Consumer Confidence Reports regulation (63 FR 44511, August 19, 1998). As stated in that Final Rule, the alternative definition applies to this regulation as well.

Pursuant to section 603 of the RFA, EPA prepared an initial regulatory flexibility analysis (IRFA) for the proposed rule (see 65 FR 30193, May 10, 2000) and convened a Small Business Advocacy Review Panel to obtain advice and recommendations of representatives of the regulated small entities (USEPA, 2000a). A detailed discussion of the Panel's advice and recommendations is found in the Panel Report (docket number EPA–HQ–OW–2002–0061; document number W–98–23–I.E–2). A summary of the Panel's recommendations is presented in the GWR proposal at 65 FR 30253, May 10, 2000 (USEPA, 2000a).

As required by section 604 of the RFA, we also prepared a final regulatory flexibility analysis (FRFA) for the final GWR. The FRFA addresses the issues raised by public comments on the IRFA, which was part of the proposal of this rule. The FRFA is available for review in the docket and is summarized below.

EPA is issuing this final rule to comply with section 1412(b)(8) of the SDWA, which directs EPA to ''promulgate national primary drinking water regulations requiring disinfection as a treatment technique for all public water systems, including surface water systems and, as necessary, ground water systems.'' The need for this final rule is based upon the substantial likelihood that fecal contamination of ground water supplies is occurring at frequencies and levels that present public health concern. Fecal contamination refers to the contaminants, particularly the microorganisms, contained in human or animal feces. These microorganisms may include bacterial and viral pathogens, which can cause illnesses in the individuals that consume them. The objective of the final GWR is to identify those systems with fecal contamination and undertake corrective action to eliminate or address that contamination.

Two significant issues were raised in comments on the IRFA for the proposed rule. First, several commenters wrote

that small water systems lack the customer base to defray the costs of installing new treatment, such as disinfection, or the cost of a new source. EPA notes that the final GWR does not mandate disinfection, but rather is a flexible regulation, targeting those high-risk systems or sources that are vulnerable to contamination. EPA also notes that financial assistance is available to small systems through programs such as the Drinking Water State Revolving Fund, the Loan and Grant program of the U.S. Department of Agriculture's Rural Utilities Services (RUS) and the Community Development Block Grant Program of the Department of Housing. The second significant issue raised in comments on the IRFA was a recommendation that EPA allow the States flexibility to consider competing fiscal impacts on small systems when implementing the rule. EPA believes the final rule has greater flexibility and is less burdensome for States and small systems than the proposal. For example, a GWS serving 1,000 people or fewer may use a repeat sample collected from a ground water source to meet the TCR to satisfy the GWR triggered source water monitoring requirements if the State approves the use of *E. coli* as a fecal indicator for ground water source monitoring.

EPA assessed the potential impact of the final GWR on small entities. There are 147,330 CWSs, NTNCWSs, and TNCWSs providing potable ground water to the public; 145,580 (99 percent) are classified by EPA as small entities. EPA has determined that all small systems are impacted by the sanitary survey requirement and a substantial number these systems will be impacted by additional requirements of the final GWR, including the triggered source water monitoring requirements and the corrective action requirements.

In addition, in the final GWR there are a number of recordkeeping and reporting requirements for all GWSs (including small systems). To minimize the burden with these provisions, the final rule uses a risk-based regulatory strategy, whereby the monitoring requirements are based on system characteristics and not directly related to system size. In this manner, the rule takes a system-specific approach to regulation.

To prevent conflict and overlap with other Federal rules, this final rule leverages the existing TCR monitoring framework to the extent possible (*e.g.*, by using the results of the routine TCR monitoring to determine if source water monitoring is required). GWSs that do not reliably treat to 4-log inactivation or removal of viruses are required to collect a source water sample following a total coliform-positive sample in the distribution system. Additionally, systems may utilize one of the follow-up monitoring samples required under the TCR to meet the triggered source water sampling requirements of this final rule.

As a result of the input received from stakeholders, the EPA workgroup, and other interested parties, EPA constructed four regulatory options: The sanitary survey option, the sanitary survey and triggered monitoring option, the multi-barrier option, and the across-the-board disinfection option. In developing this final rule, EPA considered the recommendations to minimize the cost impact to small systems. A risk-targeted approach, based on sanitary surveys and triggered source water monitoring (which only requires corrective action if the GWS has a sanitary survey significant deficiency or source water fecal contamination), was selected as the option to protect public health and to reduce burden. Assessment source water monitoring, part of the preferred proposal option (the multi-barrier option), has been finalized as a discretionary requirement as determined by the State, allowing further flexibility and burden reduction.

To mitigate the associated compliance cost increases across water systems, this final rule also provides States with considerable flexibility when implementing other requirements of the rule. This flexibility will allow States to consider the characteristics of individual systems when determining an appropriate corrective action. For example, States have the flexibility to allow systems to fix existing wells, drill a new well, obtain a new source, or use any disinfection treatment technology that achieves 4-log inactivation or removal of viruses. States may also determine that the source of contamination has been eliminated if, after thorough investigation by the State and the system, the State concludes that contamination is unlikely to reoccur.

As required by section 212 of the Small Business Regulatory Enforcement Fairness Act (SBREFA), EPA also is preparing a Small Entity Compliance Guide to help small entities comply with this rule. This guide will be available on EPA's Web site at *http://www.epa.gov/safewater/disinfection/gwr/index.html* or by calling the Safe Drinking Water Hotline at (800) 426–4791.

D. Unfunded Mandates Reform Act (UMRA)

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Pub. L. 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector. Under section 202 of UMRA, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' 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. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted. Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed under section 203 of the UMRA a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates, and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local, or Tribal governments in the aggregate, or the private sector in any one year (see Table VIII–1). The rule is estimated to cost State, local and Tribal governments $41.5 to $41.9 million. Public water systems that are privately owned will incur total costs of $20.3 to $20.4 million per year. A more detailed description is presented in the Economic Analysis for the Final Ground Water Rule (USEPA, 2006d), which is available in the water docket. Thus, this rule is not subject to the requirements of sections 202 and 205 of the UMRA.

Table VIII-1: Ground Water System, State, and Tribal Estimated Costs

(Note: Detail may not add up to totals due to independent rounding)

	3% Discount Rate	7% Discount Rate	Percent of 3% Grand Total Costs	Percent of 7% Grand Total Costs
Ground Water Systems Costs	$ 29.5	$ 30.0	48%	48%
State Costs	$ 11.8	$ 11.7	19%	19%
Tribal Costs	$ 0.2	$ 0.2	0%	0%
Total Public	**$ 41.5**	**$ 41.9**	**67%**	**67%**
Ground Water Systems Costs	$ 20.3	$ 20.4	33%	33%
Total Private	**$ 20.3**	**$ 20.4**	**33%**	**33%**
GRAND TOTAL	**$ 61.8**	**$ 62.3**	**100%**	**100%**

In developing this rule, EPA consulted with small governments pursuant to its interim plan established under section 203 of the UMRA to address impacts of regulatory requirements in the rule that might significantly or uniquely affect small governments. EPA held four public meetings for all stakeholders. Because of the GWR's impact on small entities, the Agency convened a Small Business Advocacy Review (SBAR) Panel in accordance with the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) to address small entity concerns, including small local governments specifically. EPA consulted with small entity representatives prior to convening the Panel to get their input on the GWR. Of the 22 small entity participants, five represented small governments. EPA also made presentations on the GWR to the national and some local chapters of the American Water Works Association, the Ground Water Foundation, the National Ground Water Association, the National Rural Water Association, and the National League of Cities.

E. Executive Order 13132: Federalism

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that 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.''

This final rule 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. This rule does not contain a ''significant Federal government mandate'' under section 202 of the UMRA, nor does it have a significant impact on small governments. Thus, Executive Order 13132 does not apply to this rule.

Although Section 6 of Executive Order 13132 does not apply to this rule, EPA did consult with State and local officials in developing this rule (65 FR 30203 and 30263, May 10, 2000) (USEPA, 2000a). A summary of the concerns raised during that consultation and EPA's response to those concerns are provided in the proposal. In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials.

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

Executive Order 13175, entitled ''Consultation and Coordination with Indian Tribal Governments'' (65 FR 67249, November 9, 2000), requires EPA to develop ''an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.'' Under Executive Order 13175, EPA may not issue a regulation that has Tribal implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by Tribal governments, or EPA consults with Tribal officials early in the process of developing the proposed regulation and develops a Tribal summary impact statement.

EPA has concluded that this final rule may have Tribal implications because it may impose substantial direct compliance costs on Tribal governments and the Federal government will not provide the funds necessary to pay those costs. This rule will significantly affect communities of Tribal governments because 87 percent of PWSs in Indian Country are GWSs. Accordingly, EPA provides the following Tribal summary impact statement as required by section 5(b).

EPA consulted with Tribal officials early in the process of developing this regulation to permit them to have meaningful and timely input into its development (see the proposed rule, 65 FR 30259, May 10, 2000) (USEPA, 2000a). Two consultations took place at national conferences; one for the National Indian Health Board and the other for the National Tribal Environmental Council. A third consultation was conducted in conjunction with the Inter-Tribal Council of Arizona, Inc. EPA received one comment on the proposed rule from a Tribal organization. The organization is concerned that the GWR will have a negative impact on their ability to provide infrastructure improvements by taking funding resources away from new water supply construction programs and applying these funds to cover compliance costs for existing water systems. EPA recognizes that the GWR will increase the compliance burden for some Tribal PWSs, however, EPA believes that the GWR will provide public health benefits that justify the increase in burden. To offset some of this burden, EPA has provided flexibility for small systems through various mechanisms. For a detailed discussion, please see Section IV of this preamble.

As required by section 7(a), EPA's Tribal Consultation Official has certified that the requirements of this Executive Order have been met in a meaningful and timely manner. A copy of the certification is included in the docket for this rule.

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

Executive Order 13045: ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be ''economically significant'' as defined under Executive Order 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

While this final rule is not subject to the Executive Order because it is not economically significant as defined under Executive Order 12866, we nonetheless have reason to believe that the environmental health or safety risk addressed by this action may have a disproportionate effect on children. As a matter of EPA policy, we therefore assessed the environmental health or safety effects of viruses on children. The results of this assessment are contained in Section VII.I.1 of the preamble of this rulemaking as well as in the final GWR EA (USEPA, 2006d).

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

This rule is not a ''significant energy action'' as defined in Executive Order 13211, ''Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' (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.

1. Energy Supply

The GWR does not regulate power generation, either directly or indirectly. The public and private PWSs that the GWR regulates do not, in general, generate power. Further, the cost increases borne by customers of PWSs as a result of the GWR represent a small percentage of the total cost of water, except for a very few small systems that will need to spread the cost of installing advanced technologies over a narrow customer base. Therefore, the customers that are power generation utilities are unlikely to face any significant effects as a result of the GWR. In summary, the GWR does not regulate the supply of energy, does not generally regulate the utilities that supply energy, and is unlikely to significantly affect the customer base of energy suppliers. Thus, the GWR will not adversely affect the supply of energy.

2. Energy Distribution

The GWR does not regulate any aspect of energy distribution. PWSs that are regulated by the GWR already have electrical service. The rule is projected to increase peak electricity demand at PWSs by only 0.001 percent (see below). Therefore, EPA assumes that the existing connections are adequate and that the GWR has no discernable adverse effect on energy distribution.

3. Energy Use

Some PWSs are expected to add treatment technologies that use electrical power. This potential impact of the GWR on the use of energy was evaluated. The analyses that underlay the estimation of costs are national in scope and do not identify specific plants or systems that may install treatment in response to the GWR. As a result, no analysis of the effect on specific energy suppliers is possible with the available data. Further data are required to evaluate the effect on specific energy suppliers. The approach used to estimate the impact of energy use, therefore, focuses on national-level impacts. In this approach, EPA estimates the additional energy use due to the GWR and compares that to the national levels of power generation in terms of average and peak loads.

