

Implementation Guidance for the Drinking Water Program – Ground Water Rule

**Idaho Department of Environmental Quality
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Preface

This guidance provides a concise summary of the requirements of the Drinking Water – Ground Water Rule. The primary audience is water system owners and operators who need to learn about their obligations under this rule, but it may be helpful to regulatory personnel, professional consultants, and interested customers of public drinking water systems. It may be particularly useful to those who prefer to read rule requirements in a narrative format. However, whenever a question of interpretation arises, it is the rule language itself that must be consulted. Use of this guidance is not mandatory. Interested persons may learn about these rules by reading the appropriate sections of the Code of Federal Regulations, or by referring to a variety of guidance documents that have been prepared by the U.S. EPA. Information on how to obtain the EPA publications is provided on page 33 of this document.

The Ground Water Rule, a national primary drinking water regulation, was promulgated by the U.S. Environmental Protection Agency on November 8, 2006. The Idaho Department of Environmental Quality has adopted this rule in the *Idaho Rules for Public Drinking Water Systems*. A copy of these rules may be downloaded from the Internet at: <http://adm.idaho.gov/adminrules/rules/idapa58/58index.htm>. Pertinent language from these rules is included in this guidance as Appendix A.

The Ground Water Rule is intended to protect public water system customers from microbial contamination in ground water. The rule does this by requiring sanitary surveys at frequent intervals and requiring that any significant deficiencies identified during those surveys be corrected in a timely way. The rule also requires monitoring of untreated source water when positive coliform bacteria are detected in the distribution system. If a system finds that one or more of its well sources is contaminated with fecal indicator organisms, the system must take actions that will protect customers from the contamination. In some cases, this may include the regular practice of disinfection with adequate contact time before the water is delivered to the first customer.

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Abbreviations and Definitions

4-Log Treatment. In the Ground Water Rule, this term describes treatment of water such that 99.99% of viruses are removed or inactivated. Similar terminology is used for other target organisms. The Surface Water Treatment Rule requires 3-log treatment of Giardia (99.9%) and 4-log treatment of viruses.

Consecutive System. A regulated public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

CT. CT stands for **concentration (C)** and **contact time (T)**. It is the result of multiplying the disinfectant residual concentration by the contact time. CT is a measure of disinfection effectiveness for the time that the water and disinfectant are in contact. This concept is discussed in Section 4.C (page 11) and in more detail in Section 6.D. (page 18) of this guidance.

DEQ. Idaho Department of Environmental Quality. DEQ is the primacy agency for administration of the Safe Drinking Water Act in Idaho. DEQ contracts with District Health Departments around the state to assist in implementing the drinking water program for some of the smaller public water systems. **To avoid repetition, “DEQ” is used throughout this guidance to designate the primacy agency, even though it is understood that District Health Departments administer the drinking water rules for some smaller systems.**

Ground Water System. For purposes of compliance with the Ground Water Rule, a ground water system may be defined as a system that:

- Relies entirely on one or more ground water sources;
- Is a consecutive system that receives finished ground water; or,
- Mixes surface and ground water, where ground water is added directly to the distribution system without first receiving treatment equivalent to treatment provided for surface water.

From this definition, it may be seen that a system that combines all of its ground water with surface water and then treats the combined water as required by the various surface water treatment rules would not be considered a ground water system under this rule.

SDWISS. Safe Drinking Water Information System-State – the database used and maintained by DEQ’s Drinking Water Program to store data and transmit it to EPA according to EPA’s requirements.

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Section 1 — Rule Overview and Compliance Schedule

This section presents a brief overview of the Drinking Water – Ground Water Rule requirements.

1.A. Water Systems Affected by this Rule

The requirements of the Drinking Water – Ground Water Rule apply to all public water systems that use ground water, except that it does not apply to public water systems that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment under the surface water treatment rules. For purposes of compliance with this rule, “ground water system” is defined as any public water system meeting this applicability statement, including consecutive systems receiving finished ground water.

1.B. Compliance Schedule

Public water systems that meet the applicability statement in 1.A must comply with this rule beginning December 1, 2009.

1.C. General Requirements

The DEQ Board has adopted the Drinking Water – Ground Water Rule and, the Legislature has approved the rule. DEQ expects to begin implementing this rule during the summer and fall of 2009. This rule will have widespread applicability in Idaho, because the majority of public water systems in the state are classified as ground water systems. Following is a brief overview of rule requirements. Each of these requirements will be discussed in greater detail in subsequent sections of this guidance.

