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**The Ground Water Rule
(GWR) Implementation
Guidance**

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Disclaimer

This document provides guidance to states, tribes, and U.S. Environmental Protection Agency (EPA) Regions exercising primary enforcement responsibility under the Safe Drinking Water Act (SDWA) and contains EPA's current policy recommendations for complying with the Ground Water Rule (GWR). Throughout this document, the terms "state" and "states" are used to refer to all types of primacy agencies including U.S. territories, Indian tribes, and EPA Regions.

The statutory provisions and EPA regulations described in this document contain legally binding requirements. This document is not a regulation itself, nor does it change or substitute for those provisions and regulations. Thus, it does not impose legally binding requirements on EPA, states, or public water systems. This guidance does not confer legal rights or impose legal obligations upon any member of the public.

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The general description provided here may not apply to a particular situation based upon the circumstances. Interested parties are free to raise questions and objections about the substance of this guidance and the appropriateness of the application of this guidance to a particular situation. EPA and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those described in this guidance, where appropriate.

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This is a living document and may be revised periodically without public notice. EPA welcomes public input on this document at any time. Guidance provided in this document reflects provisions published on November 8, 2006 at 71 FR 65574.

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Acronyms and Abbreviations

ASDWA	Association of State Drinking Water Administrators
CCR	Consumer Confidence Report
CDC	Centers for Disease Control
CFR	Code of Federal Regulations
CT	The Residual Concentration of Disinfectant (mg/L) Multiplied by the Contact Time (in minutes)
CWSs	Community Water Systems
DBPs	Disinfectants and Disinfection Byproducts
EPA	U.S. Environmental Protection Agency
FR	<i>Federal Register</i>
gpm	Gallon Per Minute
GWR	Ground Water Rule
GWS	Ground Water System
GWUDI	Ground Water Under the Direct Influence
HQ	Headquarters
HSA	Hydrogeologic Sensitivity Assessment
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
M-DBP Cluster	Microbial-Disinfectants/Disinfection Byproducts Cluster
MMWR	Morbidity and Mortality Weekly Report
MRDL	Maximum Residual Detection Level
MWCO	Molecular Weight Cut-Off
NCWS	Noncommunity Water System
NF	Nanofiltration
NIPDWR	National Interim Primary Drinking Water Regulation
NPDWR	National Primary Drinking Water Regulation
NRC	National Research Council
NTNCWS	Nontransient Noncommunity Water System
O&M	Operations and Maintenance
OECA	Office of Enforcement and Compliance Assurance
OGC	Office of General Counsel
OGWDW	Office of Ground Water and Drinking Water
ORC	Office of Regional Counsel
psi	Pound-force Per Square Inch
PWS	Public Water System
PWSS	Public Water System Supervision
Q&A	Question and Answer
RO	Reverse Osmosis
SBREFA	Small Business Regulatory Enforcement Fairness Act
SDWA	Safe Drinking Water Act

SDWIS	Safe Drinking Water Information System
SNC	Significant Non-complier
Stage 1 DBPR	Stage 1 Disinfectants and Disinfection Byproducts Rule
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 Noncommunity Water System
TT	Treatment Technique
UV	Ultraviolet
WHPP	Wellhead Protection Program

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Introduction

This document provides guidance to EPA regions and states exercising primary enforcement responsibility under the Safe Drinking Water Act (SDWA) concerning how the U.S. Environmental Protection Agency (EPA) interprets the Ground Water Rule (GWR) under the SDWA. It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing the statute and regulations. This guidance is designed to implement national policy on these issues. Throughout this document, the terms “state” and “states” are used to refer to all types of primacy agencies including U.S. territories, Indian tribes, and EPA Regions.

The SDWA provision and EPA regulations described in this document contain legally binding requirements. This document does not substitute for those requirements, nor is it a regulation itself. It does not impose legally binding requirements on EPA, states, or the regulated community and may not apply to a particular situation based upon the circumstances. EPA and state decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance, where appropriate. Any decisions regarding a particular facility will be made based on the applicable statutes and regulations. Therefore, interested parties are free to raise questions and objections about the appropriateness of the application of this draft guidance to a particular situation. EPA will then consider whether or not the recommendations or interpretations in the draft guidance are appropriate in that situation based on the law and regulations. EPA may change this guidance in the future.

This manual contains the following sections:

- \$ **Section 1** summarizes the rule requirements of the GWR and presents a timetable of important dates.
- \$ **Section 2** lists the “stand-alone” guidance materials that will help states and public water systems (PWSs) adopt each new requirement.
- \$ **Section 3** discusses state implementation activities.
- \$ **Section 4** covers state primacy revision requirements, including a detailed time frame for application review and approval. This section also contains guidance and references to help states adopt each new special primacy requirement included in the GWR.
- \$ **Section 5** addresses violation determinations and associated reporting requirements to assist states in their compliance activities.
- \$ **Section 6** provides examples of scenarios requiring public notification and/or special notices, and includes sample language to include in public notifications, special notices and Consumer Confidence Reports (CCRs).

The appendices of this document also provide information that will be useful to states and EPA Regions throughout the primacy revision application process.

- \$ **Appendix A** contains the primacy revision application crosswalk for the GWR.
- \$ **Appendix B** contains a copy of the final GWR.

- \$ **Appendix C** contains fact sheets and a quick reference guide for the GWR.
- \$ **Appendix D** presents flowcharts to help states and systems implement the GWR.
- \$ **Appendix E** contains guidance for reviewing extension requests under SDWA Section 1412(b)(10).

Please note that, in several sections, the guidance makes suggestions and offers alternatives that go beyond the minimum requirements indicated. EPA does this to provide information and/or suggestions that may be helpful to implementation efforts. Such suggestions are prefaced by “may” or “should” and are to be considered advisory. They are not required elements of the GWR.

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Section 1

Rule Requirements

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1.1 Introduction

EPA published the Ground Water Rule (GWR) in the *Federal Register* (FR) on November 8, 2006 (*Federal Register* Volume 71, Number 216, 65574, available at: www.epa.gov/fedrgstr/EPA-WATER/2006/November/Day-08/w8763.pdf). This rule is part of a series of rules, the “Microbial-Disinfectants/Disinfection Byproducts Cluster” (M-DBP Cluster), which is intended to improve control of microbial pathogens while minimizing public health risks of disinfectants and disinfection byproducts (DBPs). The GWR builds upon the Total Coliform Rule (TCR) by addressing the health risks of fecal contamination in community water systems (CWSs) and noncommunity water systems (NCWSs) (e.g., nontransient noncommunity water systems [NTNCWSs] and transient noncommunity water systems [TNCWSs]) that use ground water. The GWR does not apply, however, to public water systems (PWSs) that combine all of their ground water with surface water before the treatment. These systems must comply instead with requirements for surface water systems and systems using ground water under the direct influence of surface water (Subpart H systems).

Key provisions of the GWR include:

- Periodic on-site reviews and inspections of ground water systems (GWSs) requiring evaluation of eight specific sanitary survey elements and identification of significant deficiencies.
- Requirements to correct significant deficiencies and eliminate fecal contamination through specified actions.
- Triggered source water monitoring to test for the presence of fecal indicators (*E. coli*, enterococci, or coliphage) in the sample.
- Compliance monitoring to ensure that treatment technologies installed to treat drinking water reliably achieve at least 99.99 percent (4-log) inactivation or removal of viruses.

Section 1 of this guidance manual also offers suggestions and alternatives that go beyond the minimum primacy agency requirements specified in the GWR. Such suggestions are prefaced by “may” or “should” and are to be considered advisory.

1.1.1 History

The Centers for Disease Control and Prevention (CDC) maintain a database of information on waterborne disease outbreaks in the United States. The CDC defines a waterborne disease outbreak as occurring when at least two persons experience a similar illness after ingesting drinking water from the same source or system.

The CDC reports¹ that between 1991 (the year in which the TCR went into effect) and 2000, GWSs (both CWSs and NCWSs) were associated with 68 outbreaks that caused 10,926 illnesses. These accounted for 51 percent of all waterborne disease outbreaks in the United States. The major deficiency in GWSs was source water contamination, which is either untreated or inadequately treated ground water. Contaminated source water (classified by the CDC as outbreaks caused by untreated ground water and treatment deficiencies) was the cause of 79 percent of the outbreaks in GWSs (63 percent of CWS outbreaks and 86 percent of NCWS outbreaks).

Of the 68 outbreaks in GWSs, 14 (21 percent) were associated with specific bacterial pathogens. The fecal bacterial pathogen, *Shigella*, caused more reported outbreaks (7 percent) than any other identifiable agent. Identified viral pathogens were associated with four (6 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.

Despite the data, the National Research Council (NRC) believes that the waterborne disease outbreaks in the CDC database (for both surface and ground waters) represent a small percentage of the actual number. In practice, most waterborne outbreaks in water systems are not recognized until a sizable proportion of the population is ill.

EPA estimates that approximately 70 percent of GWSs provide either untreated ground water or provide treatment of less than 4-log virus inactivation or removal.² Approximately 18 percent (20 million) of people served by PWSs that use ground water sources receive water that has not been disinfected, while over 60 percent (70 million) receive either water that has not been disinfected or water treated to less than 4-log inactivation or removal of viruses. EPA also recognizes that existing outbreak and source water fecal contamination occurrence data do not appear to support mandatory disinfection of all GWSs. But despite the potential for under-reporting, the data indicate that outbreaks in GWSs are a problem, and source contamination and inadequate treatment (or treatment failures) are responsible for the great majority of outbreaks.

1.1.2 Development of the Ground Water Rule

The Agency's goal in developing the GWR is to reduce the risk of illness caused by microbial contamination in PWSs relying on ground water. As part of the 1986 amendments to the Safe Drinking Water Act (SDWA), Congress directed EPA to promulgate a National Primary Drinking Water Regulation (NPDWR) requiring disinfection as a treatment technique for all PWSs, including those served by surface water and ground water. In 1987, EPA began developing a rule to cover GWSs. From

¹ The data in this and the subsequent two paragraphs are reported in the following sources:

Barwick, R.S., D.A. Levy, G.F. Craun, M.J. Beach, and R.L. Calderon. 2000. Surveillance for waterborne-disease outbreaks—United States, 1997–1998. *Morbidity and Mortality Weekly Report (MMWR)*. 49(SS04):1–35.

Kramer, M.H., B.L. Herwaldt, G.F. Craun, R.L. Calderon, and D.D. Juranek. 1996. Waterborne disease: 1993–1994. *Journal AWWA*. 88(3):66–80.

Lee, S.H., D.A. Levy, G.F. Craun, M.J. Beach, and R.L. Calderon. 2002. Surveillance for Waterborne-Disease Outbreaks—United States, 1999–2000. *MMWR*. 51(SS08):1–28.

Levy, D.A., M.S. Bens, G.F. Craun, R.L. Calderon, and B.L. Herwaldt. 1998. Surveillance for Waterborne-Disease Outbreaks—United States, 1995–1996. *MMWR*. 47(SS–5):1–34.

Moore, A.C., B.L. Herwaldt, G.F. Craun, R. L. Calderon, A.K. Highsmith, and D.D. Juranek. 1993. Surveillance for waterborne disease outbreaks—United States, 1991–1992 *MMWR*. Surveillance Summary SS–5, U.S. CDC. 42(SS–05):1–22.

² USEPA, 2006d. *Economic Analysis for the Final Ground Water Rule*. EPA 815-R-06-014

1990 to 1997, EPA conducted technical discussions on a number of issues, primarily to establish a reasonable means of determining whether a ground water source was vulnerable to fecal contamination and, thus, pathogens. This effort was accomplished through ad hoc working groups with the participation of EPA Headquarters and regional offices, states, local governments, academicians, and trade associations.

The SDWA was amended in August 1996 and, as a result, several statutory provisions were added establishing new drinking water requirements. Specifically, Congress required under section 1412(b)(8) that EPA develops regulations specifying the use of disinfectants for GWSs “as necessary.” These amendments established a new regulatory framework that required EPA to set criteria for states to determine whether GWSs need to disinfect.

EPA held a series of stakeholder meetings to present a summary of the findings resulting from technical discussions held since 1990 and from information generated by internal EPA working groups with the intention of developing disinfection criteria for GWSs. The purpose of these meetings was to engage all interested stakeholders in the analysis of data to develop the GWR. In addition, EPA received valuable input from small system operators as part of an Agency outreach initiative under the Small Business Regulatory Enforcement Fairness Act (SBREFA).

In addition to stakeholder input, EPA has used the results of numerous field and laboratory studies conducted over the past 20 years to characterize the epidemiologic, hydrogeologic, well construction, microbial-source attributes, and treatment technology considerations in the development of the GWR.

1.1.3 Benefits of the Ground Water Rule

1.1.3.1 Quantifiable Health Benefits

The primary benefits of the GWR come from reductions in the risk of microbial illness from drinking water. In particular, the GWR focuses on reducing illness and death associated with viral infection. It is likely that the value estimated in the illness calculations used to estimate the benefits of this rule underestimate the true benefit because they do not include pain and suffering associated with viral and bacterial illnesses. According to the risk assessment performed for the Economic Analysis,³ the annualized present value of the GWR is \$19.7 million, with a 90-percent confidence interval of \$6.5 to \$45.4 million. This result is based on the number of endemic viral illnesses and deaths avoided attributable to this rule. The GWR will also decrease bacterial illness and death associated with fecal contamination of ground water.

1.1.3.2 Non-Quantifiable Health Benefits

By reducing bacterial illnesses and deaths, as well as illnesses and deaths associated with viruses, the GWR provides significant health benefits beyond the quantifiable health benefit estimates. The GWR will also result in non-health benefits, such as avoided outbreak response costs and increased information that will provide added benefits to the systems and their customers, by providing information to the system operator to ensure the system continues to provide safe drinking water. The GWR will also provide the benefit of reducing uncertainty regarding drinking water safety, which may lead to reduced costs associated with individuals seeking alternative drinking water sources or auxiliary treatment for their existing sources.

³ USEPA, 2006d. *Economic Analysis for the Final Ground Water Rule*. EPA 815-R-06-014

1.2 Requirements of the Rule: Public Water Systems

The following rule requirements are from the GWR published in the *Federal Register* on November 8, 2006 (*Federal Register* Volume 71, Number 216, 65574, available at: www.epa.gov/fedrgstr/EPA-WATER/2006/November/Day-08/w8763.pdf).

For a copy of the actual rule language, see Appendix B, or visit EPA's Web site at www.epa.gov/safewater/disinfection/gwr/regulation.html.

This section provides a brief summary of the rule requirements. GWR requirements are explained in more detail in section 3.

1.2.1 Applicability and Compliance Dates

For more detailed information about to whom this rule applies and the applicable compliance dates, see section 1.4 of this document.

1.2.1.1 To Whom Does The Rule Apply?

The GWR addresses fecal contamination in systems that use wells or other ground water sources. The rule applies to CWSs and NCWSs, regardless of size. The GWR applies to all PWSs that:

- Rely entirely on one or more ground water sources;
- Are consecutive systems that receive finished ground water; or,
- Mix surface and ground water, where ground water is added directly to the distribution system and provided to consumers without treatment equivalent to the treatment provided for surface water.

For the purposes of this document, the term "ground water system" (or GWS) will be used to refer to a system to which the GWR applies.

1.2.1.2 What Are The Compliance Dates?

Most of the GWR requirements take effect December 1, 2009. These requirements include:

- GWSs will be subject to triggered source water monitoring.
- Corrective action if a significant deficiency is identified.
- Corrective action if ground water source samples test positive for fecal contamination.
- Written notification from GWSs providing at least 4-log treatment of viruses that demonstrates the treatment effectiveness.

GWSs bringing a new ground water source into service after November 30, 2009 must either meet the triggered source water monitoring requirements of the GWR or provide 4-log treatment of viruses. After that date, new systems with 4-log treatment of viruses must provide written notification to the state that they are providing at least 4-log treatment of viruses before or at the first customer.

States must complete all initial sanitary surveys for CWSs by December 31, 2012. NCWSs (and CWSs that qualify to have sanitary surveys conducted once every 5 years) must complete initial surveys by December 31, 2014.

1.2.2 Sanitary Surveys for GWSs [40 CFR 141.401]

GWSs must provide, at the state’s request, any existing information that would allow the state to perform a sanitary survey. Examples of existing information that may be necessary to perform the survey include past survey reports, source water vulnerability assessments, monitoring and maintenance records, construction details of system infrastructure components, and operations and management-related records.

As Table 1-1 summarizes, the state is required to perform a sanitary survey for CWSs every 3 years (except for CWSs that meet certain conditions outlined in section 3.6.1 of this guidance manual) and for NCWSs (and CWSs that meet the conditions outlined in section 3.6.1) every 5 years. See section 3.6.1 for more information on sanitary survey schedules.

Table 1-1. Sanitary Survey Requirements by System Type

System Type	Timeframe	All Initial Sanitary Surveys Completed by
CWSs	Every 3 years	12/31/2012
CWSs providing at least 4-log treatment of viruses before or at the first user for all its ground water sources or if it has an outstanding performance record, as determined by the state. ¹	Every 5 years	12/31/2014
NCWSs		

1. The GWR allows states to define outstanding performance.

The GWR specifies eight elements integral to an effective sanitary survey. These elements are taken from the EPA and Association of State Drinking Water Administrators’ (ASDWA’s) guidance for conducting sanitary surveys (*Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under the Direct Influence [GWUDI]*. April 1999 EPA 815-R-99-016). This document is available at www.epa.gov/safewater/mdbp/pdf/sansurv/sansurv.pdf and from the Safe Drinking Water Hotline (800) 426-4791). The eight elements are:

- Source (protection, physical components, and condition).
- Treatment.
- Distribution System.
- Finished Water Storage.
- Pumps, Pump Facilities, and Controls.
- Monitoring, Reporting, and Data Verification.
- Water System Management and Operations.
- Operator Compliance with State Requirements.

1.2.3 Ground Water Source Microbial Monitoring [40 CFR 141.402]

The GWR has three general categories of ground water source microbial monitoring requirements: 1) triggered source water monitoring, 2) additional source water sampling, and 3) assessment source water

monitoring. This section provides a brief summary of ground water source microbial monitoring requirements. Monitoring requirements are explained in more detail in section 3.

1.2.3.1 Triggered Source Water Monitoring

Any GWS that does not provide at least 4-log treatment of viruses before or at the first customer and is notified of a total coliform-positive sample collected in compliance with the TCR (40 CFR 141.21), must conduct triggered source water monitoring.

Systems providing 4-log treatment of viruses must notify their state that they provide treatment and must conduct compliance monitoring (see section 1.2.4.1), or they will also be required to conduct triggered source water monitoring if they are notified of a total coliform-positive sample collected in compliance with the TCR. Systems providing 4-log treatment (who are not providing that treatment as a result of a corrective action) can opt to conduct triggered source water monitoring instead of compliance monitoring, as long as the state allows it.

When a system is notified of a total coliform-positive sample, the system must collect at least one ground water source sample from each source in use at the time the total coliform-positive sample was collected. The triggered source water sample must be analyzed for the presence of a state-approved fecal indicator. If the triggered source water sample is fecal indicator-positive, the GWS must either take corrective action, as directed by the state, or if corrective action is not required by the state and the sample is not invalidated by the state the system must collect five additional source water samples and analyze them for the presence of a state-approved fecal indicator.

The GWR allows states to determine that the cause of a total coliform-positive sample collected in compliance with the TCR is directly related to the distribution system and should therefore not trigger fecal indicator source water monitoring. States may also invalidate a fecal indicator-positive ground water source sample under conditions specified in the GWR. If a fecal indicator-positive source sample is invalidated, the system must collect another source water sample within 24 hours of being notified by the state of its invalidation decision and have it analyzed for the same fecal indicator that was tested for in the invalidated sample.

1.2.3.2 Additional Source Water Sampling

If the state does not require corrective action in response to a fecal indicator-positive triggered source water sample, 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. These additional source water samples should be analyzed for the same fecal indicator as was analyzed in the triggered source water sample. If any of the five additional source water samples are fecal indicator-positive, the GWS must take corrective action.

1.2.3.3 Assessment Source Water Monitoring

As a complement to the triggered source water monitoring provision, states may require GWSs to conduct assessment source water monitoring, as needed. This flexible provision gives states the opportunity to target high risk systems for additional source water monitoring and require corrective action, if necessary.

1.2.4 Treatment Technique Requirements For GWSs [40 CFR 141.403]

GWSs must take corrective action if a significant deficiency is identified, or if the initial source sample (if required by the state) or one of the five additional ground water source samples has tested positive for

fecal contamination. A “significant deficiency” is defined 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 potential for causing, the introduction of contamination into the water delivered to consumers.

The system must implement at least one of the following corrective actions:

- Correct all significant deficiencies.
- Provide an alternate source of water.
- Eliminate the source of contamination.
- Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal) before or at the first customer for the ground water source.

1.2.4.1 Treatment Technique Compliance Monitoring [40 CFR 141.403(b)]

In order **not** to be subject to triggered source water monitoring, a GWS must notify the state that it provides at least 4-log treatment of viruses using virus inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal before or at the first customer by December 1, 2009 and is therefore not subject to the triggered source water monitoring requirements. The system must then begin compliance monitoring designed to show the efficacy of their treatment processes by December 1, 2009. GWSs that provide at least 4-log treatment of viruses before or at the first customer on or after December 1, 2009 must notify the state that they provide treatment and conduct compliance monitoring, or they must comply with the GWR’s triggered source water monitoring requirements.

Compliance Monitoring

Systems that use chemical disinfection and serve more than 3,300 people must continuously monitor their disinfectant concentration. Systems must maintain the minimum disinfectant residual concentration determined by the state. If continuous monitoring equipment fails, systems must take grab samples every 4 hours until the equipment is repaired. The equipment must be repaired within 14 days.

Systems that use chemical disinfection and serve 3,300 people or fewer must take daily grab samples or meet the continuous monitoring requirements described above for systems serving more than 3,300 people. If any daily grab sample measurement falls below the minimum state-required residual disinfectant concentration, the system must take follow-up samples every 4 hours until the residual is restored to the required level.

Systems using membrane filtration for 4-log treatment of viruses must monitor the membrane filtration process according to state-specified monitoring requirements and must operate the membrane filtration according to all state-specified compliance requirements. States can refer to EPA’s *Membrane Filtration Guidance Manual* (November 2005 EPA 815-R-06-009) for information on membrane filtration system design and operation, membrane filtration testing requirements, and startup and implementation considerations.

Systems may use alternative treatment technologies (e.g., ultraviolet radiation [UV]) approved by the state, if the alternative treatment technology, alone or in combination (e.g., filtration with UV, filtration

with chlorination) can reliably provide at least 4-log treatment of viruses. Systems must monitor the alternative treatment according to state-specified monitoring requirements, and must operate the alternative treatment according to compliance requirements established by the state.

1.2.5 Public Water System Reporting Requirements [40 CFR 141.405(c)]

Table 1-2. GWS Requirements for Reporting to the State Under the GWR

GWS Requirements for Reporting to the State	Rule Cite
In addition to the requirements of 40 CFR 141.31, GWSs must provide the following information to the state:	40 CFR 141.405(a)
GWSs conducting compliance monitoring under 40 CFR 141.403(b): Must notify the state any time they fail 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 4 hours. The system must notify the state as soon as possible, but no later than the end of the next business day.	40 CFR 141.405(a)(1)
GWSs after completing any corrective action: Must notify the state within 30 days of completion of the corrective action.	40 CFR 141.405(a)(2)
GWSs subject to the requirements of 40 CFR 141.402(a) that do not conduct source water monitoring under 40 CFR 141.402(a)(5)(ii): Must provide documentation to the state within 30 days of the total coliform-positive sample that the system has met the state criteria.	40 CFR 141.405(a)(3)

1.2.6 Public Water System Recordkeeping Requirements [40 CFR 141.405(b)]

Table 1-3. GWS Recordkeeping Requirements Under the GWR

GWS Recordkeeping Requirements	Rule Cite
In addition to the requirements of 40 CFR 141.33, GWSs must maintain the following information in their records:	40 CFR 141.405(b)
GWSs must maintain: Documentation of corrective actions. Documentation shall be kept for a period of not less than 10 years.	40 CFR 141.405(b)(1)
GWSs must maintain: Documentation of notice to the public. Documentation shall be kept for a period of not less than 3 years.	40 CFR 141.405(b)(2)

GWS Recordkeeping Requirements	Rule Cite
<p>GWSs must maintain:</p> <p>Records of decision and records of invalidation of fecal indicator-positive ground water source samples. Documentation shall be kept for a period of not less than 5 years.</p>	40 CFR 141.405(b)(3)
<p>Consecutive GWSs must maintain:</p> <p>Documentation of notification to the wholesale system(s) of total coliform-positive samples that are not invalidated. Documentation shall be kept for a period of not less than 5 years.</p>	40 CFR 141.405(b)(4)
<p>GWSs (including wholesale systems) that are required to perform compliance monitoring must maintain:</p> <p>Records of the state-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than 10 years.</p>	40 CFR 141.405(b)(5)(i)
<p>GWSs (including wholesale systems) that are required to perform compliance monitoring must maintain:</p> <p>Records of the lowest daily disinfectant residual 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 4 hours. Documentation shall be kept for a period of not less than 5 years.</p>	40 CFR 141.405(b)(5)(ii)
<p>GWSs (including wholesale systems) that are required to perform compliance monitoring must maintain:</p> <p>Records of state-specific 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 operation requirements for more than 4 hours. Documentation shall be kept for a period of not less than 5 years.</p>	40 CFR 141.405(b)(5)(iii)

1.2.7 Public Notification of Drinking Water Violations [40 CFR 141.402(a) and 40 CFR 141.403(a)]

Table 1-4. GWS Public Notification Requirements Under the GWR

GWS Public Notification Requirements	Rule Cite
<p>GWSs that detect <i>E. coli</i>, enterococci, or coliphage in a source water sample, as specified in 40 CFR141.402(a) and 40 CFR141.402(b) except when the state has invalidated the sample as specified in 40 CFR141.402(d), must provide Tier 1 public notice.</p>	40 CFR 141.202(a) Table 1(8)

GWS Public Notification Requirements	Rule Cite
GWSs that fail to take corrective action within 120 days following a significant deficiency or fecal indicator-positive source water sample or fail 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 40 CFR 141.403(a) must provide Tier 2 public notice.	40 CFR 141.203(a) Table 1(4)
GWSs that fail 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 40 CFR 141.403(a)(2) must provide Tier 2 public notice.	40 CFR 141.203(a) Table 1(4)
GWSs that fail to conduct required ground water source monitoring, including compliance monitoring, triggered source water monitoring when a system has a total coliform-positive sample in the distribution system (40 CFR 141.402(a)(2)), additional source water monitoring following a fecal indicator-positive source water sample (if the state does not require corrective action) (40 CFR 141.402(a)(3)), and, if required by the state, assessment source water monitoring (40 CFR 141.402(b)), must provide Tier 3 public notice.	40 CFR 141.203(a) Table 1(4)

1.2.8 CCR Requirements [40 CFR 141.153]

CWSs are required to report GWR treatment technique violations and monitoring violations in their Consumer Confidence Reports (CCRs). In addition, the GWR has special notice requirements for CWS requiring them to report additional information in their CCRs. These special notice requirements are summarized in section 1.2.9 and described in more detail in section 3.8.2. More information on general CCR requirements can be found at www.epa.gov/safewater/ccr1.html.