The first step is to estimate the energy used by the technologies or corrective action expected to be installed as a result of the GWR. Energy use is not directly estimated in the *Technology and Cost Document for the Final Ground Water Rule* (USEPA, 2006h), but the annual cost of energy for each technology and corrective action addition or upgrade necessitated by the GWR is provided. An estimate of plant-level energy use is derived by dividing the total energy cost per plant for a range of flows by an average national cost of electricity of $0.076 per kilowatt hour per year (kWh/y) (USDOE EIA, 2002). The energy use per plant for each flow range and technology or corrective action is then multiplied by the number of plants predicted to install each technology in a given flow range. The energy requirements for each flow range are then added to produce a national total. No electricity use is subtracted to account for the technologies that may be replaced by new technologies, resulting in a conservative estimate of the increase in energy use. An incremental national annual energy usage of 4,521 megawatt hours (mWh) was calculated.

The total increase in energy usage by water systems as a result of the GWR is predicted to be approximately 4.5 million kWh/y, which is less than one-ten-thousandth of one percent of the total energy produced in 2003. While the rule may have some adverse energy effects, EPA does not believe that this constitutes a significant adverse effect on the energy supply. See the *Economic Analysis for the Final Ground Water Rule* (USEPA, 2006d) for further detail.

I. National Technology Transfer and Advancement Act

As noted in the proposed rule, 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. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This rulemaking involves technical standards. EPA has identified some consensus standards and developed or modified methods for the remaining methods requirements. These methods are listed in § 141.402(c).

Most of the methods that EPA is approving for the detection of *E. coli* in source waters are consensus methods described in *Standard Methods for the Examination of Water and Wastewater (20th Edition)* (APHA, 1998). The three *E. coli* methods that are not consensus methods are newly developed: MI agar (a membrane filter method), the ColiBlue 24 test (a membrane filter method) and the E*Colite test (a defined dehydrated medium to which water is added). EPA has already evaluated and approved these three methods for use under the TCR. Of the three enterococci methods EPA is approving in this rule, two are consensus methods in *Standard Methods*; the third (Enterolert) was described in a peer-reviewed journal article (Budnick *et al.*, 1996).

The two methods EPA proposed for the detection of coliphage in source water are not consensus methods. For the coliphage tests, EPA is approving the use of two methods: *EPA Method 1601* (Two-Step Enrichment Presence-Absence Procedure) (USEPA, 2001a) and *EPA Method 1602* (Single Agar Layer Procedure) (USEPA, 2001b). *EPA Method 1601* is a new method optimized for the detection of a single coliphage in a small (100–1,000 mL) water sample. EPA did not use the consensus method for coliphage in *Standards Methods* (20th edition) (Method 9211D) (APHA, 1998) rather, EPA modified and optimized Method 9211D to improve its sensitivity and versatility.

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

Executive Order 12898 establishes a Federal policy for incorporating environmental justice into Federal Agency missions by directing agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

The Environmental Justice Executive Order requires the Agency to consider environmental justice issues in the rulemaking and to consult with minority and low-income stakeholders. The Agency has considered environmental justice issues concerning the potential impacts of this action and has consulted with minority and low-income stakeholders. The GWR applies to all PWSs (CWSs, NTNCWSs, and NTCWSs) that use ground water as their source water. Consequently, the health protection benefits provided by this rule are equal across all income and minority groups served by these systems. Existing regulations such as the SWTR, IESWTR, and LT2ESWTR provide similar health benefit protection to communities that use surface water or ground water under the direct influence of surface water.

Nonetheless, the Agency held a stakeholder meeting on March 12, 1998, to address various components of pending drinking water regulations and how they may impact sensitive sub-populations, minority populations, and low-income populations. See the discussion of this meeting in the proposed rule for further information (65 FR 30261, May 10, 2000) (USEPA, 2000a).

K. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective January 8, 2007.

L. Analysis of the Likely Effect of Compliance With the GWR on the Technical, Financial, and Managerial Capacity of Public Water Systems

Section 1420(d)(3) of SDWA, as amended, requires that in promulgating an NPDWR, the Administrator shall include an analysis of the likely effect of compliance with the regulation on the technical, managerial, and financial capacity of public water systems. This analysis can be found in the GWR Economic Analysis (USEPA, 2006d). Analyses reflect only the impact of new requirements, as established by the GWR; the impacts of previously established requirements on system capacity are not considered.

IX. Consultation With Science Advisory Board, National Drinking Water Advisory Council, and the Secretary of Health and Human Services; and Peer Review

In accordance with sections 1412(d) and 1412(e) of the SDWA, the Agency consulted with the Science Advisory Board, the National Drinking Water Advisory Council (NDWAC), and the Secretary of Health and Human Services.

In addition, this rule was supported by influential scientific information. Therefore, the Agency conducted a peer review in accordance with OMB's Final Information Quality Bulletin for Peer Review (OMB, December 15, 2004). EPA developed charge questions related to the statistical approach used to characterize national occurrence of viral pathogens and fecal indicators; risk characterization including dose-response modeling; characterization of morbidity, mortality, and severity for Type A and Type B viruses; characterization of nonquantified benefits; and national risk reduction (benefits) and costs for the GWR. The Peer Review Report is located in the docket for this rule.

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List of Subjects

40 CFR Part 9

Reporting and recordkeeping requirements.

40 CFR Part 141

Environmental protection, Chemicals, Indians-lands, Incorporation by reference, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142

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

Dated: October 11, 2006.

Stephen L. Johnson,

Administrator.

For the reasons set forth in the preamble, title 40 chapter I of the Code of Federal Regulations is amended as follows:

PART 9—OMB APPROVALS UNDER THE PAPERWORK REDUCTION ACT

■ 1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 *et seq.*, 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345 (d) and (e), 1361; Executive Order 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 *et seq.*, 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

■ 2. In § 9.1 the table is amended by adding entries § 141.401–141.405'', § 142.14(d)(17)'', § 142.15(c)(7)'' and § 142.16(o)'' in numerical order, as follows:

§ 9.1 OMB approvals under the Paperwork Reduction Act.

* * * * *

40 CFR citation	OMB control No.
* * * * * * *	
National Primary Drinking Water Regulations	
* * * * * * *	
141.401–141.405	2040–0271
* * * * * * *	
National Primary Drinking Water Regulations Implementation	
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142.14(d)(17)	2040–0271
* * * * * * *	
142.15(c)(7)	2040–0271
* * * * * * *	
142.16(o)	2040–0271

* * * * *

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

■ 3. 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.

■ 4. Section 141.21 is amended by adding paragraph (d)(3) to read as follows:

§ 141.21 Coliform sampling.

* * * * *

(d) * * *

(3) Sanitary surveys conducted by the State under the provisions of § 142.16(o)(2) of this chapter may be used to meet the sanitary survey requirements of this section.

* * * * *

■ 5. Section 141.28 is amended by revising paragraph (a) to read as follows:

§ 141.28 Certified laboratories.

(a) For the purpose of determining compliance with § 141.21 through 141.27, 141.30, 141.40, 141.74, 141.89 and 141.402, samples may be considered only if they have been analyzed by a laboratory certified by the State except that measurements of alkalinity, calcium, conductivity, disinfectant residual, orthophosphate, pH, silica, temperature and turbidity may be performed by any person acceptable to the State.

* * * * *

■ 6. Section 141.153 is amended by adding a new paragraph (h)(6) to read as follows:

§ 141.153 Content of the reports.

* * * * *

(h) * * *

(6) Systems required to comply with subpart S. (i) Any ground water system that receives notice from the State of a significant deficiency or notice from a laboratory of a fecal indicator-positive ground water source sample that is not invalidated by the State under § 141.402(d) must inform its customers of any significant deficiency that is uncorrected at the time of the next report or of any fecal indicator-positive ground water source sample in the next report. The system must continue to inform the public annually until the State determines that particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed under § 141.403(a). Each report must include the following elements.

(A) The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the State or the dates of the fecal indicator-positive ground water source samples;

(B) If the fecal contamination in the ground water source has been addressed under § 141.403(a) and the date of such action;

(C) For each significant deficiency or fecal contamination in the ground water source that has not been addressed under § 141.403(a), the State-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and

(D) If the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the State under § 141.402(d), the potential health effects using the health effects language of Appendix A of subpart O.

(ii) If directed by the State, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of correction under paragraph (h)(6)(i) of this section.

* * * * *

■ 7. Appendix A to subpart O is amended by adding a new entry ''Fecal Indicators (enterococci or coliphage)'' 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:						
*	*	*	*	*	*	*
Fecal Indicators (enterococci or coliphage).	TT		TT	N/A	Human and animal fecal waste.	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health 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.
*	*	*	*	*	*	*

* * *

TT=Treatment Technique.

■ 8. Section 141.202 is amended by redesignating entry (8) in Table 1 in paragraph (a) as entry (9); and adding a new paragraph (8) to read as follows:

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

(a) * * *

Table 1 to § 141.202—Violation Categories and Other Situations Requiring a Tier 1 Public Notice

* * * * *

(8) Detection of *E. coli*, enterococci, or coliphage in source water samples as specified in § 141.402(a) and § 141.402(b).

* * * * *

■ 9. Section 141.203 is amended by adding entry (4) to Table 1 in paragraph (a) to read as follows:

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

(a) * * *

Table 1 to § 141.203—Violation Categories and Other Situations Requiring a Tier 2 Public Notice

* * * * *

(4) Failure to take corrective action or failure to maintain 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 under § 141.403(a).

* * * * *

■ 10. Appendix A to Subpart Q of Part 141 is amended to read as follows:

■ a. Adding I.A.11;

■ b. Redesignating entry IV.F as entry IV.G; and

■ c. Adding a new entry IV.F in alphabetical order:

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]

Contaminant	MCL/MRDL/TT violations [2]		Monitoring and testing 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				
*	*	*	*	*
11. Ground Water Rule violations	2	141.404	3	141.402(h). 141.403(d).

APPENDIX A TO SUBPART Q OF PART 141—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]—Continued

Contaminant	MCL/MRDL/TT violations [2]		Monitoring and testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
* * * *	*		*	*
IV. Other Situations Requiring Public Notification				
* * * *	*		*	*
F. Source Water Sample Positive for GWR Fecal indicators: E. coli, enterococci, or coliphage	1	141.402(g)	N/A	N/A
* * * *	*		*	*

[1] Violations and other situations not listed in this table (*e.g.*, failure to prepare Consumer Confidence Reports) do not require notice, unless otherwise determined by the primacy agency. Primacy agencies may, at their option, also require a more stringent public notice tier (*e.g.*, Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under § 141.202(a) and § 141.203(a).
[2] MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique.
[3] The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing procedure requirements.

* * * * *

■ 11. Appendix B of Subpart Q of Part 141 is amended by adding entries A.1.c and A.1.d in numerical order to read as follows:

APPENDIX B TO SUBPART Q OF PART 141—STANDARD 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**			
* * *	*		* * *
1c. Fecal indicators (GWR): i. E. coli ii. enterococci iii. coliphage	Zero None None	TT TT TT	Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health 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.
1d. Ground Water Rule (GWR) TT violations	None	TT	Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.
* * *	*		* * *

[1] MCLG—Maximum contaminant level goal.
[2] MCL—Maximum contaminant level.

* * * * *

■ 12. Appendix C to Subpart Q is amended by adding the following abbreviations in alphabetical order:

Appendix C to Subpart Q of Part 141—List of Acronyms Used in Public Notification Regulations

* * * * *

GWR Ground Water Rule

* * * * *

■ 13. A new subpart S is added to read as follows:

Subpart S—Ground Water Rule

Sec.
141.400 General requirements and applicability.
141.401 Sanitary surveys for ground water systems.
141.402 Ground water source microbial monitoring and analytical methods.
141.403 Treatment technique requirements for ground water systems.
141.404 Treatment technique violations for ground water systems.
141.405 Reporting and recordkeeping for ground water systems.