- 1 **Sanitary Surveys**—systems must provide DEQ, when requested, with any information that will enable the agency to conduct a sanitary survey. DEQ will conduct sanitary surveys at prescribed intervals and water systems must correct all significant deficiencies identified during these surveys.
- 2 **Source Water Monitoring**—Systems that do not provide 4-log treatment of viruses for each of their ground water sources before or at the first customer must comply with source water monitoring requirements. For most systems, this will entail sampling of their ground water source or sources whenever a total coliform positive sample occurs in the distribution system.
- 3 **Treatment Technique Requirements**—The owner of a system that discovers through monitoring that it has a ground water source that is contaminated with fecal organisms, or the owner of a system that has significant deficiencies identified by DEQ during a sanitary survey, must implement one or more of the following corrective actions:

- a. Correct all significant deficiencies.
 - b. Provide an alternate source of water.
 - c. Eliminate the source of contamination.
 - d. Provide treatment that reliably achieves 4-log treatment of viruses before or at the first customer.
- 4 **Compliance Monitoring**—Systems that provide 4-log treatment of viruses are required to conduct compliance monitoring to demonstrate treatment effectiveness. For systems using chemical disinfection, this will involve monitoring of disinfectant residual on a regular basis. Additional compliance monitoring requirements apply to systems that use membranes or other technologies to achieve 4-log treatment of viruses.
- 5 **Hydrogeologic Sensitivity Assessment**—If requested by DEQ, the owner of a system must provide any existing information that will enable the agency to perform a hydrogeologic sensitivity assessment to determine whether the ground water system obtains water from an aquifer that is particularly sensitive to microbial contamination.

Section 2 — Sanitary Surveys

2.A. Regulatory Authority

The requirements discussed in the Sanitary Survey section were promulgated as 40 CFR 141, Subpart S, of the Code of Federal Regulations, incorporated by reference in the *Idaho Rules for Public Drinking Water Systems* at IDAPA 58.01.08.323. Additional requirements for sanitary surveys take the form of special primacy requirements imposed on DEQ by 40 CFR 142. Specific rule language for implementing primacy requirements related to sanitary surveys was developed through a public negotiation process and is located at IDAPA 58.01.08.303. See Appendix A for pertinent excerpts from the *Idaho Rules for Public Drinking Water Systems*.

2.B. Applicability

The primacy agency must conduct a sanitary survey for all public water systems using ground water on the following schedules:

- 1 **Non-community systems**—Every five (5) years.
- 2 **Community systems**—Every three (3) years, except as specified below:
 - a. A community water system may have a sanitary survey conducted every five (5) years if the system provides at least 4-log treatment of viruses (using inactivation, removal, or a DEQ approved combination of 4-log inactivation and removal) before or at the first customer for all of its ground water sources.
 - b. A community water system may have a sanitary survey conducted every five (5) years if it has an outstanding performance record, as determined by DEQ and documented in previous sanitary surveys, and has no history of total coliform maximum contaminant level (MCL) or monitoring violations under IDAPA 58.01.08.100.01.a (Total Coliform Rule) since the last sanitary survey.

2.C. Elements of the Sanitary Survey

Since 2001, sanitary surveys conducted in Idaho have examined the eight (8) elements of water system construction and operations listed below. Because sanitary surveys conducted in Idaho have been in compliance with the requirements of the Ground Water Rule since 2001, most system owners will notice little change; however, systems that do not provide 4-log virus treatment or do not have an outstanding performance record (see section 2.B) will be subject to sanitary surveys every three (3) years instead of every five (5) years.

Eight elements of water system construction and operations included in sanitary surveys
(see definitions in IDAPA 58.01.08.003):

- 1 Source
- 2 Treatment
- 3 Distribution system
- 4 Finished water storage
- 5 Pumps, pump facilities, and controls
- 6 Monitoring, reporting, and data verification
- 7 System management and operation
- 8 Operator compliance with State licensing requirements

In evaluating ground water sources during a sanitary survey, DEQ will use results of source water assessments or other available information to identify potential sources of ground water contamination.

2.D. Significant Deficiencies Identified During the Survey

Correction of significant deficiencies identified during a sanitary survey is one of the treatment technique requirements of the Drinking Water – Ground Water Rule.

A significant deficiency is defined as follows in Section 003 of the *Idaho Rules for Public Drinking Water Systems*:

As identified during a sanitary survey, any defect in a system’s design, operation, maintenance, or administration, as well as any failure or malfunction of any system component that the Department or its agent determines to cause, or have potential to cause, risk to health or safety, or that could affect the reliable delivery of safe drinking water.

DEQ will provide the owner of the water system with a written notice within thirty (30) days describing significant deficiencies identified during a sanitary survey. The agency may choose to provide this written notice at the time the survey is conducted. In either case, DEQ may specify corrective actions or require interim public health protection measures if timely corrective action is not possible. Failure by the owner of the water system to correct significant deficiencies or comply with interim protective measures on a schedule acceptable to DEQ is a violation of the treatment technique requirements of the Ground Water Rule and requires that the system owner issue a public notice informing its customers of this violation.

As a special primacy requirement, DEQ must identify at least one (1) deficiency under each of the eight (