1.2.9 Special Notice Requirements [40 CFR 141.403(a)(7)]

The GWR requires special notice under specific circumstances. Special notice is a separate requirement from public notification and CCR requirements. For CWSs, special notice is made in the CCR. NCWSs will be required to prepare and distribute special notice in a manner approved by their state. For some of the circumstances requiring special notice, systems will not have committed a violation. Circumstances that require special notice differ for CWSs and NCWSs.

Community Water Systems

A CWS that receives notice from the state of a significant deficiency or notification of a fecal indicator-positive source water sample that is not invalidated by the state must inform its customers of the fecal indicator-positive ground water sample or of any significant deficiency that is uncorrected in their next CCR. CWSs with a fecal indicator-positive ground water sample must include certain mandatory elements in their special notice, including new health effects language for fecal indicators. More details about these requirements are provided in section 3.8 and an example of a CWS special notice is provided in section 6.

The system must continue to inform the public with a special notice annually until the state determines the particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed.

Noncommunity Water Systems

NCWSs must inform the public served by their water systems 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.

1.3 Requirements of the Rule: States or Other Primacy Agencies

The following rule requirements are from the GWR published in the *Federal Register* on November 8, 2006 (*Federal Register* Volume 71, Number 216, 65574, available at: www.epa.gov/fedrgstr/EPA-WATER/2006/November/Day-08/w8763.pdf).

For a copy of the actual rule language, see Appendix B, or visit EPA's Web site at www.epa.gov/safewater/disinfection/gwr/regulation.html.

Section 4 of this guidance manual provides a more detailed discussion of the GWR's primacy requirements.

In order to receive primacy for the GWR, states must adopt regulations no less stringent than the GWR requirements. States must submit revisions to their programs, regulations, or authorities no later than November 22, 2008, although states can request an extension of up to 2 years (i.e., until November 22, 2010). Guidance on primacy requirements is provided in Section 4.

The GWR gives states latitude to define several GWR requirements, including some monitoring requirements, definitions of significant deficiencies, and design and operating criteria. As a result, states will need to address numerous special primacy requirements in their primacy packages. Section 4 provides guidance to states on preparing primacy materials for the GWR.

Primacy requirements of the GWR include:

- Legal authority to ensure that GWSs conduct source water monitoring, including determination of the appropriate fecal indicators to use for source water monitoring.
- Legal authority to require correction of significant deficiencies and source water fecal contamination.
- Legal authority to require source water monitoring, and adoption and implementation of adequate procedures for sanitary surveys.
- Legal authority to ensure that GWSs consult with the state regarding corrective action(s).

1.3.1 Special Primacy Requirements [40 CFR 142.16(o)]

In addition to adopting basic primacy requirements specified in 40 CFR 142, states are required to adopt primacy provisions pertaining to specific regulations where implementation of the rule involves activities beyond general primacy provisions. States must include these rule-distinct provisions in an application for approval or revision of their programs.

1.3.2 Records Kept by States [40 CFR 142.14(d)(17)]

Table 1-5. State Recordkeeping Requirements

State Recordkeeping Requirements	Rule Cite
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 the GWR:	40 CFR 142.14(d)(17)
<u>Section 142.16(o)(2)(v)</u> – Records of written notices of significant deficiencies	40 CFR 142.14(d)(17)(i)
<u>Section 141.403(a)(5)(ii)</u> – Records of corrective action plans and schedule approval and/or state-specified interim measures.	40 CFR 142.14(d)(17)(ii)
<u>Section 142.16(o)(4)</u> – Records of confirmation that a significant deficiency has been corrected or source water fecal contamination has been addressed.	40 CFR 142.14(d)(17)(iii)
<u>Section 141.402(a)(5)</u> – Records of state determinations and records of GWS’s documentation for not conducting triggered source water monitoring.	40 CFR 142.14(d)(17)(iv)
<u>Section 141.402(d)</u> – Records of state determination to invalidate fecal indicator- positive source water samples.	40 CFR 142.14(d)(17)(v)
<u>Section 141.402(a)(2)(ii)</u> – Records of state approval of source water monitoring plans.	40 CFR 142.14(d)(17)(vi)
<u>Section 142.16(o)(4)(ii)</u> – 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.	40 CFR 142.14(d)(17)(vii)
<u>Sections 142.16(o)(4)(iv) and 142.16(o)(4)(v)</u> – Records of notices of 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.	40 CFR 142.14(d)(17)(viii)
<u>Sections 141.403(b)(1) and 141.403(b)(2)</u> – Records of written notice from a GWS that 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 a ground water source.	40 CFR 142.14(d)(17)(ix)
<u>Section 142.16(o)(4)(vi)</u> – Records of written determinations that a GWS may discontinue 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log inactivation and removal).	40 CFR 142.14(d)(17)(x)

1.3.3 State Reporting Requirements [40 CFR 142.15(c)(7)]

Under 40 CFR 142.15, EPA currently requires states to report to EPA information such as violations, variance and exemption status, and enforcement actions. Table 1-6 describes the additional reporting requirements for states under the GWR.

Table 1-6. State Requirements for Reporting to EPA

State Requirements for Reporting to EPA	Rule Cite
<p>For sanitary surveys:</p> <p>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 40 CFR 142.16(o)(2) for each GWS.</p>	40 CFR 142.15(c)(7)(i)
<p>For corrective action requirements:</p> <p>For any corrective action taken under 40 CFR 141.403(a), the date the GWS completed corrective action.</p>	40 CFR 142.15(c)(7)(ii)
<p>For compliance monitoring:</p> <p>All GWSs 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).</p>	40 CFR 142.15(c)(7)(iii)

1.4 Summary of Requirements

1.4.1 Applicability and Compliance Dates

The GWR addresses fecal contamination in systems that use ground water sources. The rule applies to both CWSs and NCWSs, regardless of size. The GWR applies to all PWSs that:

- Rely entirely on one or more ground water sources;
- Are consecutive systems that receive finished ground water; or,
- Mix surface and ground water, where ground water is added directly to the distribution system and provided to consumers without treatment equivalent to the treatment provided for surface water.

The GWR does not apply, however, to PWSs that combine all of their ground water with surface water before the treatment required for surface water systems is applied.

GWSs must comply with the requirements of the GWR beginning December 1, 2009 unless otherwise indicated. States must complete initial sanitary surveys for CWSs by December 31, 2012 or December 31, 2014 (based on rule requirements), and for NCWSs by December 31, 2014. The GWR also requires systems to be subject to triggered source water monitoring, beginning no later than December 1, 2009. There are additional treatment technique requirements if a significant deficiency is identified or if the initial source sample (at state discretion) or one of the five additional ground water source samples has tested positive for fecal contamination, also beginning no later than December 1, 2009.

The GWR requires GWSs that provide at least 4-log treatment of viruses using chemical disinfection, membrane filtration, or a state-approved alternative treatment technology to provide written notification

that demonstrates the treatment effectiveness, no later than December 1, 2009. The written notification must include engineering, operational and other information requested by the state so that the state can evaluate the submission.

GWSs that bring a new ground water source in service after November 30, 2009 must meet the triggered source water monitoring requirements or provide 4-log treatment of viruses. If directed by the state, a system placing a new ground water source into service after November 30, 2009 must also conduct assessment source water monitoring. The state will direct the system whether source water assessment monitoring must begin before the ground water source is used to provide water to the public. For more information on source water monitoring, refer to EPA’s *Ground Water Rule Source Water Monitoring Methods Guidance Manual* (July 2007 EPA 815-R-07-019).

If the system provides 4-log treatment of viruses, it must provide written notification to the state that they are providing 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. The written notification must include engineering, operational and other information requested by the state so that the state can evaluate the submission. The system must conduct compliance monitoring before or at the first customer in order to demonstrate the effectiveness and reliability of the treatment source within 30 days of placing the source in service. If the system discontinues 4-log treatment of viruses the system is subject to the source water monitoring and analytical methods requirements of 40 CFR 141.402.

More information can be obtained from:

A. The GWR published on November 8, 2006 (71 FR 65574 and available at: www.epa.gov/fedrgstr/EPA-WATER/2006/November/Day-08/w8763.pdf)

B. The EPA Safe Drinking Water Hotline, Telephone: (800) 426-4791

The GWR published in the *Federal Register* on November 8, 2006 at 71 FR 65574, becomes effective on January 8, 2007. This rule contains no early implementation requirements. The timetable for the GWR is presented below in Table 1-7. Table 1-7 summarizes key compliance dates required (bold) by the GWR as well as suggested action dates (shaded).

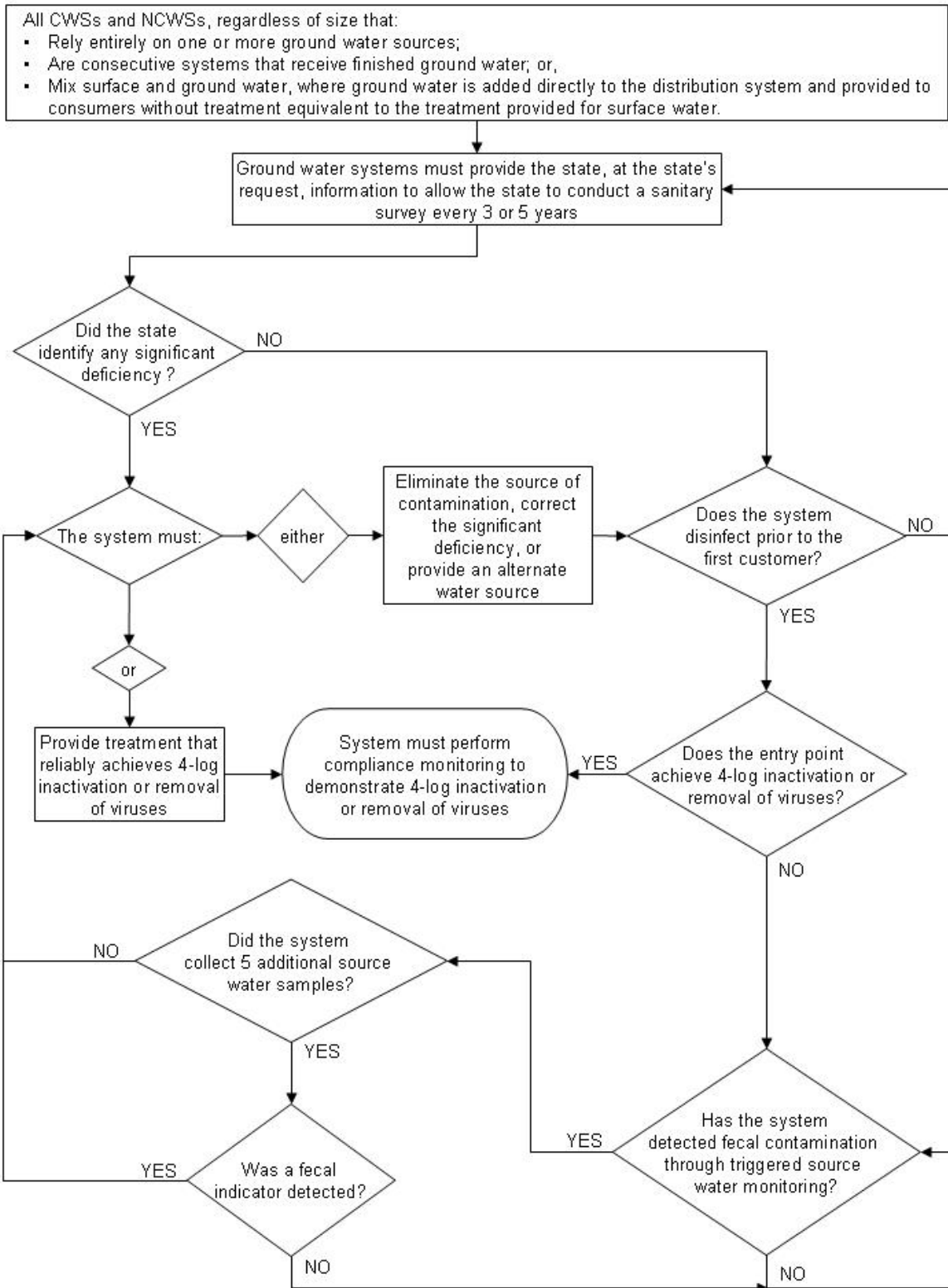
Table 1-7. Summary of Action Dates for the Ground Water Rule

Key Dates of Rule	GWR Requirements
November 8, 2006	GWR published in <i>Federal Register</i>
November 22, 2006	GWR promulgated
August 8, 2008	States are encouraged to submit final primacy applications or extension requests to EPA.
November 8, 2008	Final primacy revision applications for GWR must be submitted to the EPA regional administrator, unless state is granted an extension.
November 30, 2009	New ground water sources put in place after this date must meet triggered source water monitoring requirements or provide 4-log treatment of viruses.

Key Dates of Rule	GWR Requirements
December 1, 2009	<p>GWR compliance date - all GWSs must comply.</p> <ul style="list-style-type: none"> • GWSs providing at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer must notify the state. • GWSs providing at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer must begin compliance monitoring to demonstrate treatment effectiveness. • GWSs for which the state has identified a significant deficiency (during a sanitary survey) and GWSs at which at least one of the five additional ground water source samples (or at state discretion, the initial source sample) has tested positive for fecal contamination must comply with the treatment technique requirements. • GWSs must conduct triggered source water monitoring if the system does not provide at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer and the system is notified that a sample collected for the TCR is total coliform-positive. • GWSs providing 4-log treatment of viruses must notify the state in writing of the effectiveness and reliability of the treatment. The written notification must include engineering, operational, and other information the state requests.
August 8, 2010	States with approved extension agreements are encouraged to submit final primacy applications to EPA.
November 8, 2010	Final primacy applications must be submitted to the EPA regional administrator for systems with a full 2 year extension. [40 CFR 142.12(b)(1)]
December 31, 2012	State must complete first round of sanitary surveys for CWSs (with the exception, if the state decides, of CWSs that provide 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 that have an outstanding performance record, as determined by the state).
December 31, 2014	State must complete first round of sanitary surveys for NCWSs and any CWSs that have qualified to have surveys conducted at a frequency of once every 5 years.

The following flowchart depicts the general requirements of the rule for all systems (Figure 1.1).

Figure 1-1. Ground Water Rule Requirements



Section 2

Resources and Guidance

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In addition to this Implementation Guidance Manual, a variety of resource materials and technical guidance documents have been prepared by EPA to facilitate understanding and implementing the GWR. This section is an overview of each of these resources and includes instructions on how to obtain the documents.

2.1 Technical Guidance Manuals

The following six technical guidance manuals have been or are being developed to support the GWR. These manuals will aid EPA, state agencies, and affected PWSs in implementing this rule and will help ensure that the implementation among these groups is consistent.

- *Source Water Assessment Guidance Manual* (under development). The objective of this guidance manual is to provide states, tribes, and other primacy agencies with a brief review of hydrogeologic sensitivity assessments, an overview of the characteristics of a sensitive aquifer, information about how source water assessments may be used, and how to determine if a sensitive aquifer has a hydrogeologic barrier.
- *Ground Water Rule Source Water Monitoring Methods Guidance Manual*. July 2007. EPA 815-R-07-019. The objective of this guidance document is to provide ground water systems, states, tribes, and other primacy agencies with a brief review of the source water monitoring provisions. Since the primacy agencies may select one of three fecal indicators (e.g., *E. coli*, enterococci, coliphage) that the system would be required to test for in the ground water source sample, the source water monitoring guidance manual provides criteria to assist primacy agencies in their determination of which fecal indicator is most appropriate. Available at www.epa.gov/safewater/disinfection/gwr/pdfs/guide_gwr_sourcewatermonitoring.pdf.
- *Complying with the Ground Water Rule: Small Entity Compliance Guide One of the Simple Tools for Effective Performance (STEP) Guide Series*. July 2007. EPA 815-R-07-018. This guidance document is intended to be an official compliance guide to the GWR for small public water systems, as required by the Small Business Regulatory Enforcement Fairness Act of 1996. This guide contains a general introduction and background for the GWR, describes the specific requirements of the GWR and provides information on how to comply with those requirements. Available at www.epa.gov/safewater/disinfection/gwr/pdfs/guide_gwr_secg_may11.pdf.
- *Consecutive System Guide for the Ground Water Rule*. July 2007. EPA 815-R-07-020. The consecutive system guidance manual describes the regulatory requirements of the GWR as it applies to wholesale ground water systems and to the consecutive ground water systems that receive and distribute that ground water supply. Available at www.epa.gov/safewater/disinfection/gwr/pdfs/guide_gwr_consecutive-guidance.pdf.
- *Corrective Action Guidance Manual* (under development). The objective of the corrective action guidance manual is to provide states, tribes, other primacy agencies and ground water systems with an overview of the treatment technique requirements of the GWR. The guidance manual will provide assistance with determining the information that should be included in a systems corrective action plan.
- *Ground Water Sanitary Survey Guidance Manual* (under development). The objective of the sanitary survey guidance manual is to provide states, tribes, and other primacy agencies with a brief review of the sanitary survey regulatory provisions, give specific examples of what

constitutes a significant deficiency, and provide a checklist of elements that should be evaluated during the course of a sanitary survey inspection.

In addition to the technical guidance manuals developed to support the GWR, EPA has developed other guidance manuals that may help states agencies and affected PWSs with implementing the GWR.

- *Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under the Direct Influence (GWUDI)*. April 1999. EPA 815-R-99-016. Available at www.epa.gov/safewater/mdbp/pdf/sansurv/sansurv.pdf.
- *Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources*. October 1990. Available at www.epa.gov/safewater/mdbp/guidsws.pdf.
- *Alternative Disinfectants and Oxidants Guidance Manual*. April 1999. EPA 815-R-99-014. Available at www.epa.gov/safewater/mdbp/mdbptg.html#disinfect.
- *Disinfection Profiling and Benchmarking Guidance Manual*. August 1999. EPA-815-R-99-013. Available at www.epa.gov/safewater/mdbp/mdbptg.html#bench.
- Disinfection profile/CT spreadsheet. April 2001. Available at www.epa.gov/safewater/mdbp/mdbptg.html#ctspreadsheet.
- *Revised Public Notification Handbook*. March 2007. EPA 816-R-07-003. Available at www.epa.gov/safewater/publicnotification/pdfs/guide_publicnotification_pnhandbook.pdf.
- *Revised State Implementation Guidance for the Consumer Confidence Report (CCR) Rule*. January 2001. EPA 816-R-01-002. Available at www.epa.gov/safewater/ccr/compliancehelp.html.
- *Preparing Your Drinking Water Consumer Confidence Report Revised Guidance for Water Suppliers*. April 2005. EPA 816-R-05-002. Available at www.epa.gov/safewater/ccr/pdfs/guide_ccr_forwatersuppliers.pdf.
- *Manual for the Certification of Laboratories Analyzing Drinking Water*. 5th ed. January 2005. EPA 815-R-05-004. Available at www.epa.gov/safewater/labcert/pdfs/manual_labcert_2005.pdf.
- *Microbial and Disinfection Byproduct Rules Simultaneous Compliance Guidance Manual*. August 1999. EPA-815-R-99-015. Available at www.epa.gov/safewater/mdbp/mdbptg.html#simult.
- *Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule*. November 2006. EPA 815-R-06-007. Available at www.epa.gov/safewater/disinfection/lt2/pdfs/guide_lt2_uvguidance.pdf.
- *Membrane Filtration Guidance Manual: Overview and Summary Factsheet*. Available at www.epa.gov/safewater/disinfection/lt2/pdfs/guide_lt2_membranefiltration_fs_final.pdf.
- *Membrane Filtration Guidance Manual*. November 2005. EPA 815-R-06-009. Available at www.epa.gov/safewater/disinfection/lt2/pdfs/guide_lt2_membranefiltration_final.pdf.

For more information, contact EPA's Safe Drinking Water Hotline at (800) 426-4791, or see the Office of Ground Water and Drinking Water Web page. The GWR and guidance documents are located at www.epa.gov/safewater/disinfection/gwr/index.html.

2.2 Rule Presentation

Presentations that can be used for workshops on the GWR will be available in PowerPoint format on EPA's Web site: www.epa.gov/safewater/disinfection/gwr.

2.3 Fact Sheet and Quick Reference Guide

Two Fact Sheets and a Quick Reference Guide for the GWR may be useful for conveying basic information about the rule to water systems, new personnel, and stakeholders. These stand alone documents are included in Appendix C of this guidance. They are:

- Ground Water Rule Factsheet: General Rule Requirements
- Ground Water Rule Factsheet: Monitoring Requirements
- Ground Water Rule: A Quick Reference Guide

2.4 Questions & Answers

Questions and Answers (Q&As) on the GWR will be provided in this section. These questions have been asked of EPA through the Safe Drinking Water Hotline, implementation training, or other means.

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Section 3

State Implementation

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3.1 Overview of Implementation

Ground Water Systems (GWSs) are required to take specific actions to comply with the Ground Water Rule (GWR). Primacy agencies should clearly define the monitoring, reporting, performance, and follow-up requirements of the GWR to help systems understand how the rule will affect them and what they must do to comply. To meet this goal, primacy agencies are expected to carry out numerous implementation activities, including:

- Identifying affected systems and their system-specific requirements.
- Communicating requirements to the affected systems.
- Updating data management systems.
- Performing sanitary surveys at prescribed intervals for community water systems (CWSs) and noncommunity water systems (NCWSs).
- Notifying systems of significant deficiencies or source water fecal contamination in a timely manner and explaining the schedule and steps a system should follow in response.
- Tracking regulated system compliance progress and implementing enforcement action as needed.
- Having the authority to designate an appropriate fecal indicator for use in identifying fecal contamination after a positive total coliform sample under triggered monitoring or optional assessment monitoring provisions.
- Directing systems to conduct assessment source water monitoring, in accordance with state-determined requirements for such monitoring.
- Consulting with systems regarding any system changes.

This section discusses each of these items. To help state implementation efforts, Sections 3 and 4 of this guidance manual offer suggestions and alternatives that go beyond the minimum primacy agency requirements specified in the subsections of 40 CFR 142.16. Such suggestions are prefaced by “may” or “should” and are to be considered advisory. They are not required elements of state applications for program revision.

3.2 Identify Affected Systems

Different provisions of the GWR apply to different types (i.e., CWS, NCWS) and sizes of GWSs. In addition, some requirements have different compliance deadlines based on system type. This section summarizes how different types and sizes of GWS are affected by the various provisions of the GWR.

3.2.1 General Provisions [40 CFR 141.400(b)]

The GWR applies to public water systems (PWSs) that use ground water, except for PWSs that combine all of their ground water with surface water or with ground water under the direct influence (GWUDI) of surface water before the water is treated. These systems must comply instead with requirements for surface water systems and systems using GWUDI of surface water (Subpart H systems). Consecutive

systems that receive finished ground water are also considered GWSs and must comply with the requirements of the GWR. States may wish to query or sort their databases or other inventory information to list all PWSs that use ground water (and do not combine it with surface water or GWUDI of surface water before treatment).

As mentioned, systems using both surface water and ground water, often referred to as “mixed systems”, may have to comply with GWR requirements. If a PWS does not combine all its ground water with surface water and treat all of that water according to the treatment requirements for surface water systems, the system will have to comply with the requirements of the GWR. For example, if a PWS has a ground water supply that enters the distribution system at a different entry point than the entry point where its surface water is entering the distribution system, the PWS will have to comply with GWR requirements. As another example, if a PWS’ surface water and ground water supplies enter the distribution system via a common entry point but some or all of the ground water bypasses the surface water treatment plant, the system has to comply with the GWR. Those systems that use ground water sources seasonally (and do not treat all of the ground water as if it were a surface water supply) have to comply with GWR requirements while the ground water source is in use.

3.2.2 Sanitary Surveys [40 CFR 142.16(o)(2)(i)]

The GWR has minimum primacy requirements that apply to states for the frequency and content of sanitary surveys of CWSs and NCWSs. Since these are minimum requirements, the state may conduct more frequent sanitary surveys for any system, and may choose not to limit their sanitary surveys to the general requirements that are provided in 40 CFR 142.16(o)(2). Note that compliance with the Total Coliform Rule (TCR) sanitary survey requirements may not meet the revised scope and frequency of sanitary survey requirements stated here.

Community GWSs

States are required to conduct sanitary surveys of community GWSs at least once every 3 years unless either of the following conditions applies:

- The system 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 user for all its ground water sources and conducts state required monitoring to ensure continuous compliance.
- It has an outstanding performance record, as determined by the state and documented in previous sanitary surveys and has no history of total coliform maximum contaminant level (MCL) or monitoring violations under the TCR since the last sanitary survey.

If one of these conditions applies, the state may conduct a sanitary survey of the community GWS once every 5 years instead of once every 3 years.

The state must conduct the first sanitary survey, to meet the revised sanitary survey scope, for all community GWSs by December 31, 2012, unless the system has been put on a survey schedule of once every 5 years, as described above. For such systems, the state must complete all of the first sanitary surveys by December 31, 2014.

Noncommunity GWSs

States are required to conduct sanitary surveys of noncommunity GWSs at least once every 5 years. The GWR does not allow additional time between surveys based on whether the NCWS has treatment in place

or has demonstrated outstanding performance. The state must conduct the first sanitary surveys, to meet the revised sanitary survey scope, for all NCWSs by December 31, 2014.

3.2.3 Triggered Source Water Monitoring [40 CFR 141.402(a)]

Triggered source water monitoring is required for all GWSs that do 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. Triggered monitoring must be carried out if one of these systems is notified that a sample the system collected for compliance with the TCR is total-coliform positive. When this happens, the system must collect at least one sample from each ground water source in use when the coliform-positive sample was collected. Samples must be collected within 24 hours of notification of the total coliform-positive sample. States can, however, extend the 24 hour limit on a case-by-case basis. If approved by the state, systems with more than one ground water source may sample a representative ground water source(s). These triggered source water samples must be analyzed for a fecal indicator identified by the state.

If a triggered source water sample tests positive for a fecal indicator, the state may require corrective action. If the state does not require corrective action at that point, the GWS must collect five additional samples from the same source within 24 hours of being notified that the triggered source water sample was fecal indicator-positive. In accordance with 40 CFR 141.403(a)(1), if one or more of the five additional samples are fecal indicator-positive, the system must take corrective action. The GWR gives states the latitude to decide whether a GWS will be required to take corrective action after the first triggered source water sample tests positive for a fecal indicator or if the GWS will then be required to collect five additional source water samples.