Subpart S—Ground Water Rule

§ 141.400 General requirements and applicability.

(a) *Scope of this subpart.* The requirements of this subpart S constitute National Primary Drinking Water Regulations.

(b) *Applicability.* This subpart applies to all public water systems that use ground water except that it does not apply to public water systems that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment under subpart

H. For the purposes of this subpart, ''ground water system'' is defined as any public water system meeting this applicability statement, including consecutive systems receiving finished ground water.

(c) *General requirements.* Systems subject to this subpart must comply with the following requirements:

(1) Sanitary survey information requirements for all ground water systems as described in § 141.401.

(2) Microbial source water monitoring requirements for ground water systems that do not treat all of their ground water to at least 99.99 percent (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 as described in § 141.402.

(3) Treatment technique requirements, described in § 141.403, that apply to ground water systems that have fecally contaminated source waters, as determined by source water monitoring conducted under § 141.402, or that have significant deficiencies that are identified by the State or that are identified by EPA under SDWA section 1445. A ground water system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this subpart must implement one or more of the following corrective action options: correct all significant deficiencies; provide an alternate source of water; eliminate the source of contamination; or provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer.

(4) Ground water systems that 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 are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in § 141.403(b).

(5) If requested by the State, ground water systems must provide the State with any existing information that will enable the State to perform a hydrogeologic sensitivity assessment. For the purposes of this subpart, ''hydrogeologic sensitivity assessment'' is a determination of whether ground water systems obtain water from hydrogeologically sensitive settings.

(d) *Compliance date.* Ground water systems must comply, unless otherwise noted, with the requirements of this subpart beginning December 1, 2009.

§ 141.401 Sanitary surveys for ground water systems.

(a) Ground water systems must provide the State, at the State's request, any existing information that will enable the State to conduct a sanitary survey.

(b) For the purposes of this subpart, a ''sanitary survey,'' as conducted by the State, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

(c) The sanitary survey must include an evaluation of the applicable components listed in paragraphs (c)(1) through (8) of this section:

(1) Source,

(2) Treatment,

(3) Distribution system,

(4) Finished water storage,

(5) Pumps, pump facilities, and controls,

(6) Monitoring, reporting, and data verification,

(7) System management and operation, and

(8) Operator compliance with State requirements.

§ 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 (a)(1)(ii) 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

(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).

(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), 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) and that the system intends to use for representative sampling under this paragraph.

(iii) A ground water system serving 1,000 people or fewer 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.

(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) 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) 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) is caused by a distribution system deficiency; or

(ii) The total coliform-positive sample collected under § 141.21(a) is collected at a location that meets State criteria for distribution system conditions that will cause total coliform-positive samples.

(b) *Assessment Source Water Monitoring.* If directed by the State, ground water systems must conduct assessment source water monitoring that meets State-determined requirements for such monitoring. A ground water system conducting assessment source water monitoring may use a triggered source water sample collected under paragraph (a)(2) of this section to meet the requirements of paragraph (b) of this section. State-determined assessment source water monitoring requirements may include:

(1) Collection of a total of 12 ground water source samples that represent each month the system provides ground water to the public,

(2) Collection of samples from each well unless the system obtains written State approval to conduct monitoring at one or more wells within the ground water system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting,

(3) Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used,

(4) Analysis of all ground water source samples using one of the analytical methods listed in the in paragraph (c)(2) of this section for the presence of *E. coli*, enterococci, or coliphage,

(5) Collection of ground water source samples at a location prior to any treatment of the ground water source unless the State approves a sampling location after treatment, and

(6) Collection of ground water source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the State approves an alternate sampling location that is representative of the water quality of that well.

(c) *Analytical methods.* (1) A ground water system subject to the source water monitoring requirements of paragraph (a) of this section must collect a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used.

(2) A ground water system must analyze all ground water source samples collected under paragraph (a) of this section using one of the analytical methods listed in the following table in paragraph (c)(2) of this section for the presence of *E. coli*, enterococci, or coliphage:

ANALYTICAL METHODS FOR SOURCE WATER MONITORING

Fecal indicator [1]	Methodology	Method citation
E. coli	Colilert [3]	9223 B.[2]
	Colisure [3]	9223 B.[2]
	Membrane Filter Method with MI Agar	EPA Method 1604.[4]
	m-ColiBlue24 Test [5]	
	E*Colite Test [6]	
	EC–MUG [7]	9221 F.[2]
	NA–MUG [7]	9222 G.[2]
Enterococci	Multiple-Tube Technique	9230B.[2]
	Membrane Filter Technique	EPA Method 1600.[8]
	Enterolert [9]	
Coliphage	Two-Step Enrichment Presence-Absence Procedure.	EPA Method 1601.[10]
	Single Agar Layer Procedure	EPA Method 1602.[11]

Analyses must be conducted in accordance with the documents listed below. The Director of the Federal Register approves the incorporation by reference of the documents listed in footnotes 2–11 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. Copies may be inspected 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/code_of_federal_regulations/ibr_locations.html.*

[1] The time from sample collection to initiation of analysis may not exceed 30 hours. The ground water system is encouraged but is not required to hold samples below 10°C during transit.

[2] Methods are described in Standard Methods for the Examination of Water and Wastewater 20th edition (1998) and copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005–2605.

[3] Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092.

[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. 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] A description of the m-ColiBlue24 Test, ''Total Coliforms and *E. coli* Membrane Filtration Method with m-ColiBlue24® Broth,'' Method No. 10029 Revision 2, August 17, 1999, is available from Hach Company, 100 Dayton Ave., Ames, IA 50010 or from EPA's Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[6] A description of the E*Colite Test, ''Charm E*Colite Presence/Absence Test for Detection and Identification of Coliform Bacteria and *Escherichia coli* in Drinking Water, January 9, 1998, is available from Charm Sciences, Inc., 659 Andover St., Lawrence, MA 01843–1032 or from EPA's Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[7] EC–MUG (Method 9221F) or NA–MUG (Method 9222G) can be used for *E. coli* testing step as described in § 141.21(f)(6)(i) or (ii) after use of Standard Methods 9221 B, 9221 D, 9222 B, or 9222 C.

[8] EPA Method 1600: Enterococci in Water by Membrane Filtration Using membrane-Enterococcus Indoxyl–β–D–Glucoside Agar (mEI) EPA 821–R–02–022 (September 2002) is an approved variation of Standard Method 9230C. The method is available at *http://www.epa.gov/nerlcwww/1600sp02.pdf* or from EPA's Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460. The holding time and temperature for ground water samples are specified in footnote 1 above, rather than as specified in Section 8 of EPA Method 1600.

[9] Medium is available through IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092. Preparation and use of the medium is set forth in the article ''Evaluation of Enterolert for Enumeration of Enterococci in Recreational Waters,'' by Budnick, G.E., Howard, R.T., and Mayo, D.R., 1996, Applied and Environmental Microbiology, 62:3881–3884.

[10] EPA Method 1601: Male-specific (F+) and Somatic Coliphage in Water by Two-step Enrichment Procedure; April 2001, EPA 821–R–01–030. Method is available at *http://www.epa.gov/nerlcwww/1601ap01.pdf* or from EPA's Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

[11] EPA Method 1602: Male-specific (F+) and Somatic Coliphage in Water by Single Agar Layer (SAL) Procedure; April 2001, EPA 821–R–01–029. Method is available at *http://www.epa.gov/nerlcwww/1602ap01.pdf* or from EPA's Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460.

(d) *Invalidation of a fecal indicator-positive ground water source sample.* (1) A ground water system may obtain State invalidation of a fecal indicator-positive ground water source sample collected under paragraph (a) of this section only under the conditions specified in paragraphs (d)(1)(i) and (ii) of this section.

(i) The system provides the State with written notice from the laboratory that improper sample analysis occurred; or

(ii) The State determines and documents in writing that there is substantial evidence that a fecal indicator-positive ground water source sample is not related to source water quality.

(2) If the State invalidates a fecal indicator-positive ground water source sample, the ground water system must collect another source water sample under paragraph (a) of this section within 24 hours of being notified by the State of its invalidation decision and have it analyzed for the same fecal indicator using the analytical methods in paragraph (c) of this section. The State may extend the 24-hour time limit on a case-by-case basis if the system cannot collect the 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.

(e) *Sampling location.* (1) Any ground water source sample required under paragraph (a) of this section must be collected at a location prior to any treatment of the ground water source unless the State approves a sampling location after treatment.

(2) If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a State-approved location to meet the requirements of paragraph (a) of this section if the sample is representative of the water quality of that well.

(f) *New Sources.* If directed by the State, a ground water system that places a new ground water source into service after November 30, 2009, must conduct assessment source water monitoring under paragraph (b) of this section. If directed by the State, the system must begin monitoring before the ground water source is used to provide water to the public.

(g) *Public Notification.* A ground water system with a ground water source sample collected under paragraph (a) or (b) of this section that is fecal indicator-positive and that is not invalidated under paragraph (d) of this section, including consecutive systems served by the ground water source, must conduct public notification under § 141.202.

(h) *Monitoring Violations.* Failure to meet the requirements of paragraphs (a)–(f) of this section is a monitoring violation and requires the ground water system to provide public notification under § 141.204.

§ 141.403 Treatment technique requirements for ground water systems.

(a) *Ground water systems with significant deficiencies or source water fecal contamination.*

(1) The treatment technique requirements of this section must be met by ground water systems when a significant deficiency is identified or when a ground water source sample collected under § 141.402(a)(3) is fecal indicator-positive.

(2) If directed by the State, a ground water system with a ground water source sample collected under § 141.402(a)(2), § 141.402(a)(4), or § 141.402(b) that is fecal indicator-positive must comply with the treatment technique requirements of this section.

(3) When a significant deficiency is identified at a Subpart H public water system that uses both ground water and surface water or ground water under the direct influence of surface water, the system must comply with provisions of this paragraph except in cases where the State determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or ground water under the direct influence of surface water.

(4) Unless the State directs the ground water system to implement a specific corrective action, the ground water system must consult with the State regarding the appropriate corrective action within 30 days of receiving written notice from the State of a significant deficiency, written notice from a laboratory that a ground water source sample collected under § 141.402(a)(3) was found to be fecal indicator-positive, or direction from the State that a fecal indicator'positive collected under § 141.402(a)(2), § 141.402(a)(4), or § 141.402(b) requires corrective action. For the purposes of this subpart, significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the State determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

(5) Within 120 days (or earlier if directed by the State) of receiving written notification from the State of a significant deficiency, written notice from a laboratory that a ground water source sample collected under § 141.402(a)(3) was found to be fecal indicator-positive, or direction from the State that a fecal indicator-positive sample collected under § 141.402(a)(2), § 141.402(a)(4), or § 141.402(b) requires corrective action, the ground water system must either:

(i) Have completed corrective action in accordance with applicable State plan review processes or other State guidance or direction, if any, including State-specified interim measures; or

(ii) Be in compliance with a State-approved corrective action plan and schedule subject to the conditions specified in paragraphs (a)(5)(ii)(A) and (a)(5)(ii)(B) of this section.

(A) Any subsequent modifications to a State-approved corrective action plan and schedule must also be approved by the State.

(B) If the State specifies interim measures for protection of the public health pending State approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system must comply with these interim measures as well as

with any schedule specified by the State.

(6) *Corrective Action Alternatives.* Ground water systems that meet the conditions of paragraph (a)(1) or (a)(2) of this section must implement one or more of the following corrective action alternatives:

(i) Correct all significant deficiencies;

(ii) Provide an alternate source of water;

(iii) Eliminate the source of contamination; or

(iv) Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

(7) *Special notice to the public of significant deficiencies or source water fecal contamination.* (i) In addition to the applicable public notification requirements of § 141.202, a community ground water system that receives notice from the State of a significant deficiency or notification of a fecal indicator-positive ground water source sample that is not invalidated by the State under § 141.402(d) must inform the public served by the water system under § 141.153(h)(6) of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the ground water source is determined by the State to be corrected under paragraph (a)(5) of this section.