A GWS that is not required to meet the triggered source water monitoring requirements because it provides at least 4-log treatment of viruses before or at the first customer, must notify the state in writing before December 1, 2009 that it provides treatment and is therefore not required to conduct triggered source water monitoring. The system must also by December 1, 2009, begin compliance monitoring designed to show the efficacy of their treatment processes.. Compliance monitoring requirements are described in section 3.2.5.

Many GWSs have not documented or do not know if they provide 4-log treatment of viruses. Those systems should notify the state that they provide treatment and submit supporting information, but they should conduct triggered source water monitoring until the state has accepted information confirming that the system provides 4-log treatment of viruses. An example of a letter and form that states could use to help treated GWSs submit the necessary information to meet this reporting requirement is provided in Example 3-1. States may want to provide additional factors (e.g., baffling) into their direction to systems.

The GWR has additional triggered source water monitoring requirements that apply to consecutive systems and their wholesale GWSs. If a consecutive system is notified that a sample it collected for compliance with the TCR is total-coliform positive, that consecutive system is required to notify its wholesale system of the positive sample. The wholesale system is then required to perform triggered source water monitoring, as described above. If a triggered source water sample collected by the wholesale system is positive for a fecal indicator, the wholesale system must notify all consecutive systems served by that ground water source of the fecal indicator source water positive result. For more information and guidance on the GWR requirements for consecutive systems, refer to EPA's *Consecutive System Guide for the Ground Water Rule* (EPA 815-R-07-020, July 2007) available at www.epa.gov/safewater/disinfection/gwr/pdfs/guide_gwr_consecutive-guidance.pdf. GWSs must comply with the triggered source water monitoring requirement beginning December 1, 2009.

Example 3-1. Example State Correspondence and Form for GWSs to Notify State if they Provide 4-log Treatment of Viruses

State Letterhead

Steven Smith, Director
Aquifer Water Company, PWSID XXXXXXXX
Anywhere, USA

RE: Ground water treatment notification

Dear Mr. Smith:

The Ground Water Rule was published on November 8, 2006 to provide increased protection against pathogens in public water systems that use ground water sources. One requirement of the rule is that public water systems using ground water as their source must notify the state if they are currently providing 4-log treatment of viruses. This treatment can be achieved using inactivation (disinfection), removal (filtration), or a combination of inactivation and removal that has been approved by the state. If you are one of these systems, you are required to notify us by December 1, 2009.

We have included a form with this letter to help you comply with this requirement. If you have more than one ground water source, make copies of the form before filling it out and submit one completed copy for each source. Please complete a copy of the form for each ground water source your utility uses.

An explanation of what constitutes 4-log treatment of viruses is provided on the form. If you are not sure how to determine how much virus treatment your system has, call us at XXX XXX-1234 and we will help you make that determination. If you understand how to make the determination but do not have the necessary information, check the box that says "We do not know if our ground water system provides 4-log treatment of viruses." A representative from our office will call you and advise you how to proceed.

Completed forms should be mailed to us at the health department address on the form. We appreciate your prompt attention and reply.

Sincerely,

Your Regulator

Example 3-1. Example State Correspondence and Form for GWSs to Notify State if they Provide 4-log Treatment of Viruses (cont.)

PWSID Number: _____

System Name: _____

Contact Person and Phone Number: _____

Does Your System Provide 4-log Treatment of Viruses?

If your system disinfects with gaseous or liquid chlorine, use the table below to determine the CT that is provided for your ground water. The CT required will depend on your ground water source's temperature and the free chlorine residual concentration in your water at the first user. "CT" is an abbreviation for chlorine Concentration multiplied by Time.

To calculate your system's CT, multiply the free chlorine residual (in mg/L) at your first user's service connection by the shortest amount of time (in minutes) water is coming into contact with the chlorine.

1. System's free chlorine residual (in mg/L) at first user's service connection: _____ X
2. Shortest amount of time (in minutes) water is coming into contact with the chlorine: _____ =
3. Multiply number and enter result: _____ Min-mg/L (Total CT)
4. System's ground water source's coldest water temperature: _____ In Degrees C

On Line A in the table below circle the value that most closely relates to the temperature recorded on line 4 above. On Line B in the table circle the 4-log inactivation value that is associated with the temperature you circled on line A. Compare your CT value from Line 3 above with the value you circled in Line B of the table below. If your CT is a number larger than the number you circled in Line B then your system probably provides at least 4-log treatment of viruses.

CT Values for Inactivation of Viruses by Free Chlorine, pH 6.0-9.0

A.	Degrees C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B.	4-log Inactivation	11.6	10.7	9.8	8.9	8.0	7.6	7.2	6.8	6.4	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0

CT values provided in the tables are modified by linear interpolation between 5°C increments.

If your system uses a different kind of disinfection (e.g., UV, ozone, chloramines) and/or filters its ground water, call Susan Jones at the Green County Health Department at XXX-123-4567. She will work with you to determine how many logs of virus treatment your system provides.

Check the line below that applies to your ground water system:

- _____ **Our ground water system probably does not provide 4-log treatment of viruses**
- _____ **Our ground water system probably provides 4-log treatment of viruses**
- _____ **We do not know if our ground water system provides 4-log treatment of viruses**

The following is an example calculation:

1. System's free chlorine residual (in mg/L) at first user's service connection: _____ 0.5 mg/L X
2. Shortest amount of time (in minutes) water is coming into contact with the chlorine: _____ 10 minutes =

3. Multiply number and enter result: $(0.5 \times 10) = 5$ Min-mg/L (Total CT)
4. System's ground water source's coldest water temperature: 10 In Degrees C

On Line A in the table below circle the value that most closely relates to the temperature recorded on line 4 above. On Line B in the table circle the 4-log inactivation value that is associated with the temperature you circled on line A. Compare your CT value from Line 3 above with the value you circled in Line B of the table below. If your CT is a number larger than the number you circled in Line B then your system probably provides at least 4-log treatment of viruses.

This system does not achieve 4-log inactivation of viruses because the value from Line 3 is smaller than the value circled on Line B.

CT Values for Inactivation of Viruses by Free Chlorine, pH 6.0-9.0

A.	Degrees C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B.	4-log Inactivation	11.6	10.7	9.8	8.9	8.0	7.6	7.2	6.8	6.4	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0

CT values provided in the tables are modified by linear interpolation between 5°C increments.

Please complete this form and mail it to

**Susan Jones
Green County Health Department
123 Main Street
Anywhere, USA**

3.2.4 Treatment Technique Requirements [40 CFR 141.403(a)]

The GWR treatment technique requirements apply to all GWSs when a significant deficiency is identified or when a source water sample indicates that a ground water source is fecal indicator-positive. The GWR requires these systems to consult with the state within 30 days of receiving written notice of the significant deficiency or written notice of the fecal indicator-positive result. As part of their consultation with the state, the systems must address the appropriate corrective action they should take in response to the deficiency or positive sample.

A GWS must respond within 120 days (or earlier, if directed to do so by the state) if it receives any of the three types of notification listed below:

- Written notification from the state of a significant deficiency.
- Written notice from a laboratory that a source water sample collected in response to a fecal indicator-positive triggered source water sample was also found to be fecal indicator-positive.
- Direction from the state that a fecal indicator-positive sample requires corrective action.

Within these 120 days (or the time period specified by the state), the system must either:

- Have completed corrective action according to the applicable state guidance, direction, and plan review process.
- Be in compliance with a state-approved corrective action plan and schedule.

In addition to the treatment technique requirements, CWSs with source water fecal contamination and CWSs and NCWSs with significant deficiencies are required to provide special notification (in addition to associated public notification requirements) to the public annually until appropriate corrective action has been taken. See section 3.9 of this guidance manual for a more detailed discussion of corrective action plans, corrective action alternatives, and related notification requirements.

3.2.5 Compliance Monitoring [40 CFR 141.403(b)]

The GWR's compliance monitoring requirements apply to all community and noncommunity GWSs 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 for each ground water source. Existing GWSs must notify the state if they provide 4-log treatment of viruses and begin compliance monitoring by December 1, 2009. New ground water sources placed in service after November 30, 2009 and providing at least 4-log virus treatment must begin compliance monitoring within 30 days of placing the source in service.

GWSs serving more than 3,300 people conducting compliance monitoring must monitor the residual disinfectant concentration continuously, record the lowest daily residual disinfectant concentration, and maintain the state-determined minimum disinfectant residual concentration for each day the water is served to the public. If the continuous monitoring equipment fails, the system must collect grab samples every 4 hours until the continuous monitoring equipment is returned to service. Continuous monitoring must be resumed within 14 days.

Systems serving 3,300 or fewer people conducting compliance monitoring are required to monitor and record, during peak hourly flow or another time designated by the state, the residual disinfectant concentration daily for each day that water from the ground water source is served to the public. If the disinfectant residual falls below the state-determined minimum concentration, the system must collect follow-up samples every 4 hours until the minimum residual disinfectant concentration has been reached.

Systems using membrane filtration for 4-log treatment of viruses must monitor the membrane filtration process according to state-specified monitoring requirements and must operate the membrane filtration according to all state-specified compliance requirements.

Systems may use alternative treatment technologies (e.g., ultraviolet radiation [UV]) approved by the state, if the alternative treatment technology, alone or in combination (e.g., filtration with UV, filtration with chlorination) can reliably provide at least 4-log treatment of viruses. Systems must monitor the alternative treatment according to state-specified monitoring requirements, and must operate the alternative treatment according to compliance requirements established by the state.

3.2.6 Optional Assessment Source Water Monitoring [40 CFR 141.402(b)]

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. EPA believes that this optional provision is an important tool for states that elect to require assessment source water monitoring on a case-by-case basis. EPA recommends that states require GWSs that are most susceptible to fecal contamination to conduct assessment monitoring. States may use hydrogeologic sensitivity assessments (HSAs) as a tool to identify high risk systems for assessment source water monitoring. States also have other information available to them to target high risk systems, such as source water assessments, wellhead protection plans, and historical monitoring data. Previous data indicating source water fecal contamination, particularly from TCR monitoring, in combination with GWR triggered source water monitoring results, can be another important tool. The GWR suggests state-determined assessment source water monitoring requirements that might be appropriate. These are discussed in more detail in section 3.7.2.

3.3 Communicate GWR Requirements to Affected Systems

States should identify what actions they plan on taking and develop a schedule for carrying out those actions, in order to implement the GWR in a timely and effective manner. One key step for states implementing the GWR should be communicating with those PWSs affected by the rule and preparing them to comply with the relevant provisions. Systems should be notified of new requirements early enough to ensure their ability to budget for and schedule their compliance actions. The more this is done, the more prepared states and systems will be as compliance dates approach.

This section provides guidance to states on notifying affected PWSs of GWR requirements. This guidance includes suggestions for organizing outreach efforts based on the provisions and compliance dates that apply to different categories of systems.

3.3.1 Requirements and Target Notification Time Frames

States often notify systems of upcoming requirements using a form letter that may or may not be tailored to some degree. Based on the GWR's provisions and different compliance schedules, states may find it useful to draft and send out different form letters to different categories of systems. States should consider

categorizing systems early on in their GWR communication efforts so that each system is provided only with the provisions and deadlines that apply to them.

Some system categories that may be effective for drafting form letters regarding the GWR are:

- CWSs.
- NCWSs.
- Consecutive systems using ground water.
- GWSs serving more than 3,300 people that are likely to already provide at least 4-log treatment of viruses.
- GWSs serving 3,300 or fewer people that are likely to already provide at least 4-log treatment of viruses.
- Systems required by the state to conduct assessment source water monitoring.

Additional requirements specific to different categories of systems are provided in Table 3-1.

Table 3-1. GWR Requirements Applying To Different Categories of Water Systems

PWS Category	GWR Requirement
All GWSs	<ul style="list-style-type: none"> • Provide information to the state as needed for sanitary surveys. • Provide information requested by the state for conducting a hydrogeologic sensitivity assessment (except consecutive systems) • Conduct triggered source water monitoring if 4-log treatment is not in place (except consecutive systems). • Address significant deficiencies. • Address fecally contaminated source water (except consecutive systems). • Conduct compliance monitoring if a chemical disinfectant is being used and triggered source water monitoring requirements are not being met (except consecutive systems).
CWSs	<ul style="list-style-type: none"> • Participate in sanitary surveys every 3 years (or every 5 years under certain criteria). • Provide Special Notification of fecal contamination and any uncorrected significant deficiencies (requirements are specific to CWSs).¹
NCWSs	<ul style="list-style-type: none"> • Participate in sanitary surveys every 5 years. • Provide Special Notification of any uncorrected significant deficiencies (requirements are specific to NCWSs).¹

PWS Category	GWR Requirement
Consecutive Systems Using Ground Water	<ul style="list-style-type: none"> If a sample collected in the consecutive system's distribution system for compliance with the TCR is total coliform-positive, the consecutive system is required to notify its wholesale system of the positive sample.
Wholesale GWSs	<ul style="list-style-type: none"> If a sample collected in the distribution system of a consecutive system for compliance with the TCR is total coliform-positive, the wholesale system providing water to the consecutive system must collect a sample from its ground water source(s) and analyze it for a state-designated fecal indicator. Notify consecutive systems within 24 hours of learning of fecal indicator-positive result.
GWSs Serving More than 3,300 People that Already Provide at Least 4-log Treatment of Viruses	<ul style="list-style-type: none"> Notify state in writing that system provides 4-log treatment of viruses in order to conduct compliance monitoring instead of triggered source water monitoring. To satisfy compliance monitoring requirements, continuously monitor residual disinfectant concentration and record the lowest residual concentration every day that water from ground water source is served to public. For alternative or membrane filtration systems, comply with state-specified monitoring requirements.
GWSs Serving 3,300 or Fewer People that Already Provide at Least 4-log Treatment of Viruses	<ul style="list-style-type: none"> Notify the state in writing that system provides 4-log treatment of viruses in order to conduct compliance monitoring instead of triggered source water monitoring. Monitor and record the residual disinfectant concentration, at time designated by the state, from ground water source every day it produces water that is served to the public. For alternative or membrane filtration systems, comply with state-specified monitoring requirements.
Systems Required by the State to Conduct Assessment Source Water Monitoring	<ul style="list-style-type: none"> Meet state-determined requirements for assessment source water monitoring.

1. See section 3.8.3 for more information on special notice requirements for CWSs and NCWSs.

3.3.2 Methods of Communication

Written Notice

Providing written notice of a final rule to GWSs serves two purposes: (1) the recipient system obtains a formal notice of upcoming regulatory requirements and a timeline for compliance (in addition to EPA's publication of the rule in the *Federal Register*), and (2) the primacy agency has a hard-copy document that it may file and use in subsequent compliance tracking efforts.

Written notification can be in the form of a letter from the state to affected systems. The letter should include a summary of rule requirements and timeframes and direct the reader to an appropriate contact if questions arise. States should consider including fact sheets or other summary materials with the letter.

Appendix C of this guidance includes additional draft publications that are intended to be distributed to water systems through mailings, training sessions, and other educational forums. These publications (also available at www.epa.gov/safewater/disinfection/gwr.html) provide overviews of the GWR to help systems understand the provisions of the rule and determine which provisions apply. They also describe the benefits of the rule. Although valuable, these resources do not substitute for official rule language. States should consider mailing official rule language with the letter or including in the letter the Web site address where the regulatory language can be accessed.

A sample letter is provided in Example 3-2. In this example, the letter is tailored to systems based on their compliance deadlines. As described earlier, states may wish to further tailor the letter to accommodate systems for which the provisions are either limited or unique. Note that some of the requirements listed in the letter (i.e., corrective action, testing for *E. coli*) may vary from state to state depending on which GWR options a state chooses to adopt in its regulation.

Slide Presentation

For some GWSs, written communication alone will not result in full comprehension of the GWR requirements. Slide presentations can be used by state staff and other training providers to present the background of the rule, its benefits, and its requirements.

The EPA's Drinking Water Academy is developing a training session on the GWR (available in Microsoft PowerPoint format). Copies of the presentation may be used to train other state personnel, technical assistance providers, water system personnel, and the public. EPA's Drinking Water Academy slides will be available electronically on the EPA Web site at www.epa.gov/safewater/dwa.html.

Guidance Documents

Technical guidance documents developed for the GWR are useful for explaining rule requirements and specific aspects of rule implementation to system operators, including monitoring and compliance determination. The guidance documents can be used as stand-alone references or as supporting materials in GWR training events. See Section 2 for more information on these references.

Example 3-2. Example System Notification Letter

State Letterhead

John Smith, Supt.
Town Water System, PWSID XXXXXXXX
Town, ST 12345

RE: Ground Water Rule

Dear Mr. Smith:

This letter is to notify you that your public water system (PWS) will be affected by the Ground Water Rule (GWR). The GWR applies to all PWSs that use ground water as their source of water and do not combine their ground water with surface water prior to treatment. The requirements of the GWR will take effect December 1, 2009. You are receiving this letter because our data show your system is a PWS that uses ground water.

Our records show that you do not treat your ground water source before the water is delivered to your customers. Our records also show that your system is a community water system serving 750 people. Please let us know if this information is not accurate and our records need to be updated.

Based on these characteristics of your water system, the GWR will affect you in the following ways:

- If your monthly routine bacteriological sample is total coliform-positive, you must collect at least one sample from each ground water source in use at the time the total coliform-positive sample was collected. This follow-up sample, referred to as a triggered source water sample, must be tested for a state-approved fecal indicator. For our state, the fecal indicator that has been approved is *E. coli*.
- If your triggered source water sample tests positive for *E. coli*, you must collect five additional samples from the source that tested positive and have them analyzed for *E. coli*.
- Since your system serves fewer than 1,000 people, you may use the triggered source water sample collected from a ground water source (as described above) to meet both the requirements of the GWR and part of the requirements for repeat sampling under the Total Coliform Rule (TCR) when you have a coliform positive-sample in the distribution system.
- In the future, your system will be receiving a sanitary survey by the state every 3 years instead of every 5 years.
- If your system has an *E. coli* positive triggered source water sample or if a significant deficiency is identified at your system and not addressed, you will be required to make special notice to the public that your source water tested *E. coli* positive or that an uncorrected significant deficiency exists at your system.

A Quick Reference Guide and two Factsheets on the GWR are enclosed. The Quick Reference Guide provides more information on this regulation, and the Fact Sheet explains the monitoring and corrective actions in more detail. In addition to these materials, please refer to the final rule language on EPA's Web site at www.epa.gov/safewater/disinfection/gwr/regulation.html. We will be notifying you of upcoming training opportunities within the next month.

Please contact Ann Smith at this office at XXX-XXXX if you have any questions about this letter or the GWR and its effect on your system. We appreciate your attention to this request.

Sincerely,

Enclosures: GWR Quick Reference Guide, GWR Factsheets, [list other enclosures]

3.4 Data Management Systems

Although state data management systems vary to suit state-specific requirements and needs, EPA recommends that all states ensure that their data management systems are capable of efficiently tracking affected PWSs, compliance status, and other information needed to implement the GWR. States using SDWIS/State should see the module incorporated in **version [X]**.

Under GWR recordkeeping requirements, states are required to keep any currently applicable or most recent state determinations, along with all supporting information and explanations of the technical basis of each decision, for the following:

- Written notice of significant deficiencies.
- Corrective action plans, schedule approvals, and state-specified interim measures.
- Confirmation that a significant deficiency has been corrected or the fecal contamination in the ground water source has been addressed.
- State determinations and records of a GWS' documentation for not conducting triggered source water monitoring.
- State approvals of source water monitoring plans.
- 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.
- 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 before or at the first customer.
- Written notice from the GWS that it provides at least 4-log treatment of viruses before or at the first customer for a ground water source.
- Written determinations that the GWS may discontinue 4-log treatment of viruses.

A state may have information in its data system about the application of a disinfectant to the ground water source. The state may not, however, actually track whether this treatment meets the 4-log inactivation standard. In some data systems, it may not be possible to tell which disinfecting systems actually provide 4-log inactivation. As a result, there may need to be a separate water system-by-water system review to determine whether there is adequate inactivation to identify a system as providing 4-log treatment of viruses. The state's database system may need to be modified to capture this distinction.

3.5 Address Special Primacy Requirements of the GWR

States must provide EPA with specific information in their primacy packages in order to obtain federal approval of their program revisions adopting the provisions of the GWR. Some primacy conditions address the need for a state to have sufficient legal authority to enforce the GWR's requirements. In addition, some provisions of the GWR allow state discretion in establishing decision-making criteria. States will need to explain their intended procedures for implementing those provisions. The special primacy requirements are listed in 40 CFR 142.16(o) and are discussed in more detail in Section 4.4, and include but are not limited to the following:

- The state must have the appropriate rules or other legal authority to ensure that GWSs:
 - Conduct source water monitoring. (See Section 4.4.1)
 - Take the appropriate corrective actions including interim measures, if necessary, needed to address significant deficiencies. (See Section 4.4.2)
 - Take the appropriate corrective actions including interim measures, if necessary, to address any source water fecal contamination identified during source water monitoring. (See Section 4.4.3)
 - Consult with the state regarding corrective action(s). (See Section 4.4.)
- The state must describe how it will implement a sanitary survey program that includes the components of, and meets the survey frequencies required by, the GWR. (See Section 4.4.5)
- The state must describe the criteria that will be used for the following issues related to source water monitoring: (See Section 4.4.6)
 - Extending the 24-hour time limit for a system to collect a ground water sample to comply with the source water monitoring requirements.
 - Determining whether the cause of a total-coliform positive sample taken under the TCR is directly related to the distribution system.
 - Determining whether to invalidate a fecal-indicator positive ground water source sample.
 - Conditions that would allow source water microbial monitoring at a location after treatment.
- The state must explain the practices and procedures that will be used to enforce the treatment technique requirements of the GWR, including: (See Section 4.4.7)
 - How the state will determine whether a system is achieving at least 4-log treatment of viruses.
 - How the state will determine the minimum residual disinfectant concentration the system must provide before the first customer, for systems using chemical disinfection.
 - Alternative technologies GWSs can use to achieve at least 4-log treatment of viruses.

- Monitoring and compliance requirements required for systems using state-approved alternative technologies to achieve at least 4-log treatment of viruses.
- Monitoring, compliance, and membrane integrity testing requirements that will be used to demonstrate virus removal for GWSs using membrane filtration.
- Criteria the state will use to determine if a GWS may discontinue 4-log treatment of viruses.

3.6 State Practices or Procedures for Sanitary Surveys

The state must perform sanitary surveys for community and noncommunity GWSs at prescribed time intervals. These surveys must address the following eight elements:

- Source.
- Treatment.
- Distribution System.
- Finished Water Storage.
- Pumps, Pump Facilities, and Controls.
- Monitoring and Reporting and Data Verification.
- System Management and Operation.
- Operator Compliance with State Requirements.

States should ensure resources are adequate to meet the sanitary survey requirements given the number of affected GWSs, anticipated follow-up technical assistance and enforcement needs, and other program demands. Note that compliance with only the TCR sanitary survey criteria may not be adequate to meet the revised scope and frequency of sanitary survey requirements required under the GWR.

The state may conduct the sanitary surveys in stages or phases if all the applicable elements are evaluated within the required timeframe. For example, states may opt to use data collected during site visits for other programs such as the Source Water Assessment Program (SWAP), Wellhead Protection Program (WHPP), Operator Training and Certification Program, and other technical assistance programs. The state may also use the results of applicable sanitary survey elements conducted before November 22, 2006 to satisfy the initial sanitary survey requirements for that element as long as subsequent reviews are conducted within the required timeframe. Note that compliance with only the TCR sanitary survey requirements may not meet the revised scope and frequency of sanitary survey requirements stated here.

3.6.1 Sanitary Surveys for CWSs

Sanitary surveys must be completed by the state for CWSs every 3 years. The state may reduce the frequency of sanitary surveys of a CWS to every 5 years if the system either provides at least 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of virus inactivation and removal) before or at the first customer for each ground water source, or if it has an outstanding performance record that was documented during previous inspections and no history of total coliform maximum contaminant level (MCL) or monitoring violations under 40 CFR 141.21 since the previous sanitary survey. If a state intends to use this provision, it must describe in its primacy package how it will determine whether a CWS has an outstanding performance record. Guidance on determining outstanding performance is provided in Section 4.4.

The first sanitary survey for a CWS required to comply with the requirements of the GWR must be conducted by December 31, 2012, unless the system has been put on a survey schedule of once every 5 years, as described above. For such systems, the first sanitary survey must be completed by December 31, 2014.

3.6.2 Sanitary Surveys for NCWSs

States are required to conduct sanitary surveys of noncommunity GWSs at least once every 5 years. The GWR does not allow additional time between surveys based on whether the NCWS has treatment in place or has demonstrated outstanding performance. The first sanitary survey for a NCWS required to comply with the requirements of the GWR must be conducted by December 31, 2014.

3.6.3 Significant Deficiencies

The state must provide GWSs with written notification specifying and describing any significant deficiencies. Notification must be provided no later than 30 days after identifying the deficiencies. The notice may specify corrective actions and deadlines the system must meet for implementing the corrective actions.

Once the system receives written notice of a significant deficiency, the system has up to 30 days to consult with the state regarding the appropriate corrective action it should take. Within 120 days from the time the system receives written notice of the significant deficiency, the system must either:

- Complete corrective action according to any applicable state plan review processes or state guidance and direction, or
- Be in compliance with a state-approved corrective action plan and schedule.

The state must confirm that the significant deficiency has been addressed through either written confirmation from the GWS or a site visit by the state. The site visit must occur within 30 days after the system meets the treatment technique requirements under 40 CFR 141.404(a). The state must maintain a record of the confirmation that a significant deficiency was corrected and will be required to report this information to EPA.

In its primacy application, the state must define and describe at least one specific significant deficiency in each of the eight sanitary survey elements. These should take into account:

- A defect in design, operation, or maintenance.
- A failure or malfunction of the sources, treatment, storage, or distribution system that may be causing, or has the potential to cause, the introduction of contamination into the water delivered to consumers.
- The state's ability to ensure GWSs take appropriate corrective actions, including interim measures, to address the significant deficiency.

Guidance on defining significant deficiencies is provided in section 4.4.5.4.

3.7 State Practices or Procedures for Source Water Microbial Monitoring

The GWR requires that GWSs conduct triggered source water monitoring as described below. States also have the option of directing systems to conduct assessment source water monitoring. While there are no federal requirements for assessment source water monitoring, the GWR offers some guidelines for states on the other monitoring requirements.

EPA believes that the most appropriate fecal 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. More information and guidance on this topic is provided in EPA's *Source Water Monitoring Guidance for Public Water Systems* (EPA 815-R06-005, February 2006).

3.7.1 Triggered Source Water Monitoring

The GWR requires systems performing triggered source water monitoring to monitor their ground water sources for one of three fecal indicators (*E. coli*, enterococci, or coliphage). The state must demonstrate in its primacy package it has the legal authority to require GWSs to monitor for the fecal indicator(s) that the state has selected. The state should specify which fecal indicator(s) GWSs will be required to test for in their ground water sources. States can approve more than one fecal indicator to be used (e.g. *E. coli* and/or enterococci). EPA recommends that states use the same requirements for GWSs performing assessment source water monitoring.

Triggered source water monitoring must be conducted by a GWS if the system does not provide 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 each ground water source, and it is notified of a total coliform-positive result for a sample collected under the TCR (40 CFR 141.21). Systems providing 4-log treatment of viruses must notify their state that they provide treatment and must conduct compliance monitoring, or they will also be required to conduct triggered source water monitoring if they are notified of a total coliform-positive sample collected in compliance with the TCR.

Within 24 hours of notification of the total coliform-positive sample, the system must collect at least one source water sample from each ground water source in use at the time the total coliform-positive sample was collected. The state may extend the 24-hour 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.

EPA recognizes that some water systems that use untreated ground water already have sample taps located at or near the source and prior to the first customer and include raw water monitoring with their routine TCR monitoring of the distribution system. If a PWS collects a source water sample as part of its TCR sampling, and the source water sample is analyzed using an approved method that includes the state-approved fecal indicator, and a distribution system sample collected at the same time is total coliform-positive, the PWS can use the concurrent source water sample to satisfy the triggered source water monitoring requirement.

Systems with multiple sources may, if approved by the state, collect samples from representative source(s) for any total coliform-positive sample. The state may require systems with multiple sources to submit for approval a triggered source water monitoring plan. A triggered source water monitoring plan may evaluate each sample site in the system's TCR sample siting plan and identify sources that are representative of each TCR monitoring site. All water systems are encouraged to include a procedure for triggered source water monitoring in their standard operating procedures (SOPs). Larger systems with

multiple sources may want to include in their SOPs a triggered source water sampling plan that identifies which sources are representative of which TCR monitoring sites.

If the state allows the system to use *E. coli* as a fecal indicator for GWR triggered source water monitoring, systems serving 1,000 people or fewer that detect a total coliform-positive sample during their TCR monitoring can use the triggered source water sample collected in response to the coliform-positive sample to satisfy both the GWR triggered monitoring requirement and one of the repeat samples required by the TCR.

In addition to public notification requirements, CWSs are required to provide special notice to the state and the public if a triggered source water sample is fecal indicator-positive. Guidance on public notice and special notice is provided in section 3.8.

If a triggered source water sample is fecal indicator-positive, states may require corrective action for the ground water source where the fecal indicator-positive sample was collected. If the state does not require corrective action based on the initial indicator-positive sample, 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. The samples must be tested for the same fecal indicator for which the initial triggered source water sample tested positive. If one or more of these additional source water samples is fecal indicator-positive, the system must take corrective action.

Consecutive system triggered source water monitoring

In addition to all other triggered source water monitoring requirements, a consecutive system that has a total coliform-positive sample collected under 40 CFR 141.21 must notify the wholesale system within 24 hours of being notified of the total coliform-positive sample.

Wholesale system triggered source water monitoring

In addition to all other triggered source water monitoring requirements, if a wholesale system receives notice from a consecutive system that a sample collected under 40 CFR 141.21 is total coliform-positive, the wholesale system must, within 24 hours of being notified, collect a sample from every one of its ground water sources (unless the system has multiple sources and has been approved by the state to collect samples from representative source[s] for any total coliform-positive). The samples collected must be tested for a fecal indicator required by the state. If the sample is fecal indicator-positive, the wholesale system must notify any consecutive systems served by that source in accordance with 40 CFR 141.202 (Public Notifications of Drinking Water Violations).

Triggered source water monitoring positive sample invalidation

If a state determines and documents in writing that the total coliform-positive sample was solely a result of a documented distribution system deficiency, the state may invalidate the positive triggered source water monitoring sample. The state must maintain records of invalidation determinations. See section 4.4.6.2 for further discussion of sample invalidation and situations when it may be appropriate.

3.7.2 Assessment Source Water Monitoring

The GWR gives states the authority to direct GWSs to conduct assessment source water monitoring at the states' discretion. If a state intends to require assessment source water monitoring, it will need to specify in its state regulation the pertinent monitoring requirements, including sampling frequency and analytical methods.

EPA recommends that states require GWSs that are most susceptible to fecal contamination to conduct assessment monitoring. States may use hydrogeologic sensitivity assessments (HSAs) as a tool to identify high risk systems for assessment source water monitoring. HSAs can be an effective screening tool to identify sensitive hydrogeological settings that transmit water, and any pathogens in the water, quickly from the surface to the aquifer. Where the type of aquifer is unknown, states should consider conducting an HSA to identify sensitive aquifers and determine if assessment source water monitoring is appropriate.

States also have other information available to them to target high risk systems, such as source water assessments, wellhead protection plans, and historical monitoring data. Data indicating past episodes of source water fecal contamination, particularly from TCR monitoring, in combination with GWR triggered source water monitoring results, can be another important tool.

The GWR provides the following general suggestions to states requiring assessment source water monitoring:

- Collect a total of 12 ground water source samples that represent each month the system provides ground water to the public.
- Collect samples from each well unless the system obtains written state approval to conduct monitoring at one or more wells within the PWS that are representative of multiple wells used by the system and that draw water from the same hydrogeological setting.
- Collect a standard sample volume of at least 100 mL for fecal indicator analysis, regardless of the fecal indicator or analytical method used.
- Analyze all ground water source samples for the presence of *E. coli*, enterococci, or coliphage using one of the analytical methods listed in the GWR.
- Collect 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.
- Collect ground water samples at the well itself unless the system's configuration does not allow for such sampling and the state approves an alternate sampling location that is representative of the water quality of that well.

Positive source water samples taken under assessment monitoring are subject to the same requirements for additional sampling and/or subsequent corrective action as described above under triggered monitoring requirements.

3.7.3 Laboratory Methods

All triggered source water samples must be collected using a standard sample volume of at least 100 mL, regardless of fecal indicator or analytical method used. GWSs must test source water samples for the presence of *E. coli*, enterococci, or somatic coliphage, depending on which fecal indicator is specified by the state, and the state must require that laboratories use one of the analytical methods listed in Table 3-2.

Table 3-2. Laboratory Methods

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

Analysis must be conducted in accordance with the documents listed in the final GWR promulgated November 8, 2006.

3.7.4 Invalidation of a Fecal Indicator-Positive Ground Water Source Sample

The state can invalidate a fecal indicator-positive triggered source water sample if the system provides the state with written notice from the laboratory that improper sample analysis occurred, or the state determines and documents in writing that there is substantial evidence a fecal indicator-positive 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 state must require the system to collect another source water sample within 24 hours of being notified of sample invalidation. The system must have the follow-up sample analyzed for the same fecal indicator as the invalidated sample.

The state may extend the 24-hour 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. The state must maintain records of all invalidated fecal indicator-positive ground water source samples.

3.8 Public Notification, CCR, and Special Notice Requirements

Several general categories of notification are required by the GWR:

- Tier 1, 2, or 3 public notification
- Consumer Confidence Report (CCR) Special Notice (for CWSs)

- Special Notice (for NCWSs)
- CCR other notice

The type of notification required depends on the violation or scenario that has occurred at the PWS. The table 3-3 summarizes public notification, CCR and Special Notice requirements of the GWR. Note that Special Notice requirements for CWSs require notification to be included in the system’s CCR. NCWSs that are required to make Special Notice must inform the public served by the water system in a manner approved by the state. See section 3.8.3 for a more detailed explanation of the GWR’s Special Notice requirements.

Table 3-3. Public Notification, CCR, and Special Notice Requirements

Issue	Notification Required
Uncorrected significant deficiency – CWSs ¹	Special Notice in CCR
Uncorrected significant deficiency – NCWSs ¹	Special Notice
Fecal indicator positive ground water source sample – CWSs ²	Tier 1 public notification, Special Notice in CCR, and CCR
Fecal indicator positive ground water source sample – NCWS ²	Tier 1 public notification
Unaddressed fecal indicator positive ground water source sample – CWSs	Special Notice in CCR
Failure to take corrective action – CWSs	Tier 2 public notification, CCR
Failure to take corrective action – NCWS	Tier 2 public notification
Failure to maintain at least 4-log treatment of viruses – CWSs	Tier 2 public notification, CCR
Failure to maintain at least 4-log treatment of viruses – NCWS	Tier 2 public notification
Failure to meet monitoring requirements – CWSs	Tier 3 public notification, CCR
Failure to meet monitoring requirements – NCWS	Tier 3 public notification

1. Systems must continue to notify the public annually until the significant deficiency has been corrected.
2. Consecutive systems served by the ground water source must also notify the public.

3.8.1 Public Notification Requirements

If a ground water source sample collected as a triggered source water sample or collected in response to the state’s direction to conduct source water assessment monitoring is fecal indicator-positive and is not invalidated, then the PWS must conduct public notification under 40 CFR 141.202. Public notification must also be made by consecutive systems served by the fecal indicator-positive ground water source. This Tier 1 notification requirement is regardless of whether the system is a CWS or a NCWS.

For this Tier 1 public notice, systems must use the following standard health effects language for their public notifications:

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.

The GWR also requires Tier 2 public notification when PWSs have one of the following violations:

- Failure to take corrective action.
- Failure to maintain at least 4-log treatment of viruses.

The GWR also requires systems to make Tier 3 notification if that have failed to meet the GWR's monitoring requirements. Examples of Tier 2 and 3 public notification under these circumstances are provided in Section 6 of this guidance manual.

3.8.2 Consumer Confidence Report (CCR) Requirements

The GWR requires two general categories of notice to be included in the CCR. Community GWSs with uncorrected significant deficiencies and/or a fecal indicator-positive source water sample must inform their customers of any significant deficiency that is uncorrected and any fecal-indicator positive source water sample result in the CCR addressing the appropriate year. Section 3.8.3 describes this Special Notice requirement in more detail.

Community GWSs that fail to meet the treatment technique requirements of the GWR are also required to inform their customers of their treatment technique violations in the CCR. The GWR treatment technique violations that community GWSs are required to inform their customers of in their CCRs are:

- Failure to take corrective action.
- Failure to maintain at least 4-log treatment of viruses.

3.8.3 Special Notice Requirements

Community GWSs must inform customers in the appropriate year's CCR of any uncorrected significant deficiencies and any fecal-indicator positive source water sample results. For example:

- A community GWS receives notification from the state of a fecal indicator-positive source water sample. The system must inform its customers of positive sample in the CCR that addresses the year in which the sample was taken.
- A community GWS with an uncorrected significant deficiency must inform its customers of the uncorrected significant deficiency in that year's CCR.
 - In a situation where a system had a significant deficiency in the same calendar year (e.g., 2011) in which a CCR is being published (e.g., published in 2011 but addressing 2010), and that significant deficiency has not been corrected, the community GWS does not have to inform its customers until the following CCR (e.g., published in 2012 but addressing 2011). However, the system needs only to inform its customers of that significant deficiency if the deficiency remains uncorrected at the time of the following year's CCR publication and release. The system must continue to notify the public annually until the state determines that the deficiency or contamination has been addressed.

In addition to the Tier 1 public notification requirement associated with a fecal indicator-positive triggered source water sample, noncommunity GWSs must also provide special notice within 12 months of the system being notified by the state of the deficiency, in a manner approved by the state, of any

significant deficiency that has not been corrected. The state may direct the system to provide this notification earlier than the 12 months required by the GWR. The system must continue to notify the public annually until the significant deficiency is corrected.

The noncommunity GWS notification must include:

- The nature of the significant deficiency and the date it was identified by the state.
- The state-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed.
- 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.

If directed by the state, a NCWS with significant deficiencies that have been corrected may be required to inform its customers how the significant deficiencies were corrected and the date they were corrected.

3.9 State Practices and Procedures for Treatment Technique Requirements

The GWR identifies four possible corrective action options. The state must require systems that need to take corrective actions to take one or more of the following:

- Correct all significant deficiencies.
- Provide an alternate source of water.
- Eliminate the source of contamination.
- Install technologies that reliably achieve 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.

The state must report the date the GWS completed the required corrective action. The state must also maintain:

- Records of written notices from GWSs that document the system is 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 each ground water source.
- Records of notices sent to systems identifying the residual disinfection concentrations (when using chemical disinfection) needed to achieve 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.
- Notices sent to systems identifying the state-specified monitoring and compliance criteria (when using membrane filtration or alternative treatment) needed to achieve at least 4-log treatment of virus before or at the first customer.

3.9.1 Corrective Action Alternatives

The GWR gives states the option to prescribe specific corrective actions depending on the nature of the significant deficiency. There may be a number of corrective action alternatives that could be applied to correct the significant deficiency effectively. The state may choose not to specify corrective action, but rather allow the system to select the most appropriate corrective action and ultimately be responsible for the choice.

Two basic approaches that can be taken to ensure significant defects are corrected include:

- Correction of problems by the water system staff, their consulting engineers, and/or contractor.
 - Many deficiencies can be addressed by water system staff and their consultants. However, the state should assess whether the water system has trained and competent staff before suggesting approaches that involve water system personnel. The state should consider the cause of the deficiency (how and why it developed) and judge whether it is reasonable to expect the water system operator or manager to correct the problem.
 - Other deficiencies may be of a nature that would require the oversight of a licensed professional engineer and may have to go through the state's plan and specification review and approval (or permitting) processes.
- Technical assistance to the water utility by the regulatory agency, organizations that specialize in training and technical assistance, and/or peers at other water systems.
 - Many water systems may need assistance to eliminate significant deficiencies. The state may be able to offer the system approaches and resources to assess and address problems. Assistance may result in training; onsite system specific technical assistance; and referrals to other available resources at the state, other organizations (e.g., local Rural Water Associations), and state environmental training centers.

A combination of these approaches may be appropriate, based on the type of significant deficiency. The SDWA Section 1412(b)(10) allows states to grant systems an additional 2 years to comply with the corrective action requirement when capital investments are necessary (refer to Appendix E for guidance).

3.9.2 Process for Determining 4-log Treatment of Viruses

The state must explain the criteria that it will use to determine when a GWS has met the requirements for 4-log treatment of viruses. Criteria may include determination of the appropriate treatment technology, treatment design and specifications constituting sufficient inactivation and or removal, the minimum contact time (in minutes) required for compliance to be achieved at the minimum disinfectant residual (in mg/L), and submission of records of CT (contact time in minutes X residual disinfectant in mg/L, measured as mg/L-minutes) calculations or records documenting maintenance of a minimum disinfectant residual.

EPA recommends that states consider using the applicable EPA-developed virus CT tables provided in section 4 of this Guidance (Tables 4-4 through 4-6) to determine the concentration and contact time requirements necessary to achieve 4-log virus inactivation using chemical disinfection. If alternative criteria will be used by GWSs for compliance, the state must describe the treatment and compliance monitoring basis for the specified 4-log virus inactivation method. The description should include how

the state will factor into its determination contact time correction factors (e.g., baffling factors), pH, temperature, flow, and minimal residuals. Section 4.4.7 provides more guidance on determining 4-log treatment of viruses.

3.9.3 Process for Determining Minimum Residual Disinfectant Concentration Prior to First User

Systems conducting compliance monitoring and providing chemical disinfection must maintain a minimum residual disinfectant concentration at or before the first customer. Residual disinfectant concentration is the concentration of the disinfectant (in milligrams per liter, or mg/L) at a point before or at the first customer.

The state primacy application must include an explanation and rationale for how the state will decide what that minimum residual disinfectant concentration will be for each system. If the state sets the minimum residual disinfectant concentration level on a system-by-system basis, the application should explain the rationale for this approach and the information required from the systems to be used in the determination.

3.9.4 Alternative Technologies for Achieving 4-log Treatment of Viruses

States should identify alternative technologies that a GWS may use alone or in combination with other approved technologies to achieve at least 4-log treatment of viruses, removal, or a state-approved combination of these technologies before or at the first customer. A state's primacy application should include a list of the approved alternative technologies.

3.9.5 Membrane Filtration Requirements to Demonstrate Virus Removal

Criteria should ensure maintenance of the integrity of the membrane to prevent passage of virus particles. Criteria may include routine pressure testing and reporting of the results as prescribed by the membrane manufacturer, turbidity monitoring, monitoring of an associated chemical parameter (e.g., total dissolved solids, total organic carbon), and other site-specific variables.

3.9.6 Monitoring and Compliance Requirements for Systems Providing 4-log Treatment of Viruses

Compliance monitoring must be conducted by a GWS that does not conduct source water monitoring under 40 CFR 141.403(a) because the system is 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 each ground water source. A GWS not required to conduct source water monitoring must notify the state 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 must begin compliance monitoring. Compliance monitoring requires the system to monitor the effectiveness and reliability of its treatment before or at the first customer.

The state must report all GWSs that are 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 each ground water source. Section 4.4 provides additional guidance on compliance monitoring and on the establishment of compliance monitoring requirements.

Under 40 CFR 141.405(a), PWSs that are conducting compliance monitoring must notify the state any time they fail to meet any state-specified compliance criteria. These state-specified compliance criteria may include, but are not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria. In addition, some PWSs will need to report that they did not conduct compliance monitoring according to their requirements or did not restore monitoring within 4 hours of a problem being identified. The PWS must notify the state as soon as possible, but in no case later than the end of the next business day. PWSs that must implement a corrective action must notify the state within 30 days of the completion of state-specified corrective actions.

3.9.6.1 PWSs Using a Chemical Disinfectant and Serving More than 3,300 People

A GWS that serves more than 3,300 people must monitor the residual disinfectant concentration continuously. The residual disinfectant concentration must be monitored at a location approved by the state, and the system must record the lowest level of residual disinfectant concentration for each day that it is in operation. Every day the GWS serves water to the public, the system must maintain the minimum state-determined residual disinfectant concentration. If the continuous monitoring equipment fails, the system must conduct grab sampling every 4 hours until the continuous monitoring equipment is back on line. The system has 14 days to resume continuous monitoring before a violation is incurred.

States are encouraged to provide GWSs with a form that facilitates compliance with chemical disinfectant residual monitoring and reporting requirements. Example 3-2 provides a form that could be adapted to state requirements and distributed to systems serving more than 3,300 people. Some states may wish to require GWSs to provide all the monitoring data required to calculate daily CTs. If so, the reporting forms should be modified and additional authority for requiring the necessary monitoring and reporting should be incorporated into the state's rules.

3.9.6.2 PWSs Using a Chemical Disinfectant and Serving 3,300 People or Fewer

A GWS that serves 3,300 or fewer people must:

- Monitor the residual disinfectant concentration during peak hourly flow or another time designated by the state, at a location approved by the state
- Record the level of residual disinfectant concentration for each day it is in operation.
- 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 minimum state-determined residual disinfectant concentration, the GWS must take follow-up samples every 4 hours until the residual disinfectant concentration returns to above the minimum state-determined level.
- Maintain the minimum state-determined residual disinfectant concentration every day the GWS serves water to the public.

A PWS using ground water and serving fewer than 3,300 people may also meet the compliance monitoring requirements by monitoring the chemical disinfectant residual continuously in accordance with the requirements for systems serving 3,300 or more people.

Example 3-3 provides a form that could be adapted and used by systems serving 3,300 people or fewer. Some states may wish to require GWSs to provide all the monitoring data required to calculate daily CTs.

If so, the reporting forms should be modified and additional authority for requiring the necessary monitoring and reporting should be incorporated into the state's rules.

3.9.6.3 PWSs Using Membrane Filtration

A GWS that uses membrane filtration to meet the treatment technique requirements must monitor the membrane filtration process in accordance with state-specified monitoring requirements. A GWS that uses membrane filtration is in compliance with the treatment requirement to achieve at least 4-log removal of viruses when:

- The membrane has an absolute molecular weight cut-off or an alternate parameter that describes the exclusion characteristics of the membrane and can reliably achieve at least 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.

3.9.6.4 PWSs Using State-Alternative Treatment

A GWS that uses a state-approved alternative treatment to meet the treatment technique requirements must monitor the alternative treatment in accordance with any state-specified monitoring requirements. A system that uses a state-approved alternative treatment must operate the alternative treatment in accordance with any compliance criteria that the state determines to be necessary to demonstrate 4-log virus inactivation, removal, or a state-approved combination of these technologies.

Example 3-2. Example Monthly Operations Report for GWSs Serving More Than 3,300 People

Public Water System Name				Reporting Month/Year	
Public Water System ID				County	Town, Village, or City
Date	Time	Source(s) in use	Lowest free chlorine residual at entry point to distribution system (mg/l)	For systems using chlorine dioxide, lowest chlorine dioxide residual at entry point (mg/L)	Additional or Other Treatment (define here)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

Public Water System Name				Reporting Month/Year	
Public Water System ID				County	Town, Village, or City
Date	Time	Source(s) in use	Lowest free chlorine residual at entry point to distribution system (mg/l)	For systems using chlorine dioxide, lowest chlorine dioxide residual at entry point (mg/L)	Additional or Other Treatment (define here)
29					
30					
31					
Did continuous monitoring equipment fail at any time this reporting month? _____ If so, were grab samples collected every four hours until the continuous monitoring equipment was returned to service? _____ Attach grab sample results and submit with this form.			Date continuous monitoring equipment failed _____ Date it was returned to service _____		
Reported by: _____		Title: _____		Operator Certification Number: _____	
Signature: _____		Date: _____		Operator Grade Level: _____	

Example 3-3. Example Monthly Operation Report for GWSs Serving 3,300 People or Fewer

Public Water System Name				Reporting Month/Year	
Public Water System ID				County	Town, Village, or City
Date	Time	Source(s) in use	Free chlorine residual at entry point to distribution system (mg/l)	For systems using chlorine dioxide, lowest chlorine dioxide residual at entry point (mg/L)	Additional or Other Treatment (define here)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					

Public Water System Name				Reporting Month/Year	
Public Water System ID				County	Town, Village, or City
Date	Time	Source(s) in use	Free chlorine residual at entry point to distribution system (mg/l)	For systems using chlorine dioxide, lowest chlorine dioxide residual at entry point (mg/L)	Additional or Other Treatment (define here)
29					
30					
31					
Was the chlorine residual ever less than _____ mg/L? _____					
If so, did you monitor every four hours until it returned to _____ mg/L? _____ Attach those results and submit them with this form.					
Reported by: _____		Title: _____		Operator Certification Number: _____	
Signature: _____		Date: _____		Operator Grade Level: _____	

3.9.7 Criteria for Discontinuing 4-log Treatment of Viruses

A GWS may discontinue providing 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal) if the state determines that 4-log treatment of viruses is no longer necessary. In order for a system to discontinue treatment, the state must make a determination that the system has met the necessary criteria for discontinuing treatment. The state must document its determination in writing and maintain a record of the determination.

A system that discontinues 4-log virus treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log virus inactivation and removal) is subject to triggered source water microbial monitoring and analytical methods requirements of the GWR.

3.9.8 Treatment Technique Violations

The following treatment technique violations require Tier 2 notice to be given to the public [40 CFR subpart Q (Public Notification of Drinking Water Violations)].

- A GWS that has 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:
 - Does not complete corrective action in accordance with applicable state plan review processes or other state guidance and direction, including state specified interim actions and measures; or,
 - Is not in compliance with a state-approved corrective action plan and schedule.
- Unless the state invalidates a fecal indicator-positive ground water source sample, a GWS is in violation of the treatment technique requirement if, within 120 days of receiving notice (or earlier if directed by the state) the system:
 - 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,
 - Is not in compliance with a state-approved corrective action plan and schedule.
- A GWS that collects compliance monitoring samples and 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 4 hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.

3.9.9 Monitoring Violations

Any GWS that fails to meet the ground water source microbial monitoring and analytical methods under 40 CFR 141.402 (a) - (f) or fails to meet the compliance monitoring requirements under 40 CFR 141.403(b) is in violation of the monitoring requirements of the GWR. These monitoring violations require Tier 3 notice to be given to the public pursuant to 40 CFR subpart Q (Public Notification of Drinking Water Violations).

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Section 4

State Primacy Revision Application

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40 CFR Part 142 sets out requirements for states to obtain and/or retain primary enforcement responsibility (primacy) for the Public Water System Supervision (PWSS) program as authorized by Section 1413 of the Safe Drinking Water Act (SDWA). The 1996 SDWA Amendments updated the process for states to obtain and/or retain primacy. On April 28, 1998, EPA promulgated the Primacy Rule to reflect these statutory changes (63 *FR* 23361).

4.1 State Primacy Program Revision

Pursuant to 40 CFR 142.12, complete and final requests for approval of program revisions to adopt new or revised EPA regulations must be submitted to the EPA Administrator no later than 2 years after promulgation of new or revised federal regulations. Until EPA approves those applications, EPA regions have responsibility for directly implementing the new or revised regulations although the state and EPA can agree to implement a rule together during this period.

States that have primacy for all existing National Primary Drinking Water Regulations (NPDWRs) are considered to have interim primacy for any new or revised regulation. If a state is eligible for interim primacy, it will have full implementation and enforcement authority. Interim primacy for the Ground Water Rule (GWR) would begin on the date the state submits its final and complete primacy revision application or the effective date of the new state regulation (whichever is later), and ends when EPA makes a final determination (see Table 4-1).

A state may be granted an extension of up to 2 years to submit its application package. During any extension period, an extension agreement outlining the state's and EPA's responsibilities is required.

Table 4-1. State Rule Implementation and Revision Timetable for the GWR

EPA/State Action	Time Frame
GWR promulgated	November 8, 2006
State and region establish a process and agree upon a schedule for application review and approval (optional)	January 8, 2007
State, at its option, submits <i>draft</i> program revision package to region including: Preliminary Approval Request, Draft State Regulations and/or Statutes, Regulation Crosswalk	May 8, 2007
Regional (and Headquarters if necessary) review of draft	Completed within 90 days of state submittal of draft (suggested)
State submits final program revision package to region including: <ul style="list-style-type: none"> • Adopted State Regulations • Regulation Crosswalk • 40 CFR 142.10 Primacy Update Checklist • 40 CFR 142.14 and 142.15 Reporting and Recordkeeping • 40 CFR 142.16 Special Primacy Requirements • Attorney General's Enforceability Certification 	November 8, 2008 ¹
Rule compliance date	December 1, 2009
States with approved extensions submit complete and final program revision package	November 8, 2010 ²

<p>EPA final review and determination:</p> <ul style="list-style-type: none"> • Regional review [program and Office of Regional Counsel (ORC)] • Headquarters concurrence and waivers [Office of Ground Water and Drinking Water (OGWDW) and Office of Enforcement and Compliance Assistance (OECA)] • Public notice • Opportunity for hearing • EPA's determination 	<p>Completed within 90 days of state submittal of final program revision package</p> <p style="text-align: center;">45 days region</p> <p style="text-align: center;">45 days Headquarters(HQ)³</p>
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1. EPA suggests submitting an application by August 8, 2008 to ensure timely approval. EPA regulations allow states until November 8, 2008 for this submittal. An extension of up to 2 years may be requested by the state.
2. EPA suggests submitting an application by August 8, 2010 for states with approved extensions to ensure timely approval.
3. At least one state per region.