(ii) In addition to the applicable public notification requirements of § 141.202, a non-community ground water system that receives notice from the State of a significant deficiency must inform the public served by the water system in a manner approved by the State 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 system must continue to inform the public annually until the significant deficiency is corrected. The information must include:

(A) The nature of the significant deficiency and the date the significant deficiency was identified by the State;

(B) The State-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed; and

(C) For systems with a large proportion of non-English speaking consumers, as determined by the State, information in the appropriate language(s) regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

(iii) If directed by the State, a non-community water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under paragraph (a)(7)(ii) of this section.

(b) *Compliance monitoring*—(1) *Existing ground water sources.* A ground water system that is not required to meet the source water monitoring requirements of this subpart for any ground water source because it provides 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 any ground water source before December 1, 2009, must notify the State in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified ground water source and begin compliance monitoring in accordance with paragraph (b)(3) of this section by December 1, 2009. Notification to the State must include engineering, operational, or other information that the State requests to evaluate the submission. If the system subsequently discontinues 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 a ground water source, the system must conduct ground water source monitoring as required under § 141.402.

(2) *New ground water sources.* A ground water system that places a ground water source in service after November 30, 2009, that is not required to meet the source water monitoring requirements of this subpart because the system provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source must comply with the requirements of paragraphs (b)(2)(i), (b)(2)(ii) and (b)(2)(iii) of this section.

(i) The system must notify the State in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source. Notification to the State must include engineering, operational, or other information that the State requests to evaluate the submission.

(ii) The system must conduct compliance monitoring as required under § 141.403(b)(3) of this subpart within 30 days of placing the source in service.

(iii) The system must conduct ground water source monitoring under § 141.402 if the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

(3) *Monitoring requirements.* A ground water system subject to the requirements of paragraphs (a), (b)(1) or (b)(2) of this section must monitor the effectiveness and reliability of treatment for that ground water source before or at the first customer as follows:

(i) *Chemical disinfection*—(A) *Ground water systems serving greater than 3,300 people.* A ground water system that serves greater than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in § 141.74(a)(2) at a location approved by the State and must record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public. The ground water system must maintain the State-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. If there is a failure in the continuous monitoring equipment, the ground water system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.

(B) *Ground water systems serving 3,300 or fewer people.* A ground water system that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in § 141.74(a)(2) at a location approved by the State and record the residual disinfection concentration each day that water from the ground water source is served to the public. The ground water system must maintain the State-determined residual disinfectant concentration every day the ground water system serves water from the ground water source to the public. The ground water system must take a daily grab sample during the hour of peak flow or at another time specified by the State. If any daily grab sample

measurement falls below the State-determined residual disinfectant concentration, the ground water system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the State-determined level. Alternatively, a ground water system that serves 3,300 or fewer people may monitor continuously and meet the requirements of paragraph (b)(3)(i)(A) of this section.

(ii) *Membrane filtration.* A ground water system that uses membrane filtration to meet the requirements of this subpart must monitor the membrane filtration process in accordance with all State-specified monitoring requirements and must operate the membrane filtration in accordance with all State-specified compliance requirements. A ground water system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

(A) The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;

(B) The membrane process is operated in accordance with State-specified compliance requirements; and

(C) The integrity of the membrane is intact.

(iii) *Alternative treatment.* A ground water system that uses a State-approved alternative treatment to meet the requirements of this subpart by providing 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 must:

(A) Monitor the alternative treatment in accordance with all State-specified monitoring requirements; and

(B) Operate the alternative treatment in accordance with all compliance requirements that the State determines to be necessary to achieve at least 4-log treatment of viruses.

(c) Discontinuing treatment. A ground water system may discontinue 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 a ground water source if the State determines and documents in writing that 4-log treatment of viruses is no longer necessary for that ground water source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of § 141.402 of this subpart.

(d) Failure to meet the monitoring requirements of paragraph (b) of this section is a monitoring violation and requires the ground water system to provide public notification under § 141.204.

§ 141.404 Treatment technique violations for ground water systems.

(a) A ground water system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the State) of receiving written notice from the State of the significant deficiency, the system:

(1) Does not complete corrective action in accordance with any applicable State plan review processes or other State guidance and direction, including State specified interim actions and measures, or

(2) Is not in compliance with a State-approved corrective action plan and schedule.

(b) Unless the State invalidates a fecal indicator-positive ground water source sample under § 141.402(d), a ground water system is in violation of the treatment technique requirement if, within 120 days (or earlier if directed by the State) of meeting the conditions of § 141.403(a)(1) or § 141.403(a)(2), the system:

(1) Does not complete corrective action in accordance with any applicable State plan review processes or other State guidance and direction, including State-specified interim measures, or

(2) Is not in compliance with a State-approved corrective action plan and schedule.

(c) A ground water system subject to the requirements of § 141.403(b)(3) that fails to maintain 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 a ground water source is in violation of the treatment technique requirement if the failure is not corrected within four hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.

(d) Ground water system must give public notification under § 141.203 for the treatment technique violations specified in paragraphs (a), (b) and (c) of this section.

§ 141.405 Reporting and recordkeeping for ground water systems.

(a) *Reporting.* In addition to the requirements of § 141.31, a ground water system regulated under this subpart must provide the following information to the State:

(1) A ground water system conducting compliance monitoring under § 141.403(b) must notify the State any time the system fails to meet any State-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The ground water system must notify the State as soon as possible, but in no case later than the end of the next business day.

(2) After completing any corrective action under § 141.403(a), a ground water system must notify the State within 30 days of completion of the corrective action.

(3) If a ground water system subject to the requirements of § 141.402(a) does not conduct source water monitoring under § 141.402(a)(5)(ii), the system must provide documentation to the State within 30 days of the total coliform positive sample that it met the State criteria.

(b) *Recordkeeping.* In addition to the requirements of § 141.33, a ground water system regulated under this subpart must maintain the following information in its records:

(1) Documentation of corrective actions. Documentation shall be kept for a period of not less than ten years.

(2) Documentation of notice to the public as required under § 141.403(a)(7). Documentation shall be kept for a period of not less than three years.

(3) Records of decisions under § 141.402(a)(5)(ii) and records of invalidation of fecal indicator-positive ground water source samples under § 141.402(d). Documentation shall be kept for a period of not less than five years.

(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). Documentation shall be kept for a period of not less than five years.

(5) For systems, including wholesale systems, that are required to perform compliance monitoring under § 141.403(b):

(i) Records of the State-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than ten years.

(ii) Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the State-prescribed minimum residual disinfectant concentration for a period of more than

four hours. Documentation shall be kept for a period of not less than five years.

(iii) Records of State-specified compliance requirements for membrane filtration and of parameters specified by the State for State-approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours. Documentation shall be kept for a period of not less than five years.

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

■ 14. 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.

■ 15. Section 142.14 is amended by adding paragraph (d)(17) to read as follows:

§ 142.14 Records kept by States.

* * * * *

(d) * * *

(17) Records of the currently applicable or most recent State determination, including all supporting information and an explanation of the technical basis of each decision, made under the following provisions of 40 CFR part 141, subpart S and 40 CFR part 142.

(i) Section 142.16(o)(2)(v). Records of written notices of significant deficiencies.

(ii) Section 141.403(a)(5)(ii) of this chapter. Records of corrective action plans, schedule approvals, and State-specified interim measures.

(iii) Section 142.16(o)(4). Records of confirmations under § 141.403(a) of this chapter that a significant deficiency has been corrected or the fecal contamination in the ground water source has been addressed.

(iv) Section 141.402(a)(5) of this chapter. Records of State determinations and records of ground water system's documentation for not conducting triggered source water monitoring.

(v) Section 141.402(d) of this chapter. Records of invalidations of fecal indicator-positive ground water source samples.

(vi) Section 141.402(a)(2)(ii) of this chapter. Records of State approvals of source water monitoring plans.

(vii) Section 142.16(o)(4)(ii). Records of notices of the minimum residual disinfection concentration (when using chemical disinfection) needed to achieve at least 4-log virus inactivation before or at the first customer.

(viii) Sections 142.16(o)(4)(iv) and 142.16(o)(4)(v) Records of notices of the State-specified monitoring and compliance requirements (when using membrane filtration or alternative treatment) needed to achieve at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log inactivation and removal) before or at the first customer.

(ix) Sections 141.403(b)(1) and 141.403(b)(2) of this chapter. Records of written notices from the ground water system that it provides 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 a ground water source.

(x) Section 142.16(o)(4)(vi). Records of written determinations that the ground water system may discontinue 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log inactivation and removal).

* * * * *

■ 16. Section 142.15 is amended by adding paragraph (c)(7) to read as follows:

§ 142.15 Reports by States.

* * * * *

(c) * * *

(7) *Ground water rule.* (i) *Sanitary surveys.* The month and year in which the most recent sanitary survey was completed or, for a State that uses a phased review process, the date the last element of the applicable eight elements was evaluated under § 142.16(o)(2) for each ground water system.

(ii) *Corrective action requirements.* For any corrective action under § 141.403(a) of this chapter, the date the ground water system completed corrective action.

(iii) *Compliance monitoring.* All ground water systems providing 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 any ground water source(s).

* * * * *

■ 17. Section 142.16 is amended as follows:

■ a. Revise paragraph (a)(2)(iii), and

■ b. Add paragraph (o) to read as follows:

§ 142.16 Special primacy requirements.

(a) * * *

(2) * * *

(iii) *Table 1 of 40 CFR 141.202(a) (Items (5), (6), and (9))*—To require public water systems to give a Tier 1 public notice (rather than a Tier 2 or Tier 3 notice) for violations or situations listed in Appendix A of Subpart Q of Part 141 of this chapter;

(o) *Requirements for States to adopt 40 CFR part 141, subpart S.* In addition to the general primacy requirements specified elsewhere in this part, including the requirement that State regulations are no less stringent than the Federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, subpart S, must contain the information specified in this paragraph (o).

(1) *Legal authority.* The application for primacy must demonstrate the State has:

(i) The authority contained in statute or regulation to ensure that ground water systems conduct source water monitoring under § 141.402(a)(2), § 141.402(a)(3) and § 141.402(a)(4)(ii)(A) of this chapter.

(ii) The authority contained in statute or regulation to ensure that ground water systems take the appropriate corrective actions including interim measures, if necessary, needed to address significant deficiencies.

(iii) The authority contained in statute or regulation to ensure that ground water systems take the appropriate corrective actions, including interim measures if necessary, to address any source water fecal contamination identified during source water monitoring under § 141.402 of this chapter.

(iv) The authority contained in statute or regulation to ensure that ground water systems consult with the State regarding corrective action(s).

(2) *State practices or procedures for sanitary surveys.* In addition to the general requirements for sanitary surveys contained in § 142.10(b)(2), a primacy application must describe how the State will implement a sanitary survey program that meets the requirements of paragraph (o)(2)(i) of this section. A ''sanitary survey,'' as conducted by the State, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

(i) The State must conduct sanitary surveys that address the eight sanitary survey components listed in this section no less frequently than every three years

for community water systems, except as provided in paragraph (o)(2)(iii) of this section, and every five years for non-community water systems. The State may conduct more frequent sanitary surveys for any system. The initial sanitary survey for each community water system must be conducted by December 31, 2012, unless the system meets the requirements of paragraph (o)(2)(iii) of this section. The initial sanitary survey for each community water system that meets the requirements of paragraph (o)(2)(iii) of this section and for each non-community water system must be conducted by December 31, 2014. The sanitary survey must include an evaluation of each of the following elements as applicable:

(A) Source,

(B) Treatment,

(C) Distribution system,

(D) Finished water storage,

(E) Pumps, pump facilities, and controls,

(F) Monitoring, reporting, and data verification,

(G) System management and operation, and

(H) Operator compliance with State requirements.