4.1.1 The Revision Process

EPA recommends a two-step process for approval of state program revisions. The steps consist of submission of a draft request (optional) and submission of a complete and final request for program approval. Figure 4-1 diagrams these processes and their timing.

Draft Request—The state may submit a draft request for EPA review and tentative determination. The request should contain drafts of all required primacy application materials (with the exception of a draft Attorney General's Statement). A draft request should be submitted as soon as practicable; EPA recommends submitting it within 6 months of rule promulgation. EPA will make a tentative determination as to whether the state program meets the applicable requirements. EPA intends to make a tentative determination within 90 days.

Complete and Final Request—This submission must be in accordance with 40 CFR 142.12(c)(1) and (2) and include the Attorney General's statement. The state should also include its response to any comments or program deficiencies identified in the tentative determination (if applicable). Submission of only a final request may make it more difficult for states to address any necessary changes within the allowable time for state rule adoption.

EPA recommends that states submit their complete and final revision package within 21 months of rule promulgation (or by August 8, 2008 for the GWR). This will ensure that states will have interim primacy as soon as possible and will prevent backlogs of revision applications to adopt future federal requirements.

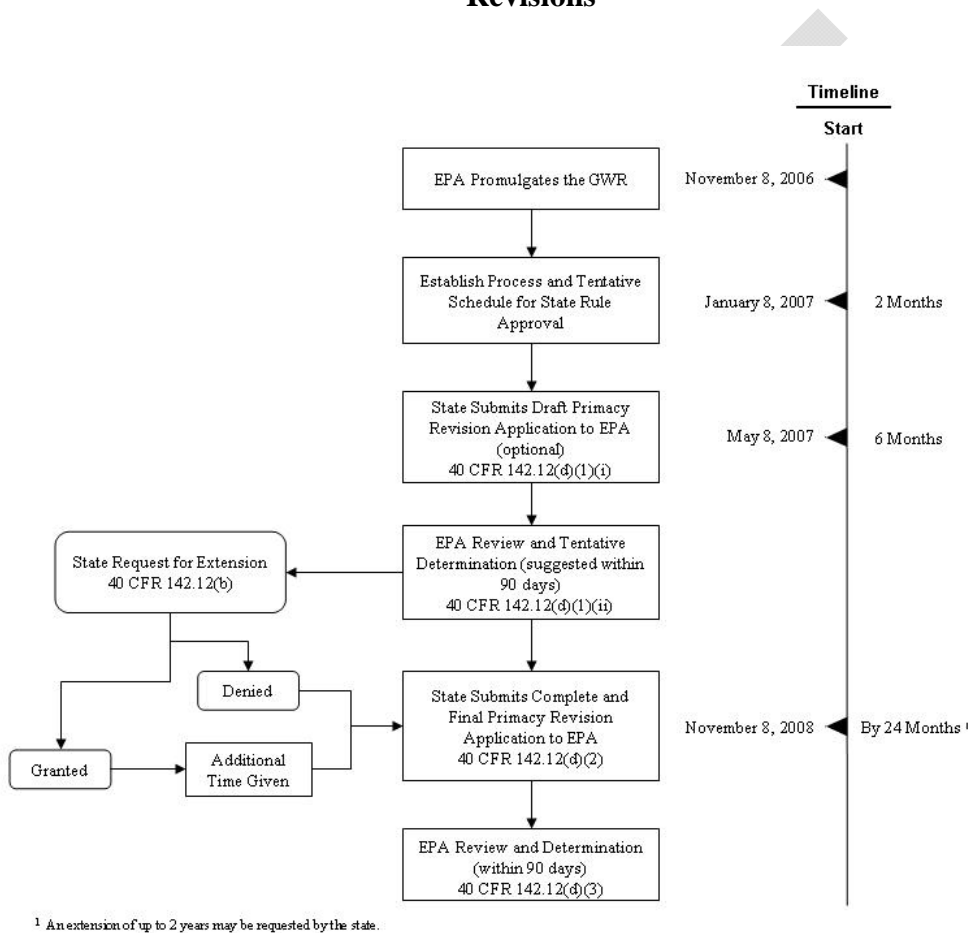
The state and region should agree to a plan and timetable for submitting the state primacy revision application as soon as possible after rule promulgation—ideally within 2 months of promulgation.

4.1.2 The Final Review Process

Once a state application is complete and final, EPA has a regulatory (and statutory) deadline of 90 days to review, and approve or disapprove the revised program. OGWDW will conduct a detailed concurrent review of the first state package from each region. The regional office should submit its comments with the state's package within 45 days for review by HQ. When the region has identified all significant issues, OGWDW waives concurrence on all other state programs in that region, although EPA HQ retains the option to review additional state programs as appropriate. The Office of General Counsel (OGC) has delegated its review and approval to the ORC.

In order to meet the 90-day deadline for packages undergoing review by HQ, the review period is equally split by giving the regions and HQ 45 days each to conduct their respective reviews. For the first package in each region, regions should forward copies of the primacy revision applications and their evaluations to the Drinking Water Protection Division Director in OGWDW no later than 45 days after state submittal. The Drinking Water Protection Division Director takes the lead on the HQ review process.

Figure 4-1. Recommended Review Process for State Request for Approval of Program Revisions



4.2 State Primacy Program Revision Extensions

4.2.1 The Extension Process

Under 40 CFR 142.12(b), a state may request that the 2 year deadline for submitting the complete and final program revision package be extended for up to 2 additional years. The extension request must be submitted to EPA within 2 years of the date that EPA published the regulation. The Regional Administrator has been delegated authority to approve extension applications. Concurrence by HQ on extensions is not required.

Therefore, the state must either adopt regulations pertaining to the GWR and submit a complete and final primacy revision application by November 8, 2008 or request an extension of up to 2 years by that date.

4.2.2 Extension Request Criteria

For an extension to be granted under 40 CFR 142.12(b), the state must demonstrate that it is requesting the extension because it cannot meet the original deadline for reasons beyond its control and despite a good faith effort to do so. A critical part of the extension application is the state's proposed schedule for submission of its complete and final request for approval of a revised primacy program. The application must also demonstrate at least one of the following:

- (i) That the state currently lacks the legislative or regulatory authority to enforce the new or revised requirements;
- (ii) That the state currently lacks the program capability adequate to implement the new or revised requirements; or,
- (iii) That the state is requesting the extension to group two or more program revisions in a single legislative or regulatory action.

In addition, the state must be implementing the EPA requirements to be adopted in its program revision within the scope of its current authority and capabilities.

4.2.3 Conditions of the Extension

Until the State Primacy Revision Application has been submitted, the state and EPA regional office will share responsibility for implementing the primary program elements as indicated in the extension agreement. The state and the EPA regional office should discuss these elements and address terms of responsibility in the agreement. PWSs should be notified of a contact person at the EPA Region if they want to ask questions or obtain information about the GWR before the state has primacy.

These conditions will be determined during the extension approval process and are decided on a case-by-case basis. The conditions must be included in an extension agreement between the state and the EPA regional office.

Conditions of an extension agreement may include:

- Informing PWSs of the new EPA (and upcoming state) requirements and the fact that the region will be overseeing implementation of the requirements until they approve the state program revisions or until the state submits a complete and final revision package if the state qualifies for interim primacy.
- Collecting, storing, and managing laboratory results, public notices, and other compliance and operation data required by the EPA regulations.
- Assisting the region in the development of the technical aspects of enforcement actions and conducting informal follow-up on violations (e.g., telephone calls, letters).
- Providing technical assistance to PWSs.

- For states whose request for an extension is based on a current lack of program capability adequate to implement the new requirements, taking steps agreed to by the region and the state to remedy the deficiency during the extension period.
- Providing the region with all the information required under 40 CFR 142.15 for state reporting.

Example 4-1 provides a checklist the region can use to review state extensions or to create an extension agreement.

Until states have primacy, EPA is the primary enforcement authority; however, states historically have played a role in implementation for various reasons—most important because states have local knowledge, expertise, and established relationships with their systems.

The state and EPA should be viewed as partners in this effort, working towards two very specific goals. The first goal is to achieve a high level of compliance with the regulation. The second goal is to facilitate successful implementation of the regulation during the transition period between when EPA has primacy and when the state has primacy, including interim primacy, for the rule. In order to accomplish these goals and to ensure proper health protection, education, training, and technical assistance will need to be provided to water suppliers explaining their responsibilities under the GWR. Water suppliers are also encouraged to refer to the GWR guidance materials, reference guide, and fact sheets listed in section 2.

Example 4-1. Example Extension Request Checklist

{Date}

{Regional Administrator}

Regional Administrator

U.S. EPA Region {Region}

{Street Address}

{City, State, Zip}

RE: Request/approval for an Extension Agreement

Dear {Regional Administrator}:

The State of {State} is requesting an extension to the date that final primacy revisions are due to EPA for the Ground Water Rule (GWR) until {insert date - no later than November 8, 2010}, as allowed by 40 CFR 142.12, and would appreciate your approval. Staff of the {State Department/Agency} have conferred with your staff and have agreed to the requirements listed below for this extension. This extension is being requested because the State of {State}:

- Is planning to group two or more program revisions into a single legislative or regulatory action.
- Currently lacks the legislative or regulatory authority to enforce the new or revised requirements.
- Currently lacks adequate program capability to implement the new or revised requirements.

{State Department/Agency} will be working with EPA to implement the GWR within the scope of its current authority and capability, as outlined in the six areas identified in 40 CFR 142.12(b)(3)(i-vi):

- i) Informing public water systems (PWSs) of the new EPA (and upcoming state) requirements and the fact that EPA will be overseeing implementation of the requirements until EPA approves the state revision.

State	EPA	
___	___	Provide copies of regulation and guidance to other state agencies, PWSs, technical assistance providers, associations, or other interested parties.
___	___	Educate and coordinate with state staff, PWSs, the public, and other water associations about the requirements of this regulation.
___	___	Notify affected systems of their requirements under the GWR.
___	___	Other:

- ii) Collecting, storing, and managing laboratory results, public notices, and other compliance and operation data required by the EPA regulations.

State	EPA	
___	___	Devise a tracking system for PWS reporting pursuant to the GWR.
___	___	Keep PWSs informed of reporting requirements during development and implementation.
___	___	Report GWR violation and enforcement information to SDWIS as required.
___	___	Other:

- iii) Assisting EPA in the development of the technical aspects of the enforcement actions and conducting informal follow-up and violations (telephones calls, letters, etc.).

State	EPA	
___	___	Issue notices of violation (NOVs) for treatment technique, maximum contaminant level (MCL), and monitoring/ reporting violations of the GWR.

_____ Provide immediate technical assistance to PWSs with treatment technique, MCL and/or monitoring/reporting violations to try to bring them into compliance.
 _____ Refer all violations to EPA for enforcement if they have not been resolved within 60 days of the incident that triggered the violation. Provide information as requested to conduct and complete any enforcement action referred to EPA.
 _____ Other:

iv) Providing technical assistance to PWSs.

State	EPA	
_____	_____	Conduct training within the state for PWSs on GWR requirements.
_____	_____	Provide technical assistance through written and/or verbal correspondence with PWSs.
_____	_____	Provide on-site technical assistance to PWSs as requested and needed to ensure compliance with this regulation.
_____	_____	Coordinate with other technical assistance providers and organizations to provide accurate information and aid in a timely manner.
_____	_____	Other:

v) Providing EPA with all information prescribed by the State Reporting Requirements in 40 CFR 142.15.

State	EPA	
_____	_____	Report any violations incurred by PWSs for this regulation each quarter.
_____	_____	Report any enforcement actions taken against PWSs for this regulation each quarter.
_____	_____	Report any variances or exemptions granted for PWSs for this regulation each quarter.
_____	_____	Other:

vi) For states whose request for an extension is based on a current lack of program capability to implement the new or revised requirements, taking the following steps to remedy the capability deficiency.

State	EPA	
_____	_____	Acquire additional resources to implement these regulations (list of specific steps being taken attached as <u>{List A}</u>).
_____	_____	Provide quarterly updates describing the status of acquiring additional resources.
_____	_____	Other:

I affirm that the {State Department/Agency} will implement provisions of the GWR as outlined above.

_____ {Agency Director or Secretary} _____ Date

_____ {Name of State Agency}

I have consulted with my staff and approve your extension for the aforementioned regulation. I affirm that EPA Region {Region} will implement provisions of the GWR as outlined above.

_____ Regional Administrator _____ Date
 EPA Region {Region}

This Extension Agreement will take effect upon the date of the last signature.

4.3 State Primacy Package

The Primacy Revision Application package should consist of the following sections:

- State Primacy Revision Checklist
- Text of the State’s Regulations
- Primacy Revision Crosswalk
- State Reporting and Recordkeeping Checklist
- Special Primacy Requirements
- Attorney General’s Statement of Enforceability

4.3.1 The State Primacy Revision Checklist [40 CFR 142.12(c)(1)]

This section is a checklist of general primacy requirements, as shown in Table 4-2. In completing this checklist, the state must identify the program elements that it has revised in response to new federal requirements. **If an element has been revised, the state should indicate a “Yes” answer in the “Revision to State Program” column and should submit appropriate documentation.** For elements that did not require revision, the state need only list the citation and date of adoption in the “Revision to State Program” column. During the application review process, EPA will insert findings and comments in the final column.

The 1996 SDWA Amendments include new provisions for PWS definition and administrative penalty authority. States must adopt provisions at least as stringent as these new provisions, now codified at 40 CFR 142.2 and 40 CFR 142.10. Failure to revise these elements can affect primacy for the GWR.

States must have primacy or interim primacy for all existing regulations before they can receive primacy for this regulation. States may bundle the primacy revision packages for multiple rules. If states choose to bundle requirements, the Attorney General’s Statement should reference all of the rules included.

Table 4-2. State Primacy Revision Checklist

Required Program Elements		Revision to State Program	EPA Findings/Comments
40 CFR 141.2	Definitions		
40 CFR 142.10(b)(6)(iii)	Right of entry		
40 CFR 142.10(b)(6)(iv)	Authority to require records		
40 CFR 142.10(b)(6)(v)	Authority to require public notification		
40 CFR 142.10(b)(6)(vi)	Authority to assess civil and criminal penalties		
40 CFR 142.10(b)(6)(vii)	Authority to require consumer confidence reports (CCRs)		
40 CFR 142.10(c)	Maintenance of records		

Required Program Elements		Revision to State Program	EPA Findings/Comments
40 CFR 142.10(d)	Variance/exemption conditions (if applicable) ¹		
40 CFR 142.10(e)	Emergency plans		
40 CFR 142.10(f)	Administrative penalty authority ²		

1. Regulations published in the August 14, 1998 *Federal Register*.

2. Requirement from the 1996 SDWA Amendments. Regulations published in the April 28, 1998 *Federal Register*.

4.3.2 Text of the State's Regulation

Each primacy application package should include the appropriate text of the state's regulations.

4.3.3 Primacy Revision Crosswalk

The Primacy Revision Crosswalk, in Appendix A, should be completed by states in order to identify state statutory or regulatory provisions that correspond to each federal requirement. If the state's provisions differ from federal requirements, the state should explain how its requirements are "no less stringent."

4.3.4 State Reporting and Recordkeeping Checklist [40 CFR 142.14 and 40 CFR 142.15]

The GWR adds 10 new state recordkeeping requirements and three new state reporting requirements.

The state should use the Primacy Revision Crosswalk in Appendix A to demonstrate that state reporting and recordkeeping requirements are no less stringent than federal requirements. If state requirements are not the same as federal requirements, the state must explain how its requirements are "no less stringent" as required under 40 CFR 142.10.

The Primacy Revision Crosswalk includes state recordkeeping requirements [40 CFR 142.14(d)(17)(i) - (d)(17)(x)] indicating that the state must maintain:

- Records of written notice of significant deficiencies. [40 CFR 142.16(o)(2)(v)]
- Records of corrective action plans and schedule approval or state-specified interim measures. [40 CFR 141.403(a)(5)(ii)]
- Records of confirmation under 40 CFR 141.403(a) that a significant deficiency has been corrected or the fecal contamination in the ground water source has been addressed. [40 CFR 142.16(o)(4)]
- Records of state determinations and records of GWSs' documentation for not conducting triggered source water monitoring. [40 CFR 141.402(a)(5)]
- Records of invalidation of fecal indicator-positive source water samples. [40 CFR 141.402(d)]
- Records of state approvals of source water monitoring plans. [40 CFR 141.402(a)(2)(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. [40 CFR 142.16(o)(4)(ii)]
- Records of notice of the state-specified monitoring and compliance criteria (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. [40 CFR 142.16(o)(4)(iv) and 40 CFR 142.16(o)(4)(v)]
- 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 a ground water source. [40 CFR 141.403(b)(1) and 40 CFR 141.403(b)(2)]
- Records of written determination that a GWS may discontinue 4-log treatment of viruses (using inactivation, removal, or a state-approved combination of 4-log inactivation and removal). [40 CFR 142.16(o)(4)(vi)]

The Primacy Revision Crosswalk includes requirements [40 CFR 142.15(c)(7)(i) - (c)(7)(iii)] indicating that the state must report:

- For each GWS, 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 eight elements was evaluated. [40 CFR 142.16(o)(2)]
- For GWSs that must meet a treatment technique requirement, the date the system completed the corrective action. [40 CFR 141.403(a)]
- All GWSs 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). [40 CFR 141.403(b)]

4.3.5 Special Primacy Requirements [40 CFR 142.16]

Special primacy conditions pertain to specific regulations where implementation of the rule involves activities beyond general primacy provisions. States must include these rule-distinct provisions in a application for approval or revision of their program. The Special Primacy Requirements section of the crosswalk is where the state has the opportunity to describe how it will satisfy these provisions. Section 4.4 provides guidance on how states may choose to meet the Special Primacy Requirements of the GWR.

4.3.6 Attorney General's Statement of Enforceability [40 CFR 142.12(c)(2)]

The complete and final primacy revision application must include an Attorney General's Statement certifying that the state regulations were duly adopted and are enforceable (unless EPA has waived this requirement by letter to the state). The Attorney General's Statement should also certify that the state does not have any audit privilege or immunity laws or, if it has such laws, that these laws do not prevent the state from meeting the requirements of the SDWA. If a state has submitted this certification with a previous revision package, then the state should indicate the date of submittal and the Attorney General need only certify that the status of the audit laws has not changed since the prior submittal. An example of an Attorney General's Statement is presented in Example 4-2.

Example 4-2. Example of Attorney General’s Statement

Model Language

I hereby certify, pursuant to my authority as (1) and in accordance with the Safe Drinking Water Act as amended, and (2), that in my opinion the laws of the [State/Commonwealth of (3)] [or tribal ordinances of (4)] to carry out the program set forth in the “Program Description” submitted by the (5) have been duly adopted and are enforceable. The specific authorities provided are contained in statutes or regulations that are lawfully adopted at the time this Statement is approved and signed and will be fully effective by the time the program is approved.

I. For States with No Audit Privilege and/or Immunity Laws

Furthermore, I certify that [State/Commonwealth of (3)] has not enacted any environmental audit privilege and/or immunity laws.

II. For States with Audit Laws that do Not Apply to the State Agency Administering the Safe Drinking Water Act

Furthermore, I certify that the environmental [audit privilege and/or immunity law] of the [State/Commonwealth of (3)] does not affect the ability of (3) to meet enforcement and information gathering requirements under the Safe Drinking Water Act because the [audit privilege and/or immunity law] does not apply to the program set forth in the “Program Description.” The Safe Drinking Water Act program set forth in the “Program Description” is administered by (5); the [audit privilege and/or immunity law] does not affect programs implemented by (5), thus the program set forth in the “Program Description” is unaffected by the provisions of [State/Commonwealth of (3)] [audit privilege and/or immunity law].

III. For States with Audit Privilege and/or Immunity Laws that Worked with EPA to Satisfy Requirements for Federally Authorized, Delegated, or Approved Environmental Programs

Furthermore, I certify that the environmental [audit privilege and/or immunity law] of the [State/Commonwealth of (3)] does not affect the ability of (3) to meet enforcement and information gathering requirements under the Safe Drinking Water Act because [State/Commonwealth of (3)] has enacted statutory revisions and/or issued a clarifying Attorney General’s Statement to satisfy requirements for federally authorized, delegated, or approved environmental programs.

Seal of Office

Signature

Name and Title

Date

- (1) State Attorney General or attorney for the primacy agency if it has independent legal counsel.
- (2) 40 CFR 142.11(a)(6)(i) for initial primacy applications or 40 CFR 142.12(c)(1)(iii) for primacy program revision applications.
- (3) Name of state or commonwealth.
- (4) Name of tribe.
- (5) Name of primacy agency.

4.3.6.1 Guidance for States on Audit Privilege and/or Immunity Laws

In order for EPA to properly evaluate the state's request for approval, the State Attorney General or independent legal counsel should certify that the state's environmental audit immunity and/or privilege and immunity law does not affect its ability to meet enforcement and information gathering requirements under SDWA. This certification should be reasonably consistent with the wording of the state audit laws and should demonstrate how state program approval criteria are satisfied.

EPA will apply the criteria outlined in its "Statement of Principles" memo issued on February 14, 1997, (www.epa.gov/epaoswer/hazwaste/state/policy/policies.htm) to determine whether states with audit laws have retained adequate enforcement authority for any authorized federal programs. The principles articulated in the guidance are based on the requirements of federal law, specifically the enforcement and compliance and state program approval provisions of environmental statutes and their corresponding regulations. The Principles provide that if provisions of state law are ambiguous, it will be important to obtain opinions from the State Attorney General, or independent legal counsel, interpreting the law as meeting specific federal requirements. If the law cannot be so interpreted, changes to state laws may be necessary to obtain federal program approval. Before submitting a package for approval, states with audit privilege and/or immunity laws should initiate communications with appropriate EPA regional offices to identify and discuss the issues raised by the state's audit privilege and/or immunity law.

The guidance for states on Audit Law Privilege and/or Immunity Laws is currently under review. If amended, EPA will issue an addendum to this document with the revised guidance.

4.4 Guidance for the Special Primacy Requirements of the GWR

In addition to adopting basic primacy requirements specified in 40 CFR 142, states are required to adopt primacy provisions pertaining to specific regulations where implementation of the rule involves activities beyond general primacy provisions. The purpose of these provisions is to allow state flexibility in implementing a regulation that: (1) applies to specific system configurations within the particular state; and, (2) can be integrated with a state's existing PWSS Program. States must include these rule-distinct provisions in an application for approval or revision of their programs. This section contains information and guidance that states can use when addressing the Special Primacy Requirements of the GWR. The guidance addresses Special Primacy Conditions in the same order that they occur in the rule. In the state primacy revision application packages, the state must explain how it intends to accomplish the requirements of 40 CFR 142.16.

Note: EPA has included the appropriate text from the GWR at the beginning of each subsection.

4.4.1 Special Primacy Requirement Regarding Legal Authority to Ensure GWSs Conduct Source Water Monitoring

40 CFR 142.16 Special primacy requirements. (o) (1) Legal authority. The application for primacy must demonstrate the State has: (i) The authority contained in statute or regulation to ensure that GWSs conduct source water monitoring under 40 CFR 141.402(a)(2), 40 CFR 141.402(a)(3) and 40 CFR 141.402(a)(4)(ii)(A).

Guidance

This Special Primacy Requirement addresses a state's rules or other authority to ensure a GWS conducts monitoring at its ground water source(s) for a fecal indicator in response to a total coliform-positive

sample result obtained in compliance with the TCR. This requirement also addresses the state's authority to require a GWS to collect five additional source water samples from a ground water source that has a fecal indicator-positive test result. In addition, this primacy requirement addresses the state's authority to require a wholesale system to test its ground water source(s) for a fecal indicator in response to a total coliform-positive result obtained in compliance with the TCR by a consecutive system that receives water from that wholesale system.

In response to this primacy requirement the state should demonstrate it has the authority to require GWSs to comply with the requirements of 40 CFR 141.402(a)(2), 40 CFR 141.402(a)(3) and 40 CFR 141.402(a)(4)(ii)(A). States that adopt the federal GWR by reference can make this demonstration by showing they have adopted the federal rule. In addition, the state should provide an explanation for its choice of fecal indicator. States may want to refer to regional groundwater occurrence studies or applicable studies comparing the presence of indicators under various wellhead or hydrogeological conditions. States should also consider the availability of laboratories that can perform the EPA-approved analytical method for the fecal indicator that is selected.

For those states that do not adopt the federal GWR by reference, this primacy requirement may be satisfied by a description of statutes, rules, and other authorities the state can use to ensure GWSs collect the necessary samples in accordance with 40 CFR 141.402(a)(2), 40 CFR 141.402(a)(3) and 40 CFR 141.402(a)(4)(ii)(A). States must also have the authority to specify the microbial methods listed in 40 CFR 141.402(c). The appropriate section(s) of each source of authority must be cited and copies of the written documents must be included in the program revision application package.

4.4.2 Special Primacy Requirement Regarding Legal Authority to Ensure GWSs Address Significant Deficiencies

40 CFR 142.16 Special primacy requirements. (o) (1) Legal authority. The application for primacy must demonstrate the State has: (ii) The authority contained in statute and regulation to ensure that GWSs take the appropriate corrective actions including interim measures, if necessary, needed to address significant deficiencies.

Guidance

States that adopt the federal GWR by reference can make this demonstration by showing they have adopted the federal rule (i.e., 40 CFR 141.403). For those not adopting by reference, this Special Primacy Requirement may be satisfied by a description of statutes, rules, and other authority the state can use to ensure GWSs take action necessary to address significant deficiencies as required in 40 CFR 141.403. The appropriate section(s) of each source of authority must be cited and copies of the written documents must be included in the revision application package.

In addition, states may wish to address their authority to take administrative or legal actions and assess penalties. Also, states may wish to include a description of how the appropriate rules or other authority, including formal enforcement actions, will be used to ensure that the GWSs take the steps necessary to correct significant deficiencies.

EPA believes many states have existing authorities that are adequate to comply with the intent of this Special Primacy Requirement. These authorities can often be found in broad statutory language designed to provide public health protection. However, EPA does not believe that the state's existing authority to address imminent and substantial endangerment is sufficient to meet this Special Primacy Requirement. The authority must be specific enough to allow the state to require correction of conditions that have the potential for causing the introduction of contamination into the water delivered to consumers.

Some states may wish, in the rule-making process, to specifically identify significant deficiencies and provide authority to require correction of each. This has the added benefit of establishing a transparent process that ensures the state's administrative procedures requirements are met.

4.4.3 Special Primacy Requirement Regarding Legal Authority to Ensure GWSs Address Source Water Fecal Contamination

40 CFR 142.16 Special primacy requirements. (o) (1) Legal authority. The application for primacy must demonstrate the State has: (iii) The authority contained in statute and regulation to ensure that GWSs take the appropriate corrective actions, including interim measures, if necessary, to address any source water fecal contamination identified during routine or triggered source water monitoring.

Guidance

This Special Primacy Requirement addresses a state's rules or other authority to ensure a GWS responds to fecal contamination (identified during source water monitoring that has been triggered by a total coliform-positive sample result obtained in compliance with the TCR or additional source water monitoring).

States that adopt the federal GWR by reference, can make this demonstration by showing they have adopted the federal rule (i.e., 40 CFR 141.403). For others, this primacy requirement can be satisfied by a description of statutes, rules, and other authorities the state can use to ensure PWSs take the necessary actions appropriate for the nature and severity of the problem. The appropriate section(s) of each source of authority must be cited, copies of the written documents must be included in the program revision application package, and the authority must be equivalent to that provided in 40 CFR 141.403 of the GWR.

In their applications, states may also wish to address their authority to take administrative or legal actions and assess penalties. In addition, states may want to include a description of how they will use their appropriate rules or other authorities to achieve the desired actions on the part of GWSs.

4.4.4 Special Primacy Requirement Regarding Legal Authority to Ensure GWSs Consult with the State Prior to Implementing Corrective Action

40 CFR 142.16 Special primacy requirements. (o) (1) Legal authority. The application for primacy must demonstrate the State has: (iv) The authority contained in statute or regulation to ensure that GWSs consult with the State regarding corrective action(s).

Guidance

This Special Primacy Requirement addresses a state's rules or other authority to ensure a system with significant deficiencies or source water fecal contamination consults with the state prior to taking corrective action as required by 141.403(4). Systems and states should have the flexibility and authority to determine and require the most appropriate corrective action to address site-specific conditions.

This consultation is intended to allow the state the ability to provide an initial review and engage in a discussion with the system to ensure that, when appropriate, state plan review/permitting requirements are met and corrective actions are conducted that are appropriate and protective of public health.

States that adopt the federal GWR by reference can demonstrate authority to require consultation by showing they have adopted the federal rule (i.e., 141.403). For others, this primacy requirement can be satisfied by a description of statutes, rules, and other authorities the state can use to ensure GWSs consult with the state before implementing corrective actions. The appropriate section(s) of each source of authority must be cited and copies of the written documents must be included in the program revision application package. States should also determine if they have existing authority to require GWSs to, not only consult, but to make corrective actions deemed appropriate by the state. If they do not have such authority, they should address it in their rule-making process.

In their applications, states may also wish to address their authority to take administrative or legal actions and assess penalties. In addition, states may include a description of the plan for using their appropriate rules or other authority to achieve the desired actions on the part of PWSs.

4.4.5 Special Primacy Requirements Regarding Sanitary Surveys

40 CFR 142.16 Special primacy requirements. (o) (2) State practices or procedures for sanitary surveys. In addition to the general requirements for sanitary surveys contained in 40 CFR 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.

Guidance

The Special Primacy Requirements of 40 CFR 142.16(o)(2) describe several additional provisions states must apply to their sanitary survey programs for GWSs. These provisions address the aspects of GWSs that must be evaluated during the sanitary survey, minimum frequencies for conducting the sanitary surveys, and identification of “significant deficiencies” that require immediate corrective action. It also offers states the flexibility to reduce the frequency of sanitary surveys necessary for CWSs with 4-log virus treatment or those deemed by the state to have outstanding performance and to conduct sanitary surveys in a phased or staged manner.

The following guidance addresses each subsection of 40 CFR 142.16(o)(2)(i) through (v) in order; however, the arrangement and structure of the state’s description are discretionary provided the state gives sufficient detail to demonstrate that its strategy and capacity are adequate for meeting the Special Primacy Conditions. For more detailed guidance see Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under the Direct Influence (GWUDI). April 1999 (EPA 815-R-99-016). Available at www.epa.gov/safewater/mdbp/pdf/sansurv/sansurv.pdf and from the Safe Drinking Water Hotline (800) 426-4791.

4.4.5.1 Frequency and scope of sanitary surveys

- (i): *The state must conduct sanitary surveys for all GWSs that address the eight sanitary survey components listed in this section no less frequently than every 3 years for community water systems and every 5 years for non-community water systems. The state may conduct more frequent sanitary surveys for any system. The initial sanitary survey for community water systems must be conducted by December 31, 2012 and the initial sanitary survey for non-community water systems must be conducted by December 31, 2014. For the purposes of this paragraph, a “sanitary survey,” as conducted by the state, includes but is not limited to an onsite review of the water source (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. The sanitary survey components are listed in (A)-(H).

(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.

(H) Operator compliance with state requirements.

Guidance

This Special Primacy Requirement addresses the scope of the state's sanitary surveys (eight components must be included), the minimum frequency for conducting surveys, and the capacity of the state to conduct these required surveys. States should have adequate resources to comply with these requirements. States must address scope and frequency of sanitary surveys in their primacy revision application and are encouraged to address capacity and implementation as well. Some states may have already adopted relevant authority for these requirements when they adopted the Interim Enhanced Surface Water Treatment Rule (IESWTR).

Frequency of sanitary surveys

In a state's description of how it will implement a sanitary survey program, the state should demonstrate that sanitary surveys will address, at a minimum, the eight components listed above. In cases where the state is currently performing sanitary surveys that meet these minimum requirements, example sanitary survey forms and completed reports can be used to demonstrate that all eight elements are addressed. If the state does not believe that it currently performs sanitary surveys that meet the minimum requirements, the revision application should include details of a plan for upgrading the state's procedures, as necessary, including examples of sanitary survey forms that will be used and a description of training for staff performing sanitary surveys.

The state must show that sanitary surveys will be conducted no less frequently than every 3 years for CWSs that are not providing at least 4-log treatment of viruses and have not been determined by the state to have an outstanding performance record. The state must show that sanitary surveys will be conducted no less frequently than every 5 years for NCWSs and CWSs providing at least 4-log treatment of viruses or that have been determined by the state to have an outstanding performance record. (See section 4.4.5.3.)

In order to ensure these surveys will be an effective preventive tool for identifying and correcting water system deficiencies that could pose a threat to public health, states should conduct surveys 3 (or 5) years from the year the survey was last conducted. Thus, if a sanitary survey for a system on a 3-year cycle is conducted on June 11, 2008, the next survey should be completed by December 2011. EPA encourages more frequent sanitary surveys than stated if that is the current practice, or requirement of the state.

Capacity

The state's revision application should address capacity for conducting appropriate sanitary surveys at, or in excess of, the frequency outlined in 40 CFR 142.16(o)(2)(i). When such capacity exists and the above requirements are being met or exceeded by an existing program, a summary of the state's sanitary survey

program, including a brief description of past and future schedules, should be sufficient to demonstrate adequate capacity. The state should also demonstrate that personnel performing the sanitary surveys will have the professional qualifications and training necessary to assure sanitary surveys are conducted by appropriately skilled and adequately trained professionals.

A state that does not have an existing sanitary survey program that meets these requirements should describe its proposed program and estimate the resources directed toward sanitary surveys. The state should explain how the new requirements will affect its program and whether existing resources will be adequate. When existing resources are clearly inadequate, the state should provide EPA with a plan for obtaining additional support before the compliance dates of the rule.

Implementation

Finally, the state should provide EPA with a brief description of its plan for meeting the requirements of 40 CFR 142.16(o)(2)(i) given existing or planned resources, the number of affected GWSs, anticipated follow-up technical assistance and enforcement needs, and other program demands.

4.4.5.2 Phased sanitary survey process

- (iii): *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 (o)(2)(i)(A) through (H) are evaluated within the required interval. States may use the results of reviews of components listed in paragraphs (o)(2)(i)(A) through (H) of this section conducted prior to November 11, 2006 to satisfy the initial sanitary survey requirements for that component. Subsequent reviews of that component must be conducted with the frequency required in paragraph (o)(2)(i).*

Guidance

In view of the fact that states often conduct inspections of one or more of the eight components of a sanitary survey as part of program efforts separate from the sanitary surveys, the rule allows for those evaluations and inspections to be used in a staged or phased review process as long as all eight components are addressed within the required frequency. Other programs whose activities may serve to address one or more of the components include:

- Source Water Assessment and Protection Program
- Wellhead Protection Program
- Operator Training and Certification Program
- Technical Assistance Programs
- Capacity Development Programs

In addition, some systems are too large or complex to complete a sanitary survey in a single visit. If a state wishes to conduct sanitary surveys in a staged or phased process, the primacy revision application should contain a description of relevant programs and activities, how they will be coordinated, the timeframe, and who the responsible parties will be for follow-up enforcement in response to deficiencies. A justification is not required if a state chooses not to use the phased approach.

4.4.5.3 Reduced frequency of sanitary surveys for CWSs

- (iv): *The state may reduce the sanitary survey frequency for a community water system from once every three years to no less frequently than every five years if the community water system either provides at least 4-log treatment of viruses (using inactivation, removal, or state-approved combination of these technologies) before or at the first customer for all its ground water sources, or has an outstanding performance record documented in previous inspections and has no history of total coliform MCL or monitoring violations under 40 CFR 141.21 (Total Coliform Rule) since the last sanitary survey. In its primacy application the state must describe how it will decide whether a community water system has an outstanding performance record.*

Guidance

This Special Primacy Requirement allows the state to decrease the frequency of sanitary surveys for some community GWSs from once every 3 years to once every 5 years. The provision is designed to allow states to direct their limited resources toward systems that have the greatest potential for posing public health risks, *i.e.*, those *not* achieving outstanding performance. States must have a procedure for determining whether a system should be considered to have outstanding performance. States should also consider integrating this procedure into the sanitary survey process. The procedure and policy for making these determinations should provide inspectors with enough direction to ensure consistent implementation. The policy should also describe who will make the final decision to reduce survey frequency.

In general, outstanding performance means that a system is well-operated and managed, has a good record of performance in past sanitary surveys, and has not had any violations in recent years. A state's specifications for outstanding performance may include factors such as the following:

- No violations of MCLs since the last sanitary survey.
- No violations of monitoring and reporting requirements since the last sanitary survey.
- No violations of primary drinking water regulations during the past 5 years (or similar time period).
- No waterborne disease outbreaks attributable to the water system during a specified period.
- The last sanitary survey contained no significant deficiencies.
- Existence of emergency preparedness measures and backup facilities.
- Expert management of system (e.g., managers are knowledgeable about providing quality drinking water; low staff turnover and positive staff morale; well-established water quality goals).
- Expert operation of the system (e.g., skilled, certified personnel in adequate numbers).
- Existence of quality operations and maintenance (O&M) manuals that are used by the staff.
- Adequate budget and revenues.
- Development and implementation of an effective cross-connection control program.

- Active public outreach programs (e.g., citizen participation committees).
- Stable water source (no interruptions in supply).
- Source water supply drawn from well(s) with sanitary construction, available documentation (e.g. driller’s logs), and protected wellhead areas.
- No identified significant risk of future violations or problems (e.g., equipment past its service life).
- System capacity sufficient to meet anticipated growth.

As noted above, each state should have its own specifications for determining if a system has outstanding performance. The state may choose to use some or all of the above factors, different factors that have been developed by the state, or a combination of both.

4.4.5.4 What constitutes a significant deficiency

- (v): *The state must describe in its primacy application what constitutes a significant deficiency in each of the eight sanitary survey elements in paragraphs (o)(2)(i)(A) through (H) of this section.*

Guidance

During sanitary surveys, inspectors often discover a wide range of deficiencies. Some are minor and have little near-term potential to pose risks to public health or safety. At the other end of the spectrum are deficiencies that provide the near-term potential for drinking water to be unsafe or the water system to be operated in a manner that threatens the safety of operators or the public. States must establish procedures for inspectors to use to determine the point at which deficiencies become “significant.”

The first step in this process is to define what characteristics constitute “significant deficiencies.” Many public health professionals believe that any aspect of a GWS (source, transmission, pumping, treatment, storage, distribution, operation, maintenance, management, etc.) that may cause, or have potential to cause, risks to public health or safety should be considered a significant deficiency. EPA does not specify the definition that a state must use; rather, the Agency suggests that states use their best professional judgment and expertise to develop and apply their own definitions.

The second step is for the state to develop a procedure whereby inspectors can evaluate system defects and determine their significance (i.e., whether it meets the state definition of significant deficiency). The procedure could begin with questions to be asked about each defect. As much as possible, states are encouraged to develop technically specific definitions of significant deficiencies. A few more general examples (*not intended to be complete*) of questions that may help inspectors in making determinations are the following:

- Is there the potential for contaminants to be introduced to the drinking water due to the deficiency?
- Would the conditions causing the deficiency be a violation of current state design, construction, treatment, or operating standards?

- If left uncorrected will the deficiency cause the potential for the introduction of contaminants at some point in the future?
- Does the deficiency affect treatment in an unacceptable manner?
- Does the deficiency pose risks to the safety of the public or operators?

States are encouraged to go beyond the minimum Special Primacy Requirement of providing at least one specific significant deficiency in each of the eight sanitary survey elements, and develop a more comprehensive list of deficiencies that meet the definition of “significant” that require immediate corrective actions. Such a list may be modified over time based upon state experience, and it is not likely that all deficiencies will be identified. By establishing its own definition of a significant deficiency and a list of what deficiencies it considers significant, a state provides consistency throughout all surveys and among inspectors.

Table 4-3 illustrates one possible approach to categorizing some of the common deficiencies by the degree of their threat to public health. The list below includes examples of deficiencies that may be considered significant public health issues. This list is not intended to be comprehensive, but serves as a guide to states for categorizing significant deficiencies. Other deficiencies could be deemed significant public health issues.

Table 4-3. Example Sanitary Survey Deficiencies

(This table is for illustrative purposes only and does not represent federal or state policy)

Finding	Minor	Moderate	Significant
No approved construction drawings		X	
Failure to update the water distribution map	X		
Stopping work on system improvements (when stopping work is not the prudent and reasonable approach)		X	
Loss of distribution system pressure for an extended period of time			X
Failure to meet water treatment requirements			X
Failure to meet water quality MCLs			X
System continues to operate in a noncompliance mode			X
Operating in excess of the maximum number of service connections allowed		X	
System not operating in compliance with water system plan		X	
System violated coliform or volatile organic contaminant (VOC) MCLs			X

The following are examples, organized by each of the eight sanitary survey elements, of system defects that states may consider to be significant and require immediate corrective action. (The list is not intended to be complete.)

- Source
 - Not having a secured protective radius around a well.
 - Wells of improper construction.
- Treatment
 - Chemical feed rates not adjusted for changes in flow rate.
 - Inadequate disinfection CT.
 - Inadequate application of treatment chemicals.
- Distribution Systems
 - TCR sampling plan not representative of distribution system.
 - Negative pressures at any time.
 - Inadequate cross connection controls, either at the treatment facility or in the distribution system (or failure to have a cross connection control program, when one is required).
 - Unacceptable system leakage that could result in entrance of contaminants.
- Finished Water Storage
 - Inadequate internal cleaning and maintenance of storage tank.
 - Improper venting of tank.
 - Lack of proper screening of overflow pipe and drain.
 - Inadequate roofing (e.g., holes in the storage tank, improper hatch construction).
 - Uncovered finished water reservoir.
- Pumps/Pump Facilities and Controls
 - Ponding of water in pump housing.
 - Inadequate pump capacity.
- Monitoring/Reporting/Data Verification
 - Failure to properly monitor water quality.
 - TCR sampling plan not available or not being followed.
 - Chronic TCR coliform detections with inadequate remediation.
- Water System Management/Operation
 - Lack of properly trained or licensed staff as required by the state.
 - Lack of approved emergency response plan.
 - Failure to meet water supply demands/interruptions to service (inadequate pump capacity, unreliable water source, lack of auxiliary power).
 - Inadequate follow-up to deficiencies noted in previous inspection/sanitary surveys.
- Operator Compliance with State Requirements
 - Operator does not have the correct level of certification as required by the state.

States should make this information available to inspectors performing the sanitary surveys so they can have guidelines available on which deficiencies meet the state's definition of significant. Inspectors can also use their state's definition of "significant deficiency" as guidance when they encounter other deficiencies that may pose a serious public health threat.

If the state determines that a significant public health issue exists, corrective action must be required. State inspectors may judge other problems as significant enough from a public health viewpoint to require establishment of a compliance schedule with follow-up action.

References for more detailed guidance

Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Ground Water. [Under Development]

Guidance Manual for Conducting Sanitary Surveys of Public Water Systems; Surface Water and Ground Water Under the Direct Influence (GWUDI) of Surface Water. April 1999 (EPA 815-R-99-016). Available at www.epa.gov/safewater/mdbp/pdf/sansurv/sansurv.pdf and from the Safe Drinking Water Hotline. (800) 426-4791.

How to Conduct a Sanitary Survey of Small Water Systems, University of Florida Training, Research and Education for Environmental Occupations Center (developed under EPA Training Grant T902854), 1998. Available from the National Environmental Training Association, (602) 956-6099.

State Sanitary Survey Resource Directory, AKA *EPA/State Joint Guidance on Sanitary Surveys*, Association of State Drinking Water Administrators, 1995. Available from the Safe Drinking Water Hotline, (800) 426-4791.

4.4.5.5 Notice to system of significant deficiencies

- (vi): *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.*

Guidance

States must describe their process of how they will inform systems of identified significant deficiencies. The GWR requires states to provide GWSs with written notice describing any significant deficiencies no later than 30 days after the state identifies the significant deficiency. If the significant deficiency is identified during a sanitary survey, the state may provide the written notice at the time of the sanitary survey. For example, some states use forms that are completed during the sanitary survey identifying significant deficiencies found during the survey. The forms can be carbon copies; the state inspector and water system representative should both sign the form at the end of the sanitary survey, and each person should receive a copy of the signed form. EPA believes such an approach would qualify as written notification for the state and satisfy this notification requirement.

The state may want to notify systems of significant deficiencies in a very brief letter. An example of a letter format that could be used to make this notification is provided in Example 4-3. Since significant deficiencies may present a public health risk to consumers, EPA encourages states to notify systems of a significant deficiency as soon as possible within the allotted 30-day notification period.

Example 4-3. Example Significant Deficiency Notification Letter

State Letterhead
February 17, 2010
John Smith, Supt. Town Water System, PWSID XXXXXXXX Town, ST 12345
RE: Significant Deficiency Notification
Dear Mr. Smith:
This letter is to notify you that a significant deficiency was found at your public water system on February 8, 2010.
The significant deficiency was:
<i>Improper well construction: The well cap was not secure and did not provide a sanitary seal; the well casing extended 4 inches above the ground but is required by state code to extend at least 18 inches above the ground; the well was located in a sunken area and standing water was pooled around the casing.</i>
You must contact us by March 22, 2010 regarding the appropriate corrective action that will be taken to correct this significant deficiency. If you do not contact us by then, you will be in violation of the state drinking water code and the state may take other enforcement action deemed appropriate. Please contact this office at XXX-XXXX to discuss this deficiency. We appreciate your prompt attention to this matter.
Sincerely,
<i>Your Regulator</i>

4.4.6 Special Primacy Requirements Regarding Routine Source Water Microbial Monitoring

40 CFR 142.16 Special primacy requirements. (o)(3) State practices or procedures for source water microbial monitoring. The state's primacy application must include a description of the following:

Guidance

The Special Primacy Requirements of 40 CFR 142.16(o)(3) address the rationales the state used when determining source water monitoring criteria.

The following guidance addresses each subsection of 40 CFR 142.16(o)(3)(i) through (iv) in order; however, the arrangement and structure of the state's description are discretionary provided the state gives sufficient detail to demonstrate that its strategy and capacity are adequate for meeting the Special Primacy Conditions.

4.4.6.1 Extending 24-hour time limit to collect triggered source water sample

- (i): *Criteria that will be used under 40 CFR 141.403(a)(2)(i) and 141.402(d)(2) 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.*

Guidance

In this Special Primacy Requirement, states must address allowable situations that would prevent a GWS from collecting a required triggered source water sample within the 24-hour time limit. Factors may include lab availability (e.g., lab closed on the weekend) and mail service. States may allow a delay in triggered source water sampling when an extreme condition or circumstance would put the sample collector in danger (e.g., severe weather conditions) or the delay cannot be avoided. If additional time is allowed for sampling, the system should sample as close to the 24-hour window as possible. EPA suggests that states require systems to call for pre-approval of the delay.

4.4.6.2 Total coliform-positive sample solely the result of a distribution system deficiency

- (ii): *Criteria that will be used under 40 CFR 141.402(a)(5) and 141.402(a)(5)(ii) to determine whether the cause of a total coliform-positive sample taken under 40 CFR 141.21 (Total Coliform Rule) is directly related to the distribution system.*

Guidance

Triggered source water monitoring is required after a total coliform-positive sample is collected from the distribution system in compliance with the TCR. The state may waive the triggered source water monitoring requirement if the state determines and documents, in writing, that the total coliform-positive sample is solely a result of a documented distribution system deficiency. To meet this Special Primacy Requirement, states must describe how a determination to waive triggered source monitoring would be made. States may consider that samples constitute documentation of a distribution system deficiency. For example, follow-up distribution sampling or system repair records may be useful.

Some examples are:

- If the water system is known to have recurring documented biofilm problems and the total coliform-positive sample is convincingly related to biofilm growth in the distribution system;
- After a storage tank inspection where contamination is evident;
- After main repair or repair of a storage tank;
- In a zone of the distribution system where water pressure is negative or low (e.g., less than 20 psi); or,
- When it is likely that contamination is the result of a cross connection in the distribution system.

The reasons for triggered source water samples not being taken should be valid and defensible, and past distribution system problems supporting the total coliform-positive result should have been documented before the positive coliform sample result was received.

4.4.6.3 Invalidation of fecal indicator-positive samples

- (iii): *Criteria for determining whether to invalidate a fecal indicator-positive sample under 40 CFR 141.402(d)(1).*

Guidance

For this Special Primacy Requirement, states must describe criteria they will use to determine whether a fecal indicator-positive sample does not reflect the true source water quality and should therefore be invalidated. Criteria may not be based solely on a belief that improper sample collection procedures were used. Suspected improper sample collection procedures are not considered adequate cause because sample collector handling error is rarely a cause of fecal contamination.

States must use the provisions for sample invalidation criteria reported in the TCR at 40 CFR 141.21(c). In summary, these criteria are:

- If the laboratory establishes that improper sample analysis caused the fecal indicator-positive result.
- If the state has substantial grounds to believe that a fecal indicator-positive result is due to a circumstance or condition that does not reflect water quality in the ground water source. In this case, the system must collect another source water sample within 24 hours of being notified by the state of its invalidation decision, and have that sample analyzed for the same fecal indicator that was analyzed in the invalidated sample. 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.
- The state should document its decision to invalidate a sample, along with the rationale for the decision, in writing. The decision should be approved and signed by the supervisor or the state official who recommended the decision, and the document should be made available to EPA and the public. The written documentation should state the specific cause of the fecal indicator-positive sample, and what action was taken by the system in response.
- The state should not invalidate a fecal indicator-positive sample solely on the grounds that repeat samples were fecal indicator negative.

4.4.6.4 Monitoring at a Location After Treatment

- (iv): *Criteria the State will use to allow source water microbial monitoring at a location after treatment under 40 CFR 141.402(e)(1).*

Guidance

Systems must collect source water samples at a location prior to any treatment. The state may, however, allow systems to collect samples after chemical treatment if the state determines that collecting a sample before treatment is not feasible and if the treatment is unlikely to have an adverse effect on sample analysis. In general, any preceding treatment should not interfere with the analytical method used to measure the fecal indicator, nor should the treatment provide any inactivation or removal of the fecal indicator being tested. For example, ground water treatment with greensand filters frequently uses

potassium permanganate to oxidize iron and manganese before filtering those metals out. Potassium permanganate may provide some inactivation of, and filtration is likely to remove, viruses and bacteria. Therefore, it would not be appropriate for a system to collect a triggered source water sample after its greensand filters. On the other hand, wells that pump sand are often equipped with sand separators that are unlikely to have an impact on the microbial quality of the water.

States could meet this requirement by stating that sampling locations after treatment will only be allowed if a system meets two conditions are shown to be met: 1) the treatment will have no impact on microbial quality of the water, and 2) it is not possible to directly sample the untreated water.

4.4.7 Special Primacy Requirements Regarding Treatment Technique Requirements

40 CFR 142.16 Special primacy requirements. (o)(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 GWS has reported to the State that it has completed corrective action. The State must verify either through written confirmation from the GWS or a site visit by the State. Written notice from the GWS under 141.405(a)(2) of this chapter may serve as this verification. The State's primacy application must include the following:

The following guidance addresses each subsection of 40 CFR 142.16(o)(4)(i) through (vi) in order; however, the arrangement and structure of the state's description are discretionary, provided the state gives sufficient detail to demonstrate that its strategy and capacity are adequate for meeting the Special Primacy Conditions.

4.4.7.1 Confirmation of system achieving at least 4-log treatment of viruses

- (i): The process the state will use to determine that a GWS 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) because the GWS has informed the State that it provides at least 4-log treatment of viruses.*

Guidance

The state must explain the criteria that will be used for determining when a GWS has met the 4-log inactivation requirements. The state should be explicit in its explanation as to how it will confirm that systems are achieving 4-log treatment of viruses. Criteria may include determination of the appropriate treatment technology, treatment design and specifications constituting sufficient inactivation and or removal, the minimum contact time required for compliance to be achieved at the minimum disinfectant residual, and submission of records of contact time calculations or records documenting maintenance of a minimum disinfectant residual.

EPA recommends that the state use applicable EPA-developed virus CT (the product of disinfection concentration in mg/L and time in minutes) tables to determine the concentration and contact time requirements necessary to achieve 4-log virus inactivation using chemical disinfection. If alternative criteria will be used by GWSs for compliance, the state must describe the treatment and compliance monitoring basis for the specified 4-log virus inactivation method. The description should include how the state will factor into its determination contact time correction factors (e.g., baffling factors), pH, temperature, flow, and minimal residuals.

While the GWR does not include CT tables for 4-log inactivation of viruses, states are encouraged to consider CT tables developed for the Surface Water Treatment Rule as helpful references when developing minimum disinfection requirements. Table 4-4 provides CT values for inactivation of viruses by free chlorine in waters with pH values falling within the range of 6.0 to 9.0. Table 4-5 provides CT values for inactivation of viruses by chlorine dioxide in waters with pH values falling between 6.0 and 9.0. Table 4-6 provides CT values for inactivation of viruses by ozone. The CT tables provided in Tables 4-4 through 4-6 have been adapted from tables provided in EPA's *Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources*, March 1991 Edition. No CT table is provided for chloramines because EPA anticipates that CT values needed to achieve 4-log virus inactivation using chloramines will be prohibitively high for most GWSs.