(ii) The State may use a phased review process to meet the requirements of (o)(2)(i) of this section if all the applicable elements of paragraphs (o)(2)(i)(A) through (o)(2)(i)(H) of this section are evaluated within the required interval.

(iii) The State may conduct sanitary surveys once every five years for community water systems if the system either provides at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log inactivation and removal) before or at the first customer for all its ground water sources, or if it has an outstanding performance record, as determined by the State and documented in previous sanitary surveys and has no history of total coliform MCL or monitoring violations under § 141.21 of this chapter since the last sanitary survey. In its primacy application, the State must describe how it will determine whether a community water system has an outstanding performance record.

(iv) The State must define and describe in its primacy application at least one specific significant deficiency in each of the eight sanitary survey elements in paragraphs (o)(2)(i)(A) through (o)(2)(i)(H) of this section. Significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution system that the State determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

(v) As a condition of primacy, the State must provide ground water systems with written notice describing any significant deficiencies no later than 30 days after the State identifies the significant deficiency. The notice may specify corrective actions and deadlines for completion of corrective actions. The State may provide the written notice at the time of the sanitary survey.

(3) *State practices or procedures for source water microbial monitoring*. The State's primacy application must include a description of the following:

(i) The criteria the State will use under §§ 141.402(a)(2)(i) and 141.402(d)(2) of this chapter for extending the 24-hour time limit for a system to collect a ground water source sample to comply with the source water monitoring requirements.

(ii) The criteria the State will use under §§ 141.402(a)(5)(i) and 141.402(a)(5)(ii) of this chapter to determine whether the cause of the total coliform-positive sample taken under § 141.21(a) of this chapter is directly related to the distribution system.

(iii) The criteria the State will use for determining whether to invalidate a fecal indicator-positive ground water source sample under § 141.402(d)(1)(ii) of this chapter.

(iv) The criteria the State will use to allow source water microbial monitoring at a location after treatment under § 141.402(e)(1) of this chapter.

(4) *State practices or procedures for treatment technique requirements.* As a condition of primacy, the State must verify that significant deficiencies or source water fecal contamination have been addressed. The State must verify within 30 days after the ground water system has reported to the State that it has completed corrective action. The State must verify either through written confirmation from the ground water system or a site visit by the State. Written notice from the ground water system under § 141.405(a)(2) of this chapter may serve as this verification. The State's primacy application must include the following:

(i) The process the State will use to determine that a ground water system achieves at least a 4-log treatment of viruses (using inactivation, removal, or a combination of inactivation and removal) before or at the first customer for a ground water source for systems that are not subject to the source water monitoring requirements of § 141.402(a) of this chapter because the ground water system has informed the State that it provides at least 4-log treatment of viruses.

(ii) The process the State will use to determine the minimum residual disinfectant concentration the system must provide prior to the first customer for systems using chemical disinfection.

(iii) The State-approved alternative technologies that ground water systems may use alone or in combination with other approved technologies to achieve at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log inactivation and removal) before or at the first customer for a ground water source.

(iv) The monitoring and compliance requirements the State will require for ground water systems treating to at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of inactivation and removal) before or at the first customer for State-approved alternative treatment technologies.

(v) The monitoring, compliance and membrane integrity testing requirements the State will require to demonstrate virus removal for ground water systems using membrane filtration technologies.

(vi) The criteria, including public health-based considerations and incorporating on-site investigations and source water monitoring results the State will use to determine if a ground water system may discontinue 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of inactivation and removal) before or at the first customer.

* * * * *

[FR Doc. 06–8763 Filed 11–7–06; 8:45 am]

BILLING CODE 6560–50–P

H.B. No. 805

AN ACT

relating to the requirement that certain water service providers ensure emergency operations during an extended power outage.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

SECTION 1. Section 13.1395(a)(1), Water Code, is amended to read as follows:

(1) "Affected utility" means a retail public utility, exempt utility, or provider or conveyor of potable or raw water service that furnishes water service to more than one customer:

(A) in a county with a population of 3.3 million or more; or

(B) in a county with a population of 550,000 [~~400,000~~] or more adjacent to a county with a population of 3.3 million or more.

SECTION 2. (a) Not later than November 1, 2011, each affected utility described by Section 13.1395(a)(1)(B), Water Code, as amended by this Act, shall submit the information required by Section 13.1396, Water Code, to:

(1) each appropriate county judge and office of emergency management;

(2) the Public Utility Commission of Texas; and

(3) the division of emergency management of the governor.

(b) Not later than February 1, 2012, each affected utility

described by Section 13.1395(a)(1)(B), Water Code, as amended by this Act, shall submit to the Texas Commission on Environmental Quality the emergency preparedness plan required by Section 13.1395, Water Code, as amended by this Act.

(c) Not later than June 1, 2012, each affected utility described by Section 13.1395(a)(1)(B), Water Code, as amended by this Act, shall implement the emergency preparedness plan approved by the Texas Commission on Environmental Quality under Section 13.1395, Water Code, as amended by this Act.

(d) An affected utility described by Section 13.1395(a)(1)(B), Water Code, as amended by this Act, may file with the Texas Commission on Environmental Quality a written request for an extension, not to exceed 90 days, of the date by which the affected utility is required under Subsection (b) of this section to submit the affected utility's emergency preparedness plan or of the date by which the affected utility is required under Subsection (c) of this section to implement the affected utility's emergency preparedness plan. The Texas Commission on Environmental Quality shall approve the requested extension for good cause shown.

SECTION 3. This Act takes effect immediately if it receives a vote of two-thirds of all the members elected to each house, as provided by Section 39, Article III, Texas Constitution. If this Act does not receive the vote necessary for immediate effect, this Act takes effect September 1, 2011.

President of the Senate

Speaker of the House

I certify that H.B. No. 805 was passed by the House on March 30, 2011, by the following vote: Yeas 146, Nays 0, 1 present, not voting; and that the House concurred in Senate amendments to H.B. No. 805 on May 25, 2011, by the following vote: Yeas 146, Nays 0, 2 present, not voting.

Chief Clerk of the House

I certify that H.B. No. 805 was passed by the Senate, with amendments, on May 24, 2011, by the following vote: Yeas 31, Nays 0.

Secretary of the Senate

APPROVED: _____

Date

_____

Governor

federal register

Wednesday
December 16, 1998

Part IV

Environmental Protection Agency

40 CFR Parts 9, 141, and 142

National Primary Drinking Water Regulations: Disinfectants and Disinfection Byproducts; Final Rule

~~chlorine dioxide MRDL beginning December 16, 2003.~~

~~(c) 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 residual disinfectant levels identified in paragraph (a) of this section: control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.~~

~~10. A new subpart L is added to read as follows:~~

Subpart L—Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors

Sec.
141.130 General requirements.
141.131 Analytical requirements.
141.132 Monitoring requirements.
141.133 Compliance requirements.
141.134 Reporting and recordkeeping requirements.
141.135 Treatment technique for control of disinfection byproduct (DBP) precursors.

§ 141.130 General requirements.

(a) The requirements of this subpart L constitute national primary drinking water regulations.

(1) The regulations in this subpart establish criteria under which community water systems (CWSs) and nontransient, noncommunity water systems (NTNCWSs) which add a chemical disinfectant to the water in any part of the drinking water treatment process must modify their practices to meet MCLs and MRDLs in §§ 141.64 and 141.65, respectively, and must meet the treatment technique requirements for disinfection byproduct precursors in § 141.135.

(2) The regulations in this subpart establish criteria under which transient NCWSs that use chlorine dioxide as a disinfectant or oxidant must modify their practices to meet the MRDL for chlorine dioxide in § 141.65.

(3) EPA has established MCLs for TTHM and HAA5 and treatment technique requirements for disinfection byproduct precursors to limit the levels of known and unknown disinfection byproducts which may have adverse health effects. These disinfection byproducts may include chloroform; bromodichloromethane; dibromochloromethane; bromoform; dichloroacetic acid; and trichloroacetic acid.

(b) *Compliance dates.* (1) *CWSs and NTNCWSs.* Unless otherwise noted, systems must comply with the requirements of this subpart as follows. Subpart H systems serving 10,000 or more persons must comply with this subpart beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this subpart beginning December 16, 2003.

(2) *Transient NCWSs.* Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide and chlorite in this subpart beginning December 16, 2001. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with any requirements for chlorine dioxide and chlorite in this subpart beginning December 16, 2003.

(c) Each CWS and NTNCWS regulated under paragraph (a) of this section must be operated by qualified personnel who meet the requirements specified by the State and are included in a State register of qualified operators.

(d) *Control of disinfectant residuals.* Notwithstanding the MRDLs in § 141.65, systems may increase residual disinfectant levels in the distribution system of chlorine or chloramines (but not chlorine dioxide) to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run-off events, source water contamination events, or cross-connection events.

§ 141.131 Analytical requirements.

(a) *General.* (1) Systems must use only the analytical method(s) specified in this section, or otherwise approved by EPA for monitoring under this subpart, to demonstrate compliance with the requirements of this subpart. These methods are effective for compliance monitoring February 16, 1999.

(2) The following documents are incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460, or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington DC. EPA Method 552.1 is in *Methods for the Determination of Organic Compounds in Drinking Water-Supplement II,* USEPA, August 1992, EPA/600/R–92/129 (available through National Information Technical Service (NTIS), PB92–207703). EPA Methods 502.2, 524.2, 551.1, and 552.2 are in *Methods for the Determination of Organic Compounds in Drinking Water-Supplement III,* USEPA, August 1995, EPA/600/R–95/131. (available through NTIS, PB95–261616). EPA Method 300.0 is in *Methods for the Determination of Inorganic Substances in Environmental Samples,* USEPA, August 1993, EPA/600/R–93/100. (available through NTIS, PB94–121811). EPA Method 300.1 is titled *USEPA Method 300.1, Determination of Inorganic Anions in Drinking Water by Ion Chromatography, Revision 1.0,* USEPA, 1997, EPA/600/R–98/118 (available through NTIS, PB98-169196); also available from: Chemical Exposure Research Branch, Microbiological & Chemical Exposure Assessment Research Division, National Exposure Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH 45268, Fax Number: 513–569–7757, Phone number: 513–569–7586. Standard Methods 4500-Cl D, 4500-Cl E, 4500-Cl F, 4500-Cl G, 4500-Cl H, 4500-Cl I, 4500-ClO_2 D, 4500-ClO_2 E, 6251 B, and 5910 B shall be followed in accordance with *Standard Methods for the Examination of Water and Wastewater, 19th Edition,* American Public Health Association, 1995; copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. Standard Methods 5310 B, 5310 C, and 5310 D shall be followed in accordance with the *Supplement to the 19th Edition of Standard Methods for the Examination of Water and Wastewater,* American Public Health Association, 1996; copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. ASTM Method D 1253–86 shall be followed in accordance with the *Annual Book of ASTM Standards,* Volume 11.01, American Society for Testing and Materials, 1996 edition; copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohoken, PA 19428.