States should describe criteria for determining effective contact times provided by typical configurations for hydropneumatic tanks and other storage facilities that GWSs will use to obtain disinfectant contact time. For example, hydropneumatic pressure tanks and storage tanks that "ride" or "float" on the distribution system should not typically be considered for provision of contact time because the chemically treated water is not obliged to pass through them under all conditions of flow. States should also explain their approach to making baffling factor determinations. Larger GWSs with gravity storage can obtain guidance for determining the effectiveness of chemical disinfection in EPA's 1991 edition of *Guidance Manual for Compliance with the Filtration and Disinfection Requirements for Public Water Systems Using Surface Water Sources*. Also, Appendix D in EPA's *Disinfection Profiling and Benchmarking Guidance Manual* (EPA-815-R-99-013, August 1999) provides information on baffling factors, tracer studies and other issues related to determining the amount of disinfectant contact time provided by water systems.

While the above referenced guidance manuals are especially helpful to surface water systems, they should not be expected to provide all the information necessary for GWSs. This is true for a few reasons. First, while both ground and surface water systems are most likely to use free chlorine as a chemical disinfectant, the target organisms of most concern are very different. In the case of surface water systems, the target organism is *Giardia lamblia*. GWSs, on the other hand, target viruses. In comparing the disinfection requirements for two systems with the same temperature (15 degrees C), pH (7) and chlorine residual (1.0 mg/L), the respective CT requirements can be very different. For the surface water system the requirements would be 25 mg/L-min. for 1-log and 75 mg/L-min. for 3-log *Giardia lamblia* inactivation; therefore requiring 25 minutes contact time in one case and 75 minutes in the other. For the GWS the requirement would be 4 mg/L-min. for 4-log virus inactivation. Thus, 4 minutes of contact time. Therefore, while the surface water guidance recommends consideration of a worst-case scenario at daily peak hourly flow, this may not be appropriate for all GWSs.

The second major difference between ground and surface water systems is also related to water production rates. While most surface water plants generally produce water at constant rates and have clearwells to provide contact time, this is not true for many GWSs, particularly the smaller GWSs (i.e., those serving less than 100 people). Small GWSs typically have wells that pump into the distributions system and are equipped with hydropneumatic tanks intended to limit the cycling of the well pumps. For these systems a pressure switch turns the well pump on at a minimum distribution system pressure (e.g., 35 psi), then the well pumps water until an upper pressure is reached, perhaps 65 psi, and the pressure switch turns the pump off. As shown by the example pump curve in Figure 4-2, the flow rate from the well varies greatly as the pressure changes during the pump cycle. At the turn-on pressure of 35 psi, the well production rate is 58 gpm or about 145% of the flow rate at shut-off pressure (65 psi). In a typical small hydropneumatic tank system, the well may often pump at this higher rate for several minutes during peak demand periods. Therefore, it is appropriate for states to consider these momentary peaks in water demand for determining the provisions necessary to ensure adequate contact time.

Table 4-4. CT Values for Inactivation of Viruses by Free Chlorine, pH 6.0-9.0

Degrees C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Inactivation (log)																									
2	5.8	5.3	4.9	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	1.0	1.0	1.0	1.0	1.0
3	8.7	8.0	7.3	6.7	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0
4	11.6	10.7	9.8	8.9	8.0	7.6	7.2	6.8	6.4	6.0	5.6	5.2	4.8	4.4	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0

CT values provided in the tables are modified by linear interpolation between 5°C increments.

Table 4-5. CT Values for Inactivation of Viruses by Chlorine Dioxide, pH 6.0-9.0

Degrees C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Inactivation (log)																									
2	8.4	7.7	7.0	6.3	5.6	5.3	5.0	4.8	4.5	4.2	3.9	3.6	3.4	3.1	2.8	2.7	2.5	2.4	2.2	2.1	2.0	1.8	1.7	1.5	1.4
3	25.6	23.5	21.4	19.2	17.1	16.2	15.4	14.5	13.7	12.8	12.0	11.1	10.3	9.4	8.6	8.2	7.7	7.3	6.8	6.4	6.0	5.6	5.1	4.7	4.3
4	50.1	45.9	41.8	37.6	33.4	31.7	30.1	28.4	26.8	25.1	23.4	21.7	20.1	18.4	16.7	15.9	15.0	14.2	13.3	12.5	11.7	10.9	10.0	9.2	8.4

CT values provided in the tables are modified by linear interpolation between 5°C increments.

Table 4-6. CT Values for Inactivation of Viruses by Ozone

Degrees C	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Inactivation (log)																									
2	0.90	0.83	0.75	0.68	0.60	0.58	0.56	0.54	0.52	0.50	0.46	0.42	0.38	0.34	0.30	0.29	0.28	0.27	0.26	0.25	0.23	0.21	0.19	0.17	0.15
3	1.40	1.28	1.15	1.03	0.90	0.88	0.86	0.84	0.82	0.80	0.74	0.68	0.62	0.56	0.50	0.48	0.46	0.44	0.42	0.40	0.37	0.34	0.31	0.28	0.25
4	1.80	1.65	1.50	1.35	1.20	1.16	1.12	1.08	1.04	1.00	0.92	0.84	0.76	0.68	0.60	0.58	0.56	0.54	0.52	0.50	0.46	0.42	0.38	0.34	0.30

CT values provided in the tables are modified by linear interpolation between 5°C increments.

Figure 4-2. Example Pump Curve for A Ground Water Well

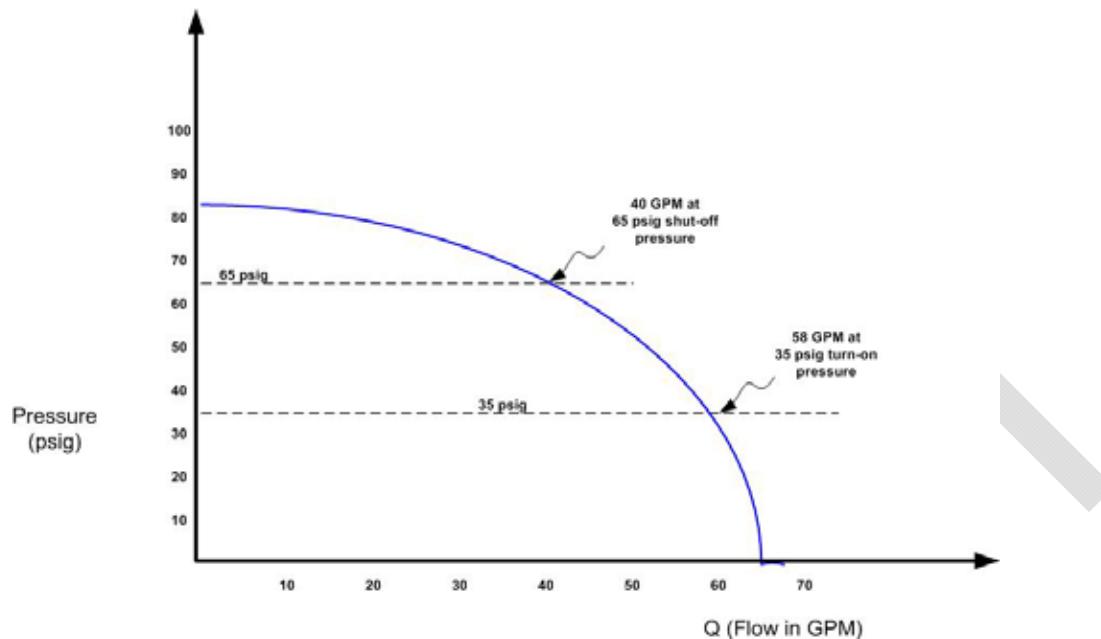
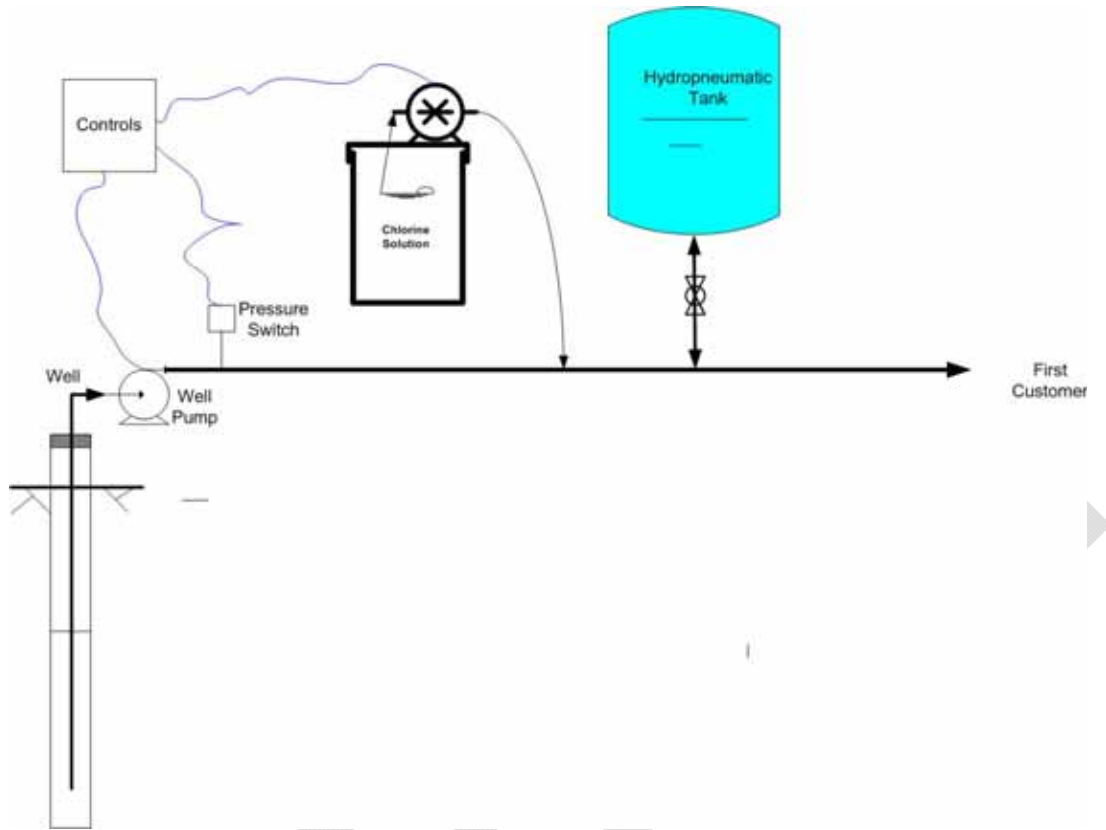


Figure 4-3 shows a schematic drawing of a typical small GWS well equipped with a shallow well pump and a hydropneumatic tank for limiting the pump's cycling. As shown, the chlorine solution is injected into the discharge line ahead of the hydropneumatic tank. However, the volume of the tank cannot be considered for contact time because, when turn-on pressure occurs, the tank is effectively empty. At this point the pump is producing 58 gpm and, during peak demand times, all water will be bypassing the hydropneumatic tank and entering the distribution system to satisfy demand. Therefore, there should be provisions to provide the minimum contact time between the point of chlorine injection and the first customer. In this example, that means a minimum effective volume of 232 gallons (58 gpm X 4 min. = 232 gallons). Assuming the pipe between the discharge chlorine injection point and the first customer is all 2-inch diameter, 1,422 feet of pipe would be necessary to provide 4 minutes of contact time at 58 gpm (i.e., $\Pi (2/12')^2/4 \times 1,422' \times 7.48 \text{ gallons/ft}^3 = 232 \text{ gallons}$). For most small systems, it is unlikely that there is that much pipe between the well and the first customer. As a result, provisions for contact time will often have to be added to ensure 4-log virus inactivation.

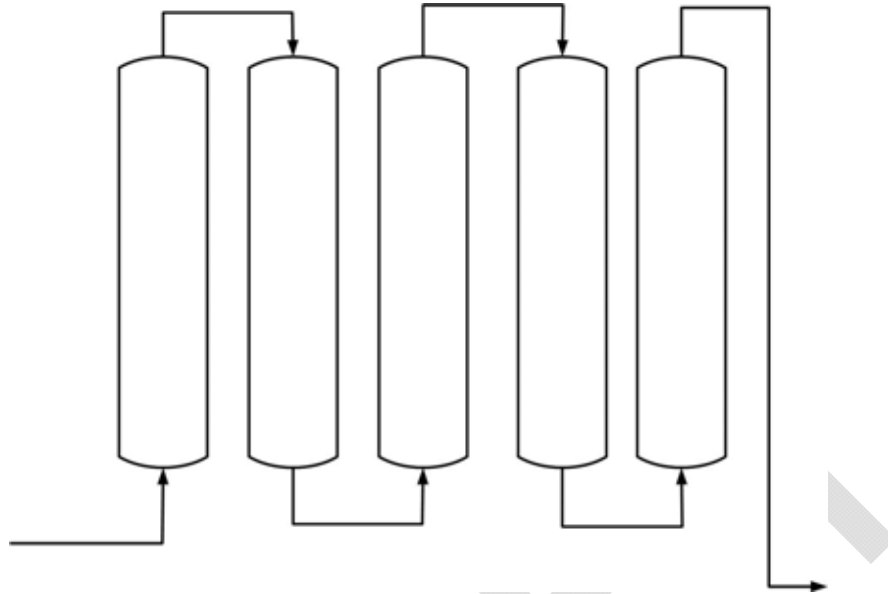
There are a variety of ways contact time can be added in small GWSs. Where possible, it is best and least expensive to try and add the contact time without the need for re-pumping the treated water. In this example, one could put 40 feet of 12-inch water main between the chlorine injection point and the first customer (i.e., $\Pi (1')^2/4 \times 40' \times 7.48 \text{ gallons/ft}^3 = 235 \text{ gallons}$) and, assuming plug flow, there would be a minimum of 4 minutes contact time at 58 gpm, thus, a CT of 4 mg/L-min. with a free chlorine residual of 1.0 mg/L.

Figure 4-3. Schematic of Hydropneumatic System



In some cases where there is adequate above-ground, heated storage, pressure vessels with a high length to diameter ratio can be useful tools for adding contact time without the need for pumping to storage and re-pumping. Figure 4-4 shows an example of five pressure vessels placed in series to provide contact time. Assuming each vessel has a diameter of 1.5 feet and a length of 8 feet, they would have a gross volume of 528 gallons. If the state granted a baffling factor of 0.7, this would provide an effective volume of 370 gallons, more than enough to ensure 4 minutes contact time.

Figure 4-4. Five Pressure Vessels in Series



Unlike chemical disinfectants, UV leaves no residual that can be monitored to determine UV dose and inactivation credit. The UV dose depends on UV intensity (measured by UV sensors), flow rate, and UV transmittance (UVT). UV intensity measurements may account for UVT depending on sensor locations. For systems using UV, a relationship between the required UV dose and these parameters should be established and then monitored at the water treatment plant to ensure sufficient disinfection. Section 4.4.7.4 discusses monitoring of UV treatment in more detail.

EPA has developed a UV dose table for inactivation of viruses (Table 4-7). Data published subsequent to the GWR proposal has indicated that some viruses, particularly adenoviruses, are more resistant than other viruses to UV light. Therefore, the final GWR does not include an 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 resistant to UV inactivation.

Table 4-7. Virus Inactivation from UV dose (mJ/cm²)¹

Target Pathogen	Log Inactivation							
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Viruses	39	58	79	100	121	143	163	186

1. 40 CFR 141.720(d)(1).

Any UV reactors used for virus inactivation should undergo challenge testing to validate the dose level delivered so that effective public health protection is provided by 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 UV technology can, however, 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 the GWR’s requirements. EPA 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, the GWR 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.

The UV doses provided in Table 4-7 account for uncertainty in the UV dose-response relationships of viral pathogens but do not address other significant sources of uncertainty in full-scale UV disinfection applications. These other sources of uncertainty are due to the hydraulic effects of the UV installation, the UV reactor equipment (e.g., UV sensors), and the monitoring approach. Due to these factors, GWSs installing UV should use UV reactors that have undergone validation testing. This validation testing should determine the operating conditions under which the reactor delivers the required UV dose for treatment credit. Operating conditions should include flow, UV intensity as measured by a UV sensor, and UV lamp status. For more information on UV validation testing, refer to EPA's *Ultraviolet Disinfection Guidance Manual Final* (EPA 815-R-06-007, November 2006).

To receive inactivation credit, the UV reactors should be operated within the validated limits. When a UV reactor is operating outside of these limits, the UV reactor is operating off-specification. Ground water systems that use UV disinfection to provide inactivation of viruses for GWR compliance should demonstrate that at least 95 percent of the water delivered to the public during each month is treated by UV reactors operating within validated limits. Guidance on determining validated operating conditions is provided in EPA's *Ultraviolet Disinfection Guidance Manual Final* (EPA 815-R-06-007, November 2006).

4.4.7.2 Determine the minimum residual disinfectant concentration

- (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.*

Guidance

Residual disinfectant concentration is the concentration of the disinfectant (in mg/L) at a point before or at the first customer. Systems conducting compliance monitoring and providing chemical disinfection must maintain a minimum residual disinfectant concentration at or before the first customer. The state primacy application must include an explanation and rationale for how the state will decide what that minimum residual disinfectant concentration will be for each system. If the state sets the minimum residual disinfectant concentration level on a system-by-system basis, the application will need to explain the rationale and information that will be required from systems in order to make the determination.

States may consider setting minimum residual disinfectant concentrations on a system-by-system basis in accordance with CT requirements. Systems with substantial contact time before their first customers can achieve the required CT at a lower disinfectant residual concentration than systems with limited contact time. Therefore, states may determine it is appropriate to have different minimum residual disinfectant concentrations depending on the contact time available before the first customer. Alternatively, states may decide to require a uniform minimum residual disinfectant concentration that will apply to all systems using chemical disinfectant. In this case, states would have to take measures in their permitting process to ensure that adequate contact is available in each system to achieve 4-log virus inactivation. For either requirement, the state must explain in its primacy application the basis for its approach.

One approach for meeting this primacy requirement would be to point out that the state through its permitting (plant and specification approval) process, would address each system's specific configuration, water quality (e.g., temperature, pH), and require conditions of chlorine residual and contact time at peak momentary demand that would result in a minimum CT capable of inactivating 4-log viruses in accordance with EPA's CT tables.

4.4.7.3 State-approved alternative technologies

- (iii): *The state-approved alternative technologies that GWSs 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 inactivation and removal) before or at the first customer for a ground water source.*

Guidance

Under this Special Primacy Requirement states must identify the state-approved alternative technologies that the GWS may use alone or in combination with other approved technologies to achieve at least 4-log virus inactivation, removal, or a state-approved combination of these technologies before or at the first customer. The application should include a list of the approved alternative technologies and the rationale for allowing the use of the alternative technologies.

States may want to allow themselves flexibility to address technologies that may emerge in the future by obtaining the authority to review and approve all treatment/disinfection technologies that have potential to be applied for removal and inactivation of microbial contaminants. If they do this, they should ensure in their permitting/approval process that there is adequate evidence confirming the long-term ability of the process(s) to achieve at least 4-log virus treatment.

Systems may claim credit for UV processes for inactivation of viruses. Section 4.4.7.1 explains EPA's concerns about current limitations of challenge testing of UV reactors with respect to adenoviruses (and perhaps other viruses) and EPA's recommendations to states regarding the application of UV treatment.

4.4.7.4 Monitoring and compliance criteria

- (iv): *The monitoring and compliance requirements the state will require for GWSs 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.*

Guidance

State primacy applications should include an explanation of the monitoring requirements and compliance criteria the state will require for systems using alternative treatment technologies. This includes an explanation of the types of monitoring and reporting that systems will have to complete and submit to the state.

For example, EPA recommends that PWSs check their UV units daily to ensure they are operating properly. PWSs should monitor their UV reactors to determine if the reactors are operating within validated conditions. This monitoring should include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters designated by the state. UV reactors should also be regularly monitored to diagnose operating problems, determine when maintenance is necessary, and maintain safe operation. In addition to monitoring operational parameters, PWSs should verify the calibration of UV sensors in

accordance with a protocol that the state approves. States are encouraged to refer to EPA's *Ultraviolet Disinfection Guidance Manual Final* (EPA 815-R-06-007, November 2006) for more information on routine monitoring and calibration of UV units.

States are encouraged to require GWSs using UV to prepare and submit monthly reports to the state. The monthly report should include the percentage of off-specification water for the UV facility and the UV sensor calibration monitoring. The percentage of UV sensors checked for calibration should also be reported monthly. All UV sensors in operation that month should be checked. Additionally, the daily low validated dose or daily low UV intensity, depending on the dose-monitoring strategy, should be reported to the state monthly.

Example 4-4 provides an example of a summary report that could be completed by the PWS and submitted to the state on a monthly basis. Examples 4-5 and 4-6 are example operating logs that would be completed on a daily basis for the calculated dose and UV Intensity Setpoint Approach, respectively. The forms would be used to record the operating status of the UV equipment and to record the volume of water discharged during off-specification operation each day. Additional examples of operating logs for UV are provided in EPA's *Ultraviolet Disinfection Guidance Manual* (EPA 815-R-06-007, November 2006).

Additional items states may want systems using UV disinfection to report on periodically include:

- Date the UV tube was last replaced;
- If UV unit is preceded by filtration (e.g. a 5-micron cartridge filter), date the filter was last changed;
- If additional water quality monitoring is required (e.g. turbidity, coliform, iron, manganese), most recent analytical results; and,
- Whether a spare UV tube and other necessary equipment are available on site.

States may want to consider each technology, or combination of technologies, on a case-by-case basis and require appropriate monitoring for ensuring that a minimum of 4-log virus removal/inactivation would be achieved during peak momentary demand.

Example 4-5. Example Daily Operating Log for Calculated Dose Approach

Reporting Period: _____	Maximum Validated Flow Rate: _____	$\text{Validated Dose} = \frac{\text{Calculated Dose}}{\text{VF} \times \text{CF}}$ <p>Calculated Dose = Dose that is calculated by validated PLC algorithm VF = Validation factor CF = UV intensity sensor correction factor. The CF is only applied if sensors do not meet recommended criteria (NOTE – a CF will not be needed in most cases)</p>
System/Treatment Plant: _____	Minimum Validated UVT: _____	
PWSID: _____	Target Log Inactivation: _____	
UV Reactor: _____	Target Pathogen: _____	
Process Train: _____	Dose Required ($D_{req'd}$): _____	
Operator Signature: _____	Validation Factor (VF): _____	
Date: _____		

Operational Data			Dose Requirements	Data at Daily Minimum Validated Dose					UV Dose Adequacy Determination	Total Off-Specification
Day	Run Time (hrs)	Total Production (MG)	$D_{req'd}^1$ (mJ/cm ²) [A]	Sensor Correction Factor ² [B]	Calculated Dose ³ (mJ/cm ²) [C]	Daily Minimum Validated Dose ⁴ ((C)/[VF]/[B]) (mJ/cm ²) [D]	Flow Rate (MGD)	UVT (%)	Validated Dose > $D_{req'd}$ ([D] > [A]) (Y/N)	Total Off-Specification Volume (MG)
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
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20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
Min										
Max										
Total										

¹ $D_{req'd}$ is the dose required for the target log inactivation without a VF or Sensor CF applied and can be found in the UVDGM Table 1.4.
² Sensor CF will be 1 if no CF is used
³ Calculated dose is calculated using the dose algorithm in the PLC.
⁴ The Validated Dose is the dose based on the calculated dose that is normalized on the Validation Factor and Correction Factor
⁵ Off-specification worksheet (Figure 6.5) should be used to calculate daily off-specification volume. If UVT, flowrate, and/or Validated Dose off-specification occur simultaneously, the off-specification time should only be counted once

Example 4-6. Example Daily Operating Log for UV Intensity Setpoint Approach

Reporting Period: _____						Maximum Validated Flow Rate: _____					
System/Treatment Plant: _____						Minimum Validated UVT: _____					
PWSID: _____						Target Log Inactivation: _____					
UV Reactor: _____						Target Pathogen: _____					
Process Train: _____						Intensity Setpoint: _____					
Operator Signature: _____											
Date: _____											

Operational Data			Flow Rate			Intensity Requirements			Daily Minimum Intensity		Total Flow Off-Specification
Day	Run Time (hrs)	Total Production (MG)	Min (mgd)	Ave (mgd)	Max (mgd)	Intensity Setpoint (W/m ²)	Sensor Correction Factor ¹	Adjusted Intensity Setpoint (W/m ²) ([A] * [B])	Daily Minimum Intensity (W/m ²)	Minimum Daily Intensity > Adjusted Intensity Setpoint ([D] > [C]) (Y/N)	Total Flow Off-Specification ³ (MG)
						[A]	[B]	[C]	[D]		
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
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20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
Min											
Max											
Total											

¹ Sensor CF will be 1 if no CF is used.
² UVT measurements are not required but could be useful in addressing operational issues.
³ Off-specification worksheet (Figure 6.5) should be used to calculate daily off-specification volume. If UV intensity or flowrate off-specification occur simultaneously, the off-specification time should only be counted once

4.4.7.5 Monitoring, compliance, and membrane integrity testing requirements

(v): *The monitoring, compliance and membrane integrity testing requirements the state will require to demonstrate virus removal for GWSs using membrane filtration technologies.*

A GWS that uses membrane filtration to meet the treatment technique requirements must monitor the membrane filtration process in accordance with state-specified monitoring requirements. A GWS that uses membrane filtration is in compliance with the treatment requirement to achieve at least 4-log removal of viruses when:

- The membrane has an absolute molecular weight cut-off or an alternate parameter that describes the exclusion characteristics of the membrane and can reliably achieve at least 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.

Because removal of viruses by membrane filtration does not enable measurement of a residual or measurable turbidity breakthrough to ensure treatment performance, states must provide alternative compliance monitoring criteria. Criteria must ensure maintenance of the integrity of the membrane to prevent passage of virus particles. Criteria may include routine pressure testing and reporting of the results as prescribed by the membrane manufacturer, turbidity monitoring, monitoring of an associated chemical parameter, or other site-specific variables.

To grant removal credit to systems using membrane filtration, states should ensure that the membrane technology is a pressure- or vacuum-driven separation process in which particulate matter is rejected by a nonfibrous, engineered barrier, primarily through a size exclusion mechanism. The membrane technology should also allow for routine direct integrity testing while in operation, to verify that the removal efficiency demonstrated through challenge testing is being achieved.

The removal efficiency demonstrated during challenge testing establishes the maximum removal credit that a membrane filtration process is eligible to receive, provided this value is less than or equal to the maximum log removal value that can be verified by the direct integrity test (a physical test applied to a membrane unit to identify and isolate integrity breaches such as leaks). The state may use its discretion when considering data from challenge studies conducted prior to promulgation of the GWR in lieu of requiring additional testing. Additional requirements and guidance on membrane filtration is provided in EPA's *Membrane Filtration Guidance Manual: Overview and Summary Factsheet* and EPA's *Membrane Filtration Guidance Manual* (EPA 815-R-06-009, November 2005).