(b) *Disinfection byproducts.* (1) Systems must measure disinfection byproducts by the methods (as modified by the footnotes) listed in the following table:

APPROVED METHODS FOR DISINFECTION BYPRODUCT COMPLIANCE MONITORING

Methodology [2]	EPA method	Standard method	Byproduct measured [1]			
			TTHM	HAA5	Chlorite [4]	Bromate
P&T/GC/ElCD & PID	[3]502.2		X			
P&T/GC/MS	524.2		X			
LLE/GC/ECD	551.1		X			
LLE/GC/ECD		6251 B		X		
SPE/GC/ECD	552.1			X		
LLE/GC/ECD	552.2			X		
Amperometric Titration		4500-ClO_2 E			X	
IC	300.0				X	
IC	300.1				X	X

[1] X indicates method is approved for measuring specified disinfection byproduct.
[2] P&T = purge and trap; GC = gas chromatography; ElCD = electrolytic conductivity detector; PID = photoionization detector; MS = mass spectrometer; LLE = liquid/liquid extraction; ECD = electron capture detector; SPE = solid phase extractor; IC = ion chromatography.
[3] If TTHMs are the only analytes being measured in the sample, then a PID is not required.
[4] Amperometric titration may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in § 141.132(b)(2)(i)(A). Ion chromatography must be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in § 141.132(b)(2)(i)(B) and (b)(2)(ii).

(2) Analysis under this section for disinfection byproducts must be conducted by laboratories that have received certification by EPA or the State. To receive certification to conduct analyses for the contaminants in § 141.64(a), the laboratory must carry out annual analyses of performance evaluation (PE) samples approved by EPA or the State. In these analyses of PE samples, the laboratory must achieve quantitative results within the acceptance limit on a minimum of 80% of the analytes included in each PE sample. The acceptance limit is defined as the 95% confidence interval calculated around the mean of the PE study data between a maximum and minimum acceptance limit of +/−50% and +/−15% of the study mean.

(c) *Disinfectant residuals.* (1) Systems must measure residual disinfectant concentrations for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in the following table:

APPROVED METHODS FOR DISINFECTANT RESIDUAL COMPLIANCE MONITORING

Methodology	Standard method	ASTM method	Residual Measured [1]			
			Free chlorine	Combined chlorine	Total chlorine	Chlorine dioxide
Amperometric Titration	4500-Cl D	D 1253–86	X	X	X	
Low Level Amperometric Titration	4500-Cl E				X	
DPD Ferrous Titrimetric	4500-Cl F		X	X	X	
DPD Colorimetric	4500-Cl G		X	X	X	
Syringaldazin e (FACTS)	4500-Cl H		X			
Iodometric Electrode	4500-Cl I				X	
DPD	4500-ClO_2 D					X
Amperometric Method II	4500-ClO_2 E					X

[1] X indicates method is approved for measuring specified disinfectant residual.

(2) If approved by the State, systems may also measure residual disinfectant concentrations for chlorine, chloramines, and chlorine dioxide by using DPD colorimetric test kits.

(3) A party approved by EPA or the State must measure residual disinfectant concentration.

(d) *Additional analytical methods.* Systems required to analyze parameters not included in paragraphs (b) and (c) of this section must use the following methods. A party approved by EPA or the State must measure these parameters.

(1) *Alkalinity.* All methods allowed in § 141.89(a) for measuring alkalinity.

(2) *Bromide.* EPA Method 300.0 or EPA Method 300.1.

(3) *Total Organic Carbon (TOC).* Standard Method 5310 B (High-Temperature Combustion Method) or Standard Method 5310 C (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method) or Standard Method 5310 D (Wet-Oxidation Method). TOC samples may not be filtered prior to analysis. TOC samples must either be analyzed or must be acidified to achieve pH less than 2.0 by minimal addition of phosphoric or sulfuric acid as soon as practical after sampling, not to exceed 24 hours. Acidified TOC samples must be analyzed within 28 days.

(4) *Specific Ultraviolet Absorbance (SUVA).* SUVA is equal to the UV absorption at 254nm (UV_{254}) (measured in m^{-1} divided by the dissolved organic carbon (DOC) concentration (measured as mg/L). In order to determine SUVA, it is necessary to separately measure UV_{254} and DOC. When determining SUVA, systems must use the methods stipulated in paragraph (d)(4)(i) of this section to measure DOC and the method stipulated in paragraph (d)(4)(ii) of this section to measure UV_{254}. SUVA must be determined on water prior to the addition of disinfectants/oxidants by the system. DOC and UV_{254} samples used to determine a SUVA value must be taken at the same time and at the same location.

(i) Dissolved Organic Carbon (DOC). Standard Method 5310 B (High-Temperature Combustion Method) or Standard Method 5310 C (Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method) or Standard Method

5310 D (Wet-Oxidation Method). Prior to analysis, DOC samples must be filtered through a 0.45 µm pore-diameter filter. Water passed through the filter prior to filtration of the sample must serve as the filtered blank. This filtered blank must be analyzed using procedures identical to those used for analysis of the samples and must meet the following criteria: DOC < 0.5 mg/L. DOC samples must be filtered through the 0.45 µm pore-diameter filter prior to acidification. DOC samples must either be analyzed or must be acidified to achieve pH less than 2.0 by minimal addition of phosphoric or sulfuric acid as soon as practical after sampling, not to exceed 48 hours. Acidified DOC samples must be analyzed within 28 days.

(ii) Ultraviolet Absorption at 254 nm (UV_{254}). Method 5910 B (Ultraviolet Absorption Method). UV absorption must be measured at 253.7 nm (may be rounded off to 254 nm). Prior to analysis, UV_{254} samples must be filtered through a 0.45 µm pore-diameter filter. The pH of UV_{254} samples may not be adjusted. Samples must be analyzed as soon as practical after sampling, not to exceed 48 hours.

(5) *pH.* All methods allowed in § 141.23(k)(1) for measuring pH.

§ 141.132 Monitoring requirements.

(a) *General requirements.* (1) Systems must take all samples during normal operating conditions.

(2) Systems may consider multiple wells drawing water from a single aquifer as one treatment plant for determining the minimum number of TTHM and HAA5 samples required, with State approval in accordance with criteria developed under § 142.16(f)(5) of this chapter.

(3) Failure to monitor in accordance with the monitoring plan required under paragraph (f) of this section is a monitoring violation.

(4) Failure to monitor will be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.

(5) Systems may use only data collected under the provisions of this subpart or subpart M of this part to qualify for reduced monitoring.

(b) *Monitoring requirements for disinfection byproducts.* (1) *TTHMs and HAA5.* (i) *Routine monitoring.* Systems must monitor at the frequency indicated in the following table:

ROUTINE MONITORING FREQUENCY FOR TTHM AND HAA5

Type of system	Minimum monitoring frequency	Sample location in the distribution system
Subpart H system serving at least 10,000 persons.	Four water samples per quarter per treatment plant.	At least 25 percent of all samples collected each quarter at locations representing maximum residence time. Remaining samples taken at locations representative of at least average residence time in the distribution system and representing the entire distribution system, taking into account number of persons served, different sources of water, and different treatment methods.[1]
Subpart H system serving from 500 to 9,999 persons.	One water sample per quarter per treatment plant.	Locations representing maximum residence time.[1]
Subpart H system serving fewer than 500 persons.	One sample per year per treatment plant during month of warmest water temperature.	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets reduced monitoring criteria in paragraph (c) of this section.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	One water sample per quarter per treatment plant[2].	Locations representing maximum residence time.[1]
System using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	One sample per year per treatment plant[2] during month of warmest water temperature.	Locations representing maximum residence time.[1] If the sample (or average of annual samples, if more than one sample is taken) exceeds MCL, system must increase monitoring to one sample per treatment plant per quarter, taken at a point reflecting the maximum residence time in the distribution system, until system meets criteria in paragraph (c) of this section for reduced monitoring.

[1] If a system elects to sample more frequently than the minimum required, at least 25 percent of all samples collected each quarter (including those taken in excess of the required frequency) must be taken at locations that represent the maximum residence time of the water in the distribution system. The remaining samples must be taken at locations representative of at least average residence time in the distribution system.

[2] Multiple wells drawing water from a single aquifer may be considered one treatment plant for determining the minimum number of samples required, with State approval in accordance with criteria developed under § 142.16(f)(5) of this chapter.

(ii) Systems may reduce monitoring, except as otherwise provided, in accordance with the following table:

Reduced Monitoring Frequency for TTHM and HAA5

If you are a . . .	You may reduce monitoring if you have monitored at least one year and your . . .	To this level
Subpart H system serving at least 10,000 persons which has a source water annual average TOC level, before any treatment, ≤4.0 mg/L.	TTHM annual average ≤0.040 mg/L and HAA5 annual average ≤0.030 mg/L.	One sample per treatment plant per quarter at distribution system location reflecting maximum residence time.
Subpart H system serving from 500 to 9,999 persons which has a source water annual average TOC level, before any treatment, ≤4.0 mg/L.	TTHM annual average ≤0.040 mg/L and HAA5 annual average ≤0.030 mg/L.	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature. NOTE: Any Subpart H system serving fewer than 500 persons may not reduce its monitoring to less than one sample per treatment plant per year.
System using only ground water not under direct influence of surface water using chemical disinfectant and serving at least 10,000 persons.	TTHM annual average ≤0.040 mg/L and HAA5 annual average ≤0.030 mg/L.	One sample per treatment plant per year at distribution system location reflecting maximum residence time during month of warmest water temperature
System using only ground water not under direct influence of surface water using chemical disinfectant and serving fewer than 10,000 persons.	TTHM annual average ≤0.040 mg/L and HAA5 annual average ≤0.030 mg/L for two consecutive years OR TTHM annual average ≤0.020 mg/L and HAA5 annual average ≤0.015 mg/L for one year.	One sample per treatment plant per three year monitoring cycle at distribution system location reflecting maximum residence time during month of warmest water temperature, with the three-year cycle beginning on January 1 following quarter in which system qualifies for reduced monitoring.

(iii) Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels must resume monitoring at the frequency identified in paragraph (b)(1)(i) of this section in the quarter immediately following the quarter in which the system exceeds 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively.

(iv) The State may return a system to routine monitoring at the State's discretion.

(2) *Chlorite.* Community and nontransient noncommunity water systems using chlorine dioxide, for disinfection or oxidation, must conduct monitoring for chlorite.

(i) *Routine monitoring.* (A) *Daily monitoring.* Systems must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system must take additional samples in the distribution system the following day at the locations required by paragraph (b)(2)(ii) of this section, in addition to the sample required at the entrance to the distribution system.

(B) *Monthly monitoring.* Systems must take a three-sample set each month in the distribution system. The system must take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling must be conducted in the same manner (as three-sample sets, at the specified locations). The system may use the results of additional monitoring conducted under paragraph (b)(2)(ii) of this section to meet the requirement for monitoring in this paragraph.

(ii) *Additional monitoring.* On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system is required to take three chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(iii) *Reduced monitoring.* (A) Chlorite monitoring at the entrance to the distribution system required by paragraph (b)(2)(i)(A) of this section may not be reduced.

(B) Chlorite monitoring in the distribution system required by paragraph (b)(2)(i)(B) of this section may be reduced to one three-sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under paragraph (b)(2)(i)(B) of this section has exceeded the chlorite MCL and the system has not been required to conduct monitoring under paragraph (b)(2)(ii) of this section. The system may remain on the reduced monitoring schedule until either any of the three individual chlorite samples taken quarterly in the distribution system under paragraph (b)(2)(i)(B) of this section exceeds the chlorite MCL or the system is required to conduct monitoring under paragraph (b)(2)(ii) of this section, at which time the system must revert to routine monitoring.

(3) *Bromate.* (i) *Routine monitoring.* Community and nontransient noncommunity systems using ozone, for disinfection or oxidation, must take one sample per month for each treatment plant in the system using ozone. Systems must take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

(ii) *Reduced monitoring.* Systems required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly bromide measurements for one year. The system may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is equal to or greater than 0.05 mg/L based upon representative monthly measurements. If the running annual average source water bromide concentration is ≥0.05 mg/L, the system must resume routine monitoring

required by paragraph (b)(3)(i) of this section.

(c) *Monitoring requirements for disinfectant residuals.* (1) *Chlorine and chloramines.* (i) *Routine monitoring.* Systems must measure the residual disinfectant level at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in § 141.21. Subpart H systems 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.

(ii) *Reduced monitoring.* Monitoring may not be reduced.

(2) *Chlorine dioxide.* (i) *Routine monitoring.* Community, nontransient noncommunity, and transient noncommunity water systems that use chlorine dioxide for disinfection or oxidation must take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the system must take samples in the distribution system the following day at the locations required by paragraph (c)(2)(ii) of this section, in addition to the sample required at the entrance to the distribution system.

(ii) *Additional monitoring.* On each day following a routine sample monitoring result that exceeds the MRDL, the system is required to take three chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system (i.e., no booster chlorination), the system must take three samples as close to the first customer as possible, at intervals of at least six hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system (i.e., booster chlorination), the system must take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible (reflecting maximum residence time in the distribution system).

(iii) *Reduced monitoring.* Chlorine dioxide monitoring may not be reduced.

(d) *Monitoring requirements for disinfection byproduct precursors (DBPP).* (1) *Routine monitoring.* Subpart H systems which use conventional filtration treatment (as defined in § 141.2) must monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water. All systems required to monitor under this paragraph (d)(1) must also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water. These samples (source water and treated water) are referred to as paired samples. At the same time as the source water sample is taken, all systems must monitor for alkalinity in the source water prior to any treatment. Systems must take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

(2) *Reduced monitoring.* Subpart H systems with an average treated water TOC of less than 2.0 mg/L for two consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The system must revert to routine monitoring in the month following the quarter when the annual average treated water TOC ≥2.0 mg/L.

(e) *Bromide.* Systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system must continue bromide monitoring to remain on reduced bromate monitoring.

(f) *Monitoring plans.* Each system required to monitor under this subpart must develop and implement a monitoring plan. The system must maintain the plan and make it available for inspection by the State and the general public no later than 30 days following the applicable compliance dates in § 141.130(b). All Subpart H systems serving more than 3300 people must submit a copy of the monitoring plan to the State no later than the date of the first report required under § 141.134. The State may also require the plan to be submitted by any other system. After review, the State may require changes in any plan elements. The plan must include at least the following elements.

(1) Specific locations and schedules for collecting samples for any parameters included in this subpart.

(2) How the system will calculate compliance with MCLs, MRDLs, and treatment techniques.

(3) If approved for monitoring as a consecutive system, or if providing water to a consecutive system, under the provisions of § 141.29, the sampling plan must reflect the entire distribution system.

§ 141.133 Compliance requirements.

(a) *General requirements.* (1) Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor for TTHM, HAA5, or bromate, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average. Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, this failure to monitor will be treated as a monitoring violation for the entire period covered by the annual average.

(2) All samples taken and analyzed under the provisions of this subpart must be included in determining compliance, even if that number is greater than the minimum required.

(3) If, during the first year of monitoring under § 141.132, any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

(b) *Disinfection byproducts.* (1) *TTHMs and HAA5.* (i) For systems monitoring quarterly, compliance with MCLs in § 141.64 must be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as prescribed by § 141.132(b)(1). If the running annual arithmetic average of quarterly averages covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to § 141.32, in addition to reporting to the State pursuant to § 141.134. If a PWS fails to complete four consecutive quarters' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

(ii) For systems monitoring less frequently than quarterly, compliance must be based on an average of samples taken that year under the provisions of § 141.132(b)(1). If the average of these samples exceeds the MCL, the system must increase monitoring to once per quarter per treatment plant.

(iii) Systems on a reduced monitoring schedule whose annual average exceeds the MCL will revert to routine monitoring immediately. These systems

will not be considered in violation of the MCL until they have completed one year of routine monitoring.

(2). *Bromate.* Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly samples (or, for months in which the system takes more than one sample, the average of all samples taken during the month) collected by the system as prescribed by § 141.132(b)(3). If the average of samples covering any consecutive four-quarter period exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to § 141.32, in addition to reporting to the State pursuant to § 141.134. If a PWS fails to complete 12 consecutive months' monitoring, compliance with the MCL for the last four-quarter compliance period must be based on an average of the available data.

(3) *Chlorite.* Compliance must be based on an arithmetic average of each three sample set taken in the distribution system as prescribed by § 141.132(b)(2)(i)(B) and § 141.132(b)(2)(ii). If the arithmetic average of any three sample set exceeds the MCL, the system is in violation of the MCL and must notify the public pursuant to § 141.32, in addition to reporting to the State pursuant to § 141.134.

(c) *Disinfectant residuals.* (1) *Chlorine and chloramines.* (i) Compliance must be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system under § 141.132(c)(1). If the average of quarterly averages covering any consecutive four-quarter period exceeds the MRDL, the system is in violation of the MRDL and must notify the public pursuant to § 141.32, in addition to reporting to the State pursuant to § 141.134.

(ii) In cases where systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance must be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to § 141.134 must clearly indicate which residual disinfectant was analyzed for each sample.

(2) *Chlorine dioxide.* (i) *Acute violations.* Compliance must be based on consecutive daily samples collected by the system under § 141.132(c)(2). If any daily sample taken at the entrance to the distribution system exceeds the MRDL, and on the following day one (or more) of the three samples taken in the distribution system exceed the MRDL, the system is in violation of the MRDL and must take immediate corrective action to lower the level of chlorine dioxide below the MRDL and must notify the public pursuant to the procedures for acute health risks in § 141.32(a)(1)(iii)(E). Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system will also be considered an MRDL violation and the system must notify the public of the violation in accordance with the provisions for acute violations under § 141.32(a)(1)(iii)(E).

(ii) *Nonacute violations.* Compliance must be based on consecutive daily samples collected by the system under § 141.132(c)(2). If any two consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL, the system is in violation of the MRDL and must take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and will notify the public pursuant to the procedures for nonacute health risks in § 141.32(e)(78). Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the system must notify the public of the violation in accordance with the provisions for nonacute violations under § 141.32(e)(78).

(d) *Disinfection byproduct precursors (DBPP).* Compliance must be determined as specified by § 141.135(b). Systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements in § 141.135(b)(2) and must therefore apply for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to § 141.135(b)(3) and is in violation. Systems may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date.

§ 141.134 Reporting and recordkeeping requirements.

(a) Systems required to sample quarterly or more frequently must report to the State within 10 days after the end of each quarter in which samples were collected, notwithstanding the provisions of § 141.31. Systems required to sample less frequently than quarterly must report to the State within 10 days after the end of each monitoring period in which samples were collected.

(b) *Disinfection byproducts.* Systems must report the information specified in the following table:

If you are a...	You must report...[1]
System monitoring for TTHM and HAA5 under the requirements of §§ 141.132(b) on a quarterly or more frequent basis.	(1) The number of samples taken during the last quarter. (2) The location, date, and result of each sample taken during the last quarter. (3) The arithmetic average of all samples taken in the last quarter. (4) The annual arithmetic average of the quarterly arithmetic averages of this section for the last four quarters. (5) Whether the MCL was exceeded.
System monitoring for TTHMs and HAA5 under the requirements of §§ 141.132(b) less frequently than quarterly (but at least annually).	(1) The number of samples taken during the last year. (2) The location, date, and result of each sample taken during the last quarter. (3) The arithmetic average of all samples taken over the last year. (4) Whether the MCL was exceeded.
System monitoring for TTHMs and HAA5 under the requirements of § 141.132(b) less frequently than annually.	(1) The location, date, and result of the last sample taken. (2) Whether the MCL was exceeded.

If you are a...	You must report...[1]
System monitoring for chlorite under the requirements of § 141.132(b) ..	(1) The number of samples taken each month for the last 3 months. (2) The location, date, and result of each sample taken during the last quarter. (3) For each month in the reporting period, the arithmetic average of all samples taken in the month. (4) Whether the MCL was exceeded, and in which month it was exceeded.
System monitoring for bromate under the requirements of § 141.132(b)	(1) The number of samples taken during the last quarter. (2) The location, date, and result of each sample taken during the last quarter. (3) The arithmetic average of the monthly arithmetic averages of all samples taken in the last year. (4) Whether the MCL was exceeded.

(c) *Disinfectants.* Systems must report the information specified in the following table:

If you are a...	You must report...[1]
System monitoring for chlorine or chloramines under the requirements of § 141.132(c).	(1) The number of samples taken during each month of the last quarter. (2) The monthly arithmetic average of all samples taken in each month for the last 12 months. (3) The arithmetic average of all monthly averages for the last 12 months. (4) Whether the MRDL was exceeded.
System monitoring for chlorine dioxide under the requirements of § 141.132(c).	(1) The dates, results, and locations of samples taken during the last quarter. (2) Whether the MRDL was exceeded. (3) Whether the MRDL was exceeded in any two consecutive daily samples and whether the resulting violation was acute or nonacute.

[1] The State may choose to perform calculations and determine whether the MRDL was exceeded, in lieu of having the system report that information.

(d) *Disinfection byproduct precursors and enhanced coagulation or enhanced softening.* Systems must report the information specified in the following table:

If you are a . . .	You must report . . .[1]
System monitoring monthly or quarterly for TOC under the requirements of § 141.132(d) and required to meet the enhanced coagulation or enhanced softening requirements in § 141.135(b)(2) or (3).	(1) The number of paired (source water and treated water, prior to continuous disinfection) samples taken during the last quarter. (2) The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. (3) For each month in the reporting period that paired samples were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal. (4) Calculations for determining compliance with the TOC percent removal requirements, as provided in § 141.135(c)(1). (5) Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in § 141.135(b) for the last four quarters.
System monitoring monthly or quarterly for TOC under the requirements of § 141.132(d) and meeting one or more of the alternative compliance criteria in § 141.135(a)(2) or (3).	(1) The alternative compliance criterion that the system is using. (2) The number of paired samples taken during the last quarter. (3) The location, date, and result of each paired sample and associated alkalinity taken during the last quarter. (4) The running annual arithmetic average based on monthly averages (or quarterly samples) of source water TOC for systems meeting a criterion in §§ 141.135(a)(2)(i) or (iii) or of treated water TOC for systems meeting the criterion in § 141.135(a)(2)(ii).

If you are a . . .	You must report . . .[1]
	(5) The running annual arithmetic average based on monthly averages (or quarterly samples) of source water SUVA for systems meeting the criterion in § 141.135(a)(2)(v) or of treated water SUVA for systems meeting the criterion in § 141.135(a)(2)(vi). (6) The running annual average of source water alkalinity for systems meeting the criterion in § 141.135(a)(2)(iii) and of treated water alkalinity for systems meeting the criterion in § 141.135(a)(3)(i). (7) The running annual average for both TTHM and HAA5 for systems meeting the criterion in § 141.135(a)(2)(iii) or (iv). (8) The running annual average of the amount of magnesium hardness removal (as $CaCO_3$, in mg/L) for systems meeting the criterion in § 141.135(a)(3)(ii). (9) Whether the system is in compliance with the particular alternative compliance criterion in § 141.135(a)(2) or (3).

[1] The State may choose to perform calculations and determine whether the treatment technique was met, in lieu of having the system report that information.

§ 141.135 Treatment technique for control of disinfection byproduct (DBP) precursors.

(a) *Applicability.* (1) Subpart H systems using conventional filtration treatment (as defined in § 141.2) must operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in paragraph (b) of this section unless the system meets at least one of the alternative compliance criteria listed in paragraph (a)(2) or (a)(3) of this section.

(2) *Alternative compliance criteria for enhanced coagulation and enhanced softening systems.* Subpart H systems using conventional filtration treatment may use the alternative compliance criteria in paragraphs (a)(2)(i) through (vi) of this section to comply with this section in lieu of complying with paragraph (b) of this section. Systems must still comply with monitoring requirements in § 141.132(d).

(i) The system's source water TOC level, measured according to § 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

(ii) The system's treated water TOC level, measured according to § 141.131(d)(3), is less than 2.0 mg/L, calculated quarterly as a running annual average.