4.4.7.6 Discontinuation of 4-log virus inactivation, removal, or a state-approved combination of these 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 GWS 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.*

Guidance

A GWS may discontinue 4-log treatment of viruses if the state determines and documents in writing that 4-log treatment of viruses is no longer necessary for that ground water source. The state primacy application must include an explanation of what criteria the state will use to determine whether a water system may discontinue its 4-log treatment of viruses. These criteria should be strict enough to not compromise public health protection if the 4-log treatment were to be discontinued. EPA encourages states to set rigorous requirements for discontinuing treatment. Criteria may include results of on-site investigations, source water monitoring, and documentation of well rehabilitation.

Examples of when it may be appropriate to discontinue treatment are:

- The previous source is replaced by a source that has been shown to be less sensitive hydrogeologically and free from contamination based on source water monitoring;
- A well with structural conditions resulting in impairment of its water quality (e.g., not terminated above grade, inadequate well cap, lack of sanitary seal, improper grouting) is rehabilitated and conditions no longer exist; and,
- A year of monthly source water monitoring for a fecal indicator and detailed evidence that the well is drawing water from a protected confined or semi-confined aquifer.

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Section 5

SDWIS Reporting and SNC Definitions

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Section 6

Public Notification, Consumer Confidence Report, and Special Notice Examples

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Several general categories of notification are required by the Ground Water Rule (GWR):

- Tier 1, 2, or 3 public notification
- Consumer Confidence Report (CCR) Special Notice (for community water systems [CWSs])
- Special Notice (for noncommunity water systems [NCWSs])
- CCR other notice

The type of notification required depends on the violation or scenario that has occurred at the public water system (PWS). The table below summarizes public notification, CCR and Special Notice requirements of the GWR. Note that Special Notice requirements for CWSs require notification to be included in the system's CCR. NCWSs that are required to make Special Notice must inform the public served by the water system in a manner approved by the state. Section 3.8 of this guidance manual addresses the GWR's public notice requirements in more detail.

Table 6-1. Public Notification, CCR, and Special Notice Requirements

Issue	Notification Required
Uncorrected significant deficiency – CWSs¹	Special Notice in CCR
Uncorrected significant deficiency – NCWSs¹	Special Notice
Fecal indicator positive ground water source sample – CWSs²	Tier 1 public notification, Special Notice in CCR, and CCR
Fecal indicator positive ground water source sample – NCWS²	Tier 1 public notification
Unaddressed fecal indicator positive ground water source sample – CWSs	Special Notice in CCR
Failure to take corrective action – CWSs	Tier 2 public notification, CCR
Failure to take corrective action – NCWS	Tier 2 public notification
Failure to maintain at least 4-log treatment of viruses – CWSs	Tier 2 public notification, CCR
Failure to maintain at least 4-log treatment of viruses – NCWS	Tier 2 public notification
Failure to meet monitoring requirements – CWSs	Tier 3 public notification, CCR
Failure to meet monitoring requirements – NCWS	Tier 3 public notification

1. Systems must continue to notify the public annually until the significant deficiency has been corrected.

2. Consecutive systems served by the ground water source must also notify the public.

This section provides examples of public notifications, CCR excerpts and Special Notices that satisfy notification requirements of the GWR. In the examples provided, language in italics is required by 40 CFR Appendix A to Subpart O of Part 141 or by 40 CFR Appendix B to Subpart Q of Part 141. The following scenarios are addressed:

- Scenario 1: Source Water Sample is Positive for a Fecal Coliform Indicator – *CWS*
- Scenario 2: System Fails to Comply With a State Corrective Action Plan or Schedule – *NCWS*
- Scenario 3: System Fails to Take Corrective Action Following a Significant Deficiency – *CWS*
- Scenario 4: System Fails to Maintain at Least 4-log Treatment of Viruses – *CWS*

- Scenario 5: System Fails to Collect a Source Water Sample – CWS
- Scenario 6: System Fails to Conduct Compliance Monitoring – NCWS

The organization of the templates provided here follows the organization of the templates for other notification requirements that are currently available in EPA's:

- *Revised Public Notification Handbook* – EPA 816-R-07-003, March 2007. Available at www.epa.gov/safewater/publicnotification/pdfs/guide_publicnotification_pnhandbook.pdf.
- *Public Notification Handbook for Transient Non-community Water Systems* – EPA 816-R-07-004, March 2007. Available at www.epa.gov/safewater/publicnotification/pdfs/guide_publicnotification_pnhandbook_tncws.pdf.

Readers are encouraged to refer to these manuals for additional public notification guidance. Systems with a large proportion of non-English speaking consumers should refer to these manuals for examples of notices that use language other than English to provide key information.

Scenario 1: A Source Water Sample is Positive for a Fecal Coliform Indicator

System Description – System A

System A is a community GWS serving 1,500 people. The system has two wells in use year-round and does not provide 4-log treatment of viruses before or at the first customer.

Situation

On April 2, 2010, the system collects its two routine monthly TCR samples for April. The system is notified by the laboratory on the afternoon of April 4 that one of its routine samples is total-coliform positive. On the morning of April 5, the system collects samples from both wells and delivers the samples to the laboratory for analysis. The analysis shows that one of the two source water samples is positive for *E. coli*.

Public Notification, Special Notice and CCR Requirements

Public Notification

System A has detected a fecal indicator (i.e., *E. coli*) in its source water sample. While the system has not had a violation, it must provide Tier 1 public notification as soon as practical but no later than 24 hours of learning that the source water sample was *E. coli*-positive (i.e., no later than April 6, 2010). Notification can be made via radio, TV, hand delivery, posting, or other method specified by the state, along with other methods if needed to reach persons served. The system must initiate consultation with the state within 24 hours of learning of the *E. coli*-positive sample result (or by April 6, 2010). An example of a public notice that fulfills the Tier 1 public notification requirement for this scenario is shown in Example 6-1.

Special Notice in the CCR

A CWS that receives notice of a fecal indicator-positive ground water source sample must provide Special Notice in the CCR addressing that year, informing the public served by the water system of the fecal indicator-positive source sample. The system must continue to inform the public annually (as Special Notice in the CCR) until the state determines that the fecal contamination in the ground water source has been corrected. In order to address this Special Notice requirement, the following elements must be included in the CCR:

- The nature of the source of the fecal contamination (if the source is known) and the dates of the fecal indicator positive ground water source sample(s).
- If the fecal contamination in the ground water source has been addressed.
- For fecal contamination in the ground water source that has not been addressed, the state-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed.
- The potential health effects using the health effects language of 40 CFR Appendix A of Subpart O.

Example 6-2 provides an example that fulfills this Special Notice requirement for this scenario.

CCR

In addition to the Special Notice requirements, a CWS must also include the fecal indicator-positive result in the Regulated Contaminant table in the CCR addressing that year. Example 6-2 provides an example that fulfills this CCR requirement for this scenario.

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Example 6-1. Example Tier 1 Public Notification for a Fecal Indicator-Positive Triggered Source Water Sample

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER System A Well 1 Tested Positive for Fecal Contamination

Our water system detected fecal indicators (*E. coli*) in one of our two wells. As our customers, you have a right to know what happened and what we are doing to correct this situation. On April 4, we learned that one of our routine samples collected April 2 was total coliform positive. As required by EPA's Ground Water Rule, one of our follow-up steps was to collect samples from both of our wells. The sample from Well 1 collected on April 5 tested positive for a fecal indicator (*E. coli*). We are now conducting additional sampling of the well to determine the extent of the problem and are conducting a thorough investigation to determine the source of the contamination.

What should I do?

DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST. Bring all water to a rolling boil, let it boil for one minute, and let it cool before using it. Boiling kills bacteria and other organisms in the water. You may also use bottled water. Use boiled or bottled water for drinking, making ice, preparing food, and washing dishes until further notice.

Also, if you have a severely compromised immune system, have an infant, or are elderly, you may be at increased risk and should seek advice about drinking water from your health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at (800) 426-4791. If you have specific health concerns, consult your doctor. We are also providing regular updates on this situation on Channel 22 or Radio Station KMMM (97.3 FM).

What does this mean?

Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches. *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.* These symptoms are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice.

What is being done?

We are conducting a thorough investigation to determine the source of the contamination and will be working with the State Department of Public Health to implement corrective actions to ensure that our water supplies are protected against contamination. We will keep you informed of the steps we are taking to protect your drinking water and will provide information on any steps you should be taking, until this problem is corrected.

For more information, please contact John Johnson, manager of System A, at 555-1234 or write to 2600 Winding Rd., Townsville, TM 12345.

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

This notice is being sent to you by System A.

State Water System ID# TM 1234582. Sent: 4/6/2010

Example 6-2. Example of Regulated Contaminant Table and Special Notice in the CCR for Source Water Fecal Contamination

<u>Source Water Quality Data</u>						
Contaminant	MCL/MRDL/TT	MCLG	Value	Date	Violation	Typical Sources
Fecal indicators (<i>E. coli</i>)	TT	N/A	Positive (<i>E. coli</i>)	April 5, 2010	No	Human and animal fecal waste

*System A detected *E. coli* in their source water sample; the sample was collected in response to a total coliform-positive routine sample collected on April 2, 2010. More information about this situation is provided in the Situation section.

Situation

- On April 4, 2010 we were informed that one of our routine total coliform samples collected on April 2 was total coliform-positive. As required by the Ground Water Rule, we collected samples from both of our sources, Wells 1 and 2, and had them analyzed for fecal contamination. The sample for Well 1 was positive for fecal contamination (*E. coli*).
- Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches. *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.*
- In response, we sent notices to all of our customers within 24 hours of learning of this positive sample. We carefully considered our options and developed a plan with the State Department of Public Health to extend the well's casing higher above the ground, replace the well cap, and install treatment (chlorination). As we stated in the most recent update on this issue, treatment was installed on June 1, 2010.

Scenario 2: A System Fails to Comply With a State Corrective Action Plan or Schedule

System Description – System B

System B is a noncommunity GWS serving 800 people. The system has one well in use year-round and does not provide 4-log treatment of viruses before the first customer.

Situation

During a sanitary survey on September 1, 2013, the state identifies a significant deficiency—two leaking septic tanks close to the system’s well. The system is notified of the deficiency in a letter from the state on September 14, 2013. The letter does not indicate a specific corrective action that the system is required to take. As required, the system contacts the state within 30 days of receiving written notice of the significant deficiency and the system and the state develop a plan for implementing corrective action. The first step of the corrective action plan is scheduled to be completed by December 1, 2013. The system, however, does not begin implementing the plan until February 25, 2014 and completes the plan’s steps on October 20, 2014. In waiting so long to begin implementing its corrective action plan, the system failed to be in compliance with its state-approved corrective action plan and schedule. The system is notified of this treatment technique violation on March 1, 2014.

Public Notification, Special Notice and CCR Requirements

Public Notification

Although System B contacts the state regarding the significant deficiency within the 30-day timeframe, the system is required to be in compliance with its corrective action plan and schedule within 120 days of receiving written notice from the state of the significant deficiency. Failure to do this is a treatment technique violation and requires Tier 2 public notification. The system must provide public notification within 30 days of learning of the violation. Notification must be provided by mail or other direct delivery method (such as hand delivery), and any other reasonable method to reach affected individuals who would not have received the information by mail or the direct delivery method may be used. For any unresolved violation following an initial Tier 2 notice, notice must be repeated every 3 months for as long as the violation persists. The system is notified of the violation on March 1, 2014 and therefore must provide Tier 2 public notice by March 31, 2014. Since corrective action is not back on schedule within 3 months of that date, the system has to repeat public notice. An example of a public notice that fulfills the Tier 2 public notification requirements for this violation is shown in Example 6-3.

Special Notice

Noncommunity GWSs that receive notice from the state of a significant deficiency must also provide special notice to customers of any deficiencies that have not been corrected within 12 months of being notified by the state (or earlier, if directed by the state). System B does not complete corrective action until October 20, 2014, which is more than 12 months after the system had been notified of the significant deficiency (September 14, 2013). Example 6-4 provides sample Special Notice language for this scenario. Since System B is a NCWS and does not distribute a CCR, Special Notice will be provided in a manner approved by the state.

CCR

Since System B is a NCWS, it does not have any CCR requirements.

Example 6-3. Example Tier 2 Public Notification for Failure to Comply With State Corrective Action Plan or Schedule

DRINKING WATER NOTICE

System B Failed to Comply With the Established Corrective Action Plan and Schedule after Identification of a Significant Deficiency

On September 1, 2013 the State Department of Public Health performed a detailed inspection and engineering evaluation of our water system called a sanitary survey. During this sanitary survey, they identified two leaking septic tanks close to our well. Because of the high potential for contamination of our well by these tanks, the state considered this a “significant deficiency” and directed us to correct the problem. As our customers, you have a right to know what happened and what we are doing to correct this situation. As required by EPA’s Ground Water Rule, we worked with the State to develop a plan to correct this deficiency. However, we failed to implement this corrective action plan within the established deadline and have violated a requirement of the Ground Water Rule.

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

This significant deficiency has the potential to cause source water contamination. Leaking septic tanks are a potential source of fecal contamination. *Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.* Failure to correct the deficiency according to the established schedule prolonged the risk of fecal contamination of our source water. While we have not detected any evidence of fecal contamination in our source water, we are committed to correcting the deficiency to eliminate the threat of contamination.

What should I do?

There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA’s Safe Drinking Water Hotline at (800) 426-4791. If you have specific health concerns, consult your doctor.

You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on Channel 22 or Radio Station KMMM (97.3 FM).

What is being done?

Since being informed of the deficiency, we have been conducting regular testing of our source water and we are implementing the corrective action plan established by the State Department of Public Health. Under this plan, the leaking tanks will be replaced by October 20, 2014.

For more information, please contact John Johnson, manager of System B, at 555-1234 or write to 2600 Winding Rd., Townsville, TM 12345.

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

This notice is being posted by System B.

State Water System ID# TM1234583. Sent: 3/10/2014

Example 6-4. Example of a Special Notice Regarding a Significant Deficiency

Violation

On September 14, 2013, we were informed by the State Department of Public Health that a significant deficiency—two leaking septic tanks near our source water supply—had been identified during a September 1, 2013 sanitary survey.

As required, we contacted the State Department of Public Health and were directed to make arrangements to replace the tanks with the owner of the property on which the septic tanks are located and to have the tanks replaced. We did not do so within the established deadline. Since being informed of the deficiency, we have been conducting regular testing of our source water and we are implementing the corrective action plan established by the Department of Public Health. Under this plan, the leaking tanks will be replaced by October 20, 2014.

Scenario 3: A System Fails to Take Corrective Action Following a Significant Deficiency

System Description – System C

System C is a community GWS serving 1,500 people. The system has one well in use year-round and does not provide 4-log treatment of viruses before or at the first customer.

Situation

During a sanitary survey on June 1, 2013, the state identifies a significant deficiency—the system operator’s certification has lapsed. The system is notified of the deficiency in a letter from the state on June 10, 2013. The state directs System C to take immediate corrective action by bringing on a new, certified operator or having the current operator take all necessary steps to renew certification as soon as possible. The system is told it must complete corrective action within 120 days of receiving written notification from the state of the significant deficiency, or by October 8, 2013. By October 8th, the system operator has still not been recertified and the system has not hired a new certified operator. The system is notified of its violation on November 15, 2013, for failure to take corrective action within 120 days of receiving written notice. System C finally hires a certified operator in December 2013.

Public Notification, Special Notice and CCR Requirements

Public Notification

Failure to correct a significant deficiency is a treatment technique violation and requires Tier 2 public notification. The system must provide public notification within 30 days of learning of the violation, or by December 14 2013. Notification must be provided by mail or other direct delivery method (such as hand delivery), and any other reasonable method to reach affected individuals that would not have received the information by mail or the direct delivery method may be used. For any unresolved violation following an initial Tier 2 notice, notice must be repeated every 3 months for as long as the violation persists. The system will therefore have to repeat public notice until corrective action is taken.

An example of a public notice that fulfills the public notification and special notification requirements for this violation is shown in Example 6-5.

Special Notice

Since the significant deficiency was addressed (System C hires a certified operator in December 2013), there is no special notice requirement.

CCR

All treatment technique violations must also be included in the CCR. An explanation of how the system returned to compliance could also be included.

An example of a report of this violation that could be used in the system’s CCR is shown in Example 6-6.

Example 6-5. Example Tier 2 Public Notification for Failure to Take Corrective Action

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER **System C Failed to Take Corrective Action Following Identification of a Significant Deficiency**

On June 1, 2013 the State Department of Public Health performed a detailed inspection and engineering evaluation of our water system called a sanitary survey. During this sanitary survey, they identified a significant deficiency in our system (our water system operator's certification had lapsed). As our customers, you have a right to know what happened and what we are doing to correct this situation. As required by EPA's Ground Water Rule, we worked with the State to develop a plan to correct this deficiency. However, we failed to implement this plan before the established deadline and have violated a requirement of the Ground Water Rule.

What should I do?

There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may be at increased risk and should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at (800) 426-4791. If you have specific health concerns, consult your doctor.

You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on Channel 22 or Radio Station KMMM (97.3 FM).

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

This significant deficiency has the potential to result in lack of proper treatment and oversight of the water system. *Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches.* While we have not detected any evidence of contamination or other health threats related to our source water, we are still committed to correcting the deficiency to eliminate the threat of contamination.

What is being done?

The Townsville Utilities Board is in the process of identifying a new certified operator for our water system. We will provide notice to you as soon as we hire a new, certified operator.

For more information, please contact John Johnson, manager of System C, at 555-1234 or write to 2600 Winding Rd., Townsville, TM 12345.

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

This notice is being sent to you by System C.

State Water System ID# TM 1234583. Sent: 12/13/2013

Example 6-6. Example of a Notice in the CCR for Failure to Take Corrective Action

Violation

On June 10, 2013, we were informed by the State Department of Public Health that a significant deficiency—lack of a properly certified operator—had been identified during a June 1, 2013 sanitary survey.

We were directed by the Department of Public Health to take immediate action to correct this deficiency by ensuring that our current operator took all necessary steps to be recertified or by hiring a new, properly certified operator. We did not do so within the required deadline.

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Scenario 4: A System Fails to Maintain at Least 4-log Treatment of Viruses

System Description – System D

System D is a community GWS serving 8,500 people. The system has two wells in use year-round and notifies the state in March 2009 that it provides 4-log treatment of viruses before the first customer.

Situation

During a sanitary survey on January 10, 2011, the state determines that due to a malfunctioning chlorine pump, the system has not been providing 4-log treatment of viruses at one of its wells for at least 2 weeks. The problem is identified during the sanitary survey and the system is officially notified of its failure to consistently provide 4-log treatment in a letter from the state on February 1, 2011. The state also directs System D to take corrective action to restore 4-log treatment as soon as possible.

Public Notification, Special Notice and CCR Requirements

Public Notification

A ground water system subject to the compliance monitoring requirements under 40 CFR 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 activation and removal) before or at the first customer for a ground water source has committed a treatment technique violation and must provide Tier 2 public notification. The system must provide public notification within 30 days of learning of the violation. Notification must be provided by mail or other direct delivery method (such as hand delivery), and any other reasonable method to reach affected individuals that would not have received the information by mail or the direct delivery method may be used. For any unresolved violation following an initial Tier 2 notice, notice must be repeated every 3 months for as long as the violation persists.

An example of a public notice that fulfills the public notification requirements for this violation is shown in Example 6-7.

Special Notice

No special notice is required for this scenario.

CCR

All treatment technique violations must also be included in the CCR. An explanation of how the system returned to compliance could also be included.

An example of a report of this violation that could be used in the system's CCR is shown in Example 6-8.

Example 6-7. Example Tier 2 Public Notification for Failure to Maintain at Least 4-Log Treatment of Viruses

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER System D Failed to Maintain Required Treatment of Viruses at Well 1

From December 27, 2010 to January 12, 2011, our water system did not provide chlorine in the water being used from Well 1 due to a malfunctioning chlorine feed pump. As a result, our water was not as disinfected as the state requires it to be. Our water system violated a treatment technique standard for maintaining adequate disinfection for water delivered to customers from Well 1. As our customers, you have a right to know what happened and what we are doing to correct this situation. After this problem was identified during a state inspection of our treatment facilities, we took immediate steps to repair the malfunctioning chlorine pump.

What should I do?

There is nothing you need to do unless you have a severely compromised immune system, have an infant, or are elderly. These people may have been at increased risk when our system failed to provide adequate disinfection and should seek advice about drinking water from their health care providers. General guidelines on ways to lessen the risk of infection by microbes are available from EPA's Safe Drinking Water Hotline at (800) 426-4791. If you have specific health concerns, consult your doctor.

You do not need to boil your water or take other corrective actions. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on Channel 22 or Radio Station KMMM (97.3 FM).

What does this mean?

This is not an emergency. If it had been an emergency, you would have been notified within 24 hours.

Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches. While we have not detected any evidence of contamination in, or other health threats to, our source water, we are still committed to restoring the required level of treated of water from Well 1 to eliminate the threat of contamination.

What is being done?

We have replaced the malfunctioning chlorine pump and regular sampling has shown that we are once again providing adequate disinfection of water from Well 1.

For more information, please contact John Johnson, manager of System D, at 555-1234 or write to 2600 Winding Rd., Townsville, TM 12345.

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

This notice is being sent to you by System D.

State Water System ID# TM 1234584. Sent: 2/10/2011

Example 6-8. Example of a Notice in the CCR for Failure to Maintain at Least 4-Log Treatment of Viruses

Violation

On January 10, 2011 state inspection of our water system identified a malfunctioning chlorine pump. As a result, the water from one of our wells (Well 1) was not adequately disinfected for 2 weeks.

As directed by the Department of Public Health, we took immediate action to resolve this problem by repairing the malfunctioning chlorine pump. Regular testing since the pump was repaired has demonstrated that we are once again providing water that meets the State's standards for disinfection to our customers.

Scenario 5: A System Fails to Collect a Source Water Sample

System Description – System E

System E is a community GWS serving 10,000 people. The system has four wells in use year-round and does not provide 4-log treatment of viruses before or at the first customer.

Situation

On December 15, 2011, the system is notified by the laboratory that one of its routine monthly total coliform samples is total-coliform positive. The system collects three repeat samples as required under the TCR, but does not collect any source water samples. The state notifies the system that it is in violation of the GWR requirements on January 2, 2012. System E collects samples from all four wells to have them tested for fecal indicators on January 4, 2012. None of the samples is positive for fecal indicators.

Public Notification, Special Notice and CCR Requirements

Public Notification

System E has committed a monitoring violation. It is required to collect samples from each water source in use at the time the total coliform-positive sample was collected, within 24 hours of learning of the total coliform-positive routine TCR sample. The system must provide Tier 3 public notification within 1 year of learning of the violation. Notification must be provided by mail or other direct delivery method (such as hand delivery), and any other reasonable method to reach affected individuals that would not have received the information by mail or the direct delivery method used. Notice must be provided to each customer receiving a bill and other service connections to which water is delivered.

Special Notice

No special notice is required for this scenario.

CCR

Since System E is a CWS, it could use the CCR to inform the public of the Tier 3 violations if the CCR is released within 1 year of the system's learning of the violations. For this particular example, the system became aware of the monitoring violation on January 2, 2012. The public could therefore be informed of the violation in the CCR produced for calendar year 2011.

An example of a public notice that fulfills the public notification requirements for this violation is shown in Example 6-9. An example of a report of this violation in the CCR is shown in Example 6-10.

Example 6-9. Example Tier 3 Public Notification for Failure to Collect Source Water Sample(s) Following a Routine Total Coliform-Positive Distribution System Sample Result

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER
Monitoring Requirements not Met for System E

Our water system recently failed to collect source water samples for fecal indicators following a total coliform-positive routine distribution system sample. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did to correct the situation.

What should I do?

There is nothing you need to do. You do not need to boil your water or take other corrective actions. You may continue to drink the water. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on Channel 22 or Radio Station KMMM (97.3 FM).

What was done?

We collected samples from all four wells and had them tested for fecal indicators on January 4, 2012. None of the samples was positive for fecal indicators.

For more information, please contact John Johnson, manager of System E, at 555-1234 or write to 2600 Winding Rd., Townsville, TM 12345.

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

This notice is being sent to you by System E.

State Water System ID# TM 1234585. Sent: 2/5/2012

Example 6-10. Example of a Notice in the CCR for Failure to Collect Source Water Sample(s) Following a Routine Total Coliform-Positive Distribution System Sample Result

Violation

On December 15, 2011, we were informed by our laboratory that one of our routine bacteriological samples for December tested positive for total coliform.

We were required to collect follow-up samples within 24 hours of learning of the total coliform-positive sample. Follow-up samples needed to be tested for fecal indicators from all sources that were active at the time the total coliform-positive sample was collected. Source water samples were collected on January 4, 2012, and all of the samples were negative for fecal indicators.

Failure to conduct source water monitoring within the required 24 hour period is a monitoring and reporting violation.

Scenario 6: A System Fails to Conduct Compliance Monitoring

System Description – System F

System F is a noncommunity GWS serving 3,900 people. The system has two wells in use year-round and notifies the state in January 2009 that it provides 4-log treatment of viruses before the first customer.

Situation

The system is conducting continuous residual disinfectant monitoring in accordance with the GWR and recording the lowest residual disinfectant concentration every day it serves water to the public. For 1 week that the system is in operation in April 2010, the system fails to conduct residual disinfectant monitoring. The state notifies the system that it is in violation of the GWR monitoring requirements on May 25, 2010.

Public Notification, Special Notice and CCR Requirements

Public Notification

System F has committed a monitoring violation. Because it serves more than 3,300 people and provides 4-log treatment of viruses, the system must continuously monitor the residual disinfectant level at a state-approved location. The system must provide Tier 3 public notification within 1 year of learning of the violation. Notification must be provided by mail or other direct delivery method (such as hand delivery), and any other reasonable method to reach affected individuals that would not have received the information by mail or the direct delivery method used. Notice must be provided to each customer receiving a bill and other service connections to which water is delivered.

An example of a public notice that fulfills the public notification requirements for this violation is shown in Example 6-11.

Special Notice

No special notice is required for this scenario.

CCR

Because System F is a NCWS, it is not required to prepare and distribute a CCR.

Example 6-11. Example Tier 3 Public Notification for Failure to Conduct Compliance Monitoring

DRINKING WATER NOTICE
Monitoring and Reporting Requirements not Met for System F

Our water system recently failed to collect routine samples for residual disinfectants in the water that we deliver to you. Although this incident was not an emergency, as our customers, you have a right to know what happened and what we did to correct the situation.

What should I do?

There is nothing you need to do. You do not need to boil your water or take other corrective actions. You may continue to drink the water. If a situation arises where the water is no longer safe to drink, you will be notified within 24 hours. We will announce any emergencies on Channel 22 or Radio Station KMMM (97.3 FM).

What was done?

Our continuous disinfection residual monitoring equipment has been repaired and all monitoring requirements are being satisfied.

For more information, please contact John Johnson, manager of System F, at 555-1234 or write to 2600 Winding Rd., Townsville, TM 12345.

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

This notice has been posted by System F.

State Water System ID# TM 1234586. Sent: 6/1/2010