(iii) The system's source water TOC level, measured as required by § 141.131(d)(3), is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity, measured according to § 141.131(d)(1), is greater than 60 mg/L (as $CaCO_3$), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively; or prior to the effective date for compliance in § 141.130(b), the system has made a clear and irrevocable financial commitment not later than the effective date for compliance in § 141.130(b) to use of technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/L and 0.030 mg/L, respectively. Systems must submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the State for approval not later than the effective date for compliance in § 141.130(b). These technologies must be installed and operating not later than June 16, 2005. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of National Primary Drinking Water Regulations.

(iv) The TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

(v) The system's source water SUVA, prior to any treatment and measured monthly according to § 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(vi) The system's finished water SUVA, measured monthly according to § 141.131(d)(4), is less than or equal to 2.0 L/mg-m, calculated quarterly as a running annual average.

(3) *Additional alternative compliance criteria for softening systems.* Systems practicing enhanced softening that cannot achieve the TOC removals required by paragraph (b)(2) of this section may use the alternative compliance criteria in paragraphs (a)(3)(i) and (ii) of this section in lieu of complying with paragraph (b) of this section. Systems must still comply with monitoring requirements in § 141.132(d).

(i) Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as $CaCO_3$), measured monthly according to § 141.131(d)(1) and calculated quarterly as a running annual average.

(ii) Softening that results in removing at least 10 mg/L of magnesium hardness (as $CaCO_3$), measured monthly and calculated quarterly as an annual running average.

(b) *Enhanced coagulation and enhanced softening performance requirements.* (1) Systems must achieve the percent reduction of TOC specified in paragraph (b)(2) of this section between the source water and the combined filter effluent, unless the State approves a system's request for alternate minimum TOC removal (Step 2) requirements under paragraph (b)(3) of this section.

(2) Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with § 141.131(d). Systems practicing softening are required to meet the Step 1 TOC reductions in the far-right column (Source water alkalinity >120 mg/L) for the specified source water TOC:

STEP 1 REQUIRED REMOVAL OF TOC BY ENHANCED COAGULATION AND ENHANCED SOFTENING FOR SUBPART H SYSTEMS USING CONVENTIONAL TREATMENT [1, 2]

Source-water TOC, mg/L	Source-water alkalinity, mg/L as $CaCO_3$		
	0–60 (percent)	≤60–120 (percent)	>120 [3] (percent)
>2.0–4.0	35.0	25.0	15.0
>4.0–8.0	45.0	35.0	25.0
>8.0	50.0	40.0	30.0

[1] Systems meeting at least one of the conditions in paragraph (a)(2)(i)–(vi) of this section are not required to operate with enhanced coagulation.
[2] Softening systems meeting one of the alternative compliance criteria in paragraph (a)(3) of this section are not required to operate with enhanced softening.
[3] Systems practicing softening must meet the TOC removal requirements in this column.

(3) Subpart H conventional treatment systems that cannot achieve the Step 1 TOC removals required by paragraph (b)(2) of this section due to water quality parameters or operational constraints must apply to the State, within three months of failure to achieve the TOC removals required by paragraph (b)(2) of this section, for approval of alternative minimum TOC (Step 2) removal requirements submitted by the system. If the State approves the alternative minimum TOC removal (Step 2) requirements, the State may make those requirements retroactive for the purposes of determining compliance. Until the State approves the alternate minimum TOC removal (Step 2) requirements, the system must meet the Step 1 TOC removals contained in paragraph (b)(2) of this section.

(4) *Alternate minimum TOC removal (Step 2) requirements.* Applications made to the State by enhanced coagulation systems for approval of alternative minimum TOC removal (Step 2) requirements under paragraph (b)(3) of this section must include, as a minimum, results of bench- or pilot-scale testing conducted under paragraph (b)(4)(i) of this section and used to determine the alternate enhanced coagulation level.

(i) *Alternate enhanced coagulation level is defined as* coagulation at a coagulant dose and pH as determined by the method described in paragraphs (b)(4)(i) through (v) of this section such that an incremental addition of 10 mg/L of alum (as aluminum) (or equivalent amount of ferric salt) results in a TOC removal of ≤ 0.3 mg/L. The percent removal of TOC at this point on the ''TOC removal versus coagulant dose'' curve is then defined as the minimum TOC removal required for the system. Once approved by the State, this minimum requirement supersedes the minimum TOC removal required by the table in paragraph (b)(2) of this section. This requirement will be effective until such time as the State approves a new value based on the results of a new bench- and pilot-scale test. Failure to achieve State-set alternative minimum TOC removal levels is a violation of National Primary Drinking Water Regulations.

(ii) Bench- or pilot-scale testing of enhanced coagulation must be conducted by using representative water samples and adding 10 mg/L increments of alum (as aluminum) (or equivalent amounts of ferric salt) until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

ENHANCED COAGULATION STEP 2 TARGET pH

Alkalinity (mg/L as $CaCO_3$)	Target pH
0–60	5.5
>60–120	6.3
>120–240	7.0
>240	7.5

(iii) For waters with alkalinities of less than 60 mg/L for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the system must add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/L per 10 mg/L alum added (as aluminum) (or equivalant addition of iron coagulant) is reached.

(iv) The system may operate at any coagulant dose or pH necessary (consistent with other NPDWRs) to achieve the minimum TOC percent removal approved under paragraph (b)(3) of this section.

(v) If the TOC removal is consistently less than 0.3 mg/L of TOC per 10 mg/L of incremental alum dose (as aluminum) at all dosages of alum (or equivalant addition of iron coagulant), the water is deemed to contain TOC not amenable to enhanced coagulation. The system may then apply to the State for a waiver of enhanced coagulation requirements.

(c) *Compliance calculations.* (1) Subpart H systems other than those identified in paragraph (a)(2) or (a)(3) of this section must comply with requirements contained in paragraph (b)(2) of this section. Systems must calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:

(i) Determine actual monthly TOC percent removal, equal to:

(1—(treated water TOC/source water TOC)) × 100

(ii) Determine the required monthly TOC percent removal (from either the table in paragraph (b)(2) of this section or from paragraph (b)(3) of this section).

(iii) Divide the value in paragraph (c)(1)(i) of this section by the value in paragraph (c)(1)(ii) of this section.

(iv) Add together the results of paragraph (c)(1)(iii) of this section for the last 12 months and divide by 12.

(v) If the value calculated in paragraph (c)(1)(iv) of this section is less than 1.00, the system is not in compliance with the TOC percent removal requirements.

(2) Systems may use the provisions in paragraphs (c)(2)(i) through (v) of this section in lieu of the calculations in paragraph (c)(1)(i) through (v) of this section to determine compliance with TOC percent removal requirements.

(i) In any month that the system's treated or source water TOC level, measured according to § 141.131(d)(3), is less than 2.0 mg/L, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.

(ii) In any month that a system practicing softening removes at least 10 mg/L of magnesium hardness (as $CaCO_3$), the system may assign a

monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.

(iii) In any month that the system's source water SUVA, prior to any treatment and measured according to § 141.131(d)(4), is ≤2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.

(iv) In any month that the system's finished water SUVA, measured according to § 141.131(d)(4), is ≤2.0 L/mg-m, the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.

(v) In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/L (as $CaCO_3$), the system may assign a monthly value of 1.0 (in lieu of the value calculated in paragraph (c)(1)(iii) of this section) when calculating compliance under the provisions of paragraph (c)(1) of this section.

(3) Subpart H systems using conventional treatment may also comply with the requirements of this section by meeting the criteria in paragraph (a)(2) or (3) of this section.

(d) *Treatment technique requirements for DBP precursors.* The Administrator identifies the following as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems: For Subpart H systems using conventional treatment, enhanced coagulation or enhanced softening.

11. Section 141.154 is amended by adding paragraph (e) to read as follows:

§ 141.154 Required additional health information.

* * * * *

(e) Community water systems that detect TTHM above 0.080 mg/l, but below the MCL in § 141.12, as an annual average, monitored and calculated under the provisions of § 141.30, must include health effects language prescribed by paragraph (73) of appendix C to subpart O.

~~PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION~~

~~12. 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.~~

~~13. Section 142.14 is amended by adding new paragraphs (d)(12), (d)(13), (d)(14), (d)(15), and (d)(16) to read as follows:~~

~~§ 142.14 Records kept by States.~~

~~* * * * *~~

~~(d) * * *~~

~~(12) Records of the currently applicable or most recent State determinations, including all supporting information and an explanation of the technical basis for each decision, made under the following provisions of 40 CFR part 141, subpart L for the control of disinfectants and disinfection byproducts. These records must also include interim measures toward installation.~~

~~(i) States must keep records of systems that are installing GAC or membrane technology in accordance with § 141.64(b)(2) of this chapter. These records must include the date by which the system is required to have completed installation.~~

~~(ii) States must keep records of systems that are required, by the State, to meet alternative minimum TOC removal requirements or for whom the State has determined that the source water is not amenable to enhanced coagulation in accordance with § 141.135(b)(3) and (4) of this chapter, respectively. These records must include the alternative limits and rationale for establishing the alternative limits.~~

~~(iii) States must keep records of subpart H systems using conventional treatment meeting any of the alternative compliance criteria in § 141.135(a)(2) or (3) of this chapter.~~

~~(iv) States must keep a register of qualified operators that have met the State requirements developed under § 142.16(f)(2).~~

~~(13) Records of systems with multiple wells considered to be one treatment plant in accordance with § 141.132(a)(2) of this chapter and § 142.16(f)(5).~~

~~(14) Monitoring plans for subpart H systems serving more than 3,300 persons in accordance with § 141.132(f) of this chapter.~~

~~(15) List of laboratories approved for analyses in accordance with § 141.131(b) of this chapter.~~

~~(16) List of systems required to monitor for disinfectants and disinfection byproducts in accordance with part 141, subpart L of this chapter. The list must indicate what disinfectants and DBPs, other than chlorine, TTHM, and HAA5, if any, are measured.~~

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~~14. Section 142.16 is amended by adding paragraph (h) to read as follows:~~

~~§ 142.16 Special primacy requirements.~~

~~* * * * *~~

~~(h) *Requirements for States to adopt 40 CFR part 141, subpart L.* In addition to the general primacy requirements elsewhere in this part, including the requirement 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 L, must contain a description of how the State will accomplish the following program requirements:~~

~~(1) Section 141.64(b)(2) of this chapter (interim treatment requirements). Determine any interim treatment requirements for those systems electing to install GAC or membrane filtration and granted additional time to comply with § 141.64 of this chapter.~~

~~(2) Section 141.130(c) of this chapter (qualification of operators). Qualify operators of public water systems subject to 40 CFR part 141, subpart L. Qualification requirements established for operators of systems subject to 40 CFR part 141, subpart H—Filtration and Disinfection may be used in whole or in part to establish operator qualification requirements for meeting 40 CFR part 141, subpart L requirements if the State determines that the 40 CFR part 141, subpart H requirements are appropriate and applicable for meeting subpart L requirements.~~

~~(3) Section 141.131(c)(2) of this chapter (DPD colorimetric test kits). Approve DPD colorimetric test kits for free and total chlorine measurements. State approval granted under § 141.74(a)(2) of this chapter for the use of DPD colorimetric test kits for free chlorine testing is acceptable for the use of DPD test kits in measuring free chlorine residuals as required in 40 CFR part 141, subpart L.~~

~~(4) Sections 141.131(c)(3) and (d) of this chapter (State approval of parties to conduct analyses). Approve parties to conduct pH, bromide, alkalinity, and residual disinfectant concentration measurements. The State's process for approving parties performing water quality measurements for systems subject to 40 CFR part 141, subpart H requirements in paragraph (b)(2)(i)(D) of this section may be used for approving parties measuring water quality parameters for systems subject to subpart L requirements, if the State determines the process is appropriate and applicable.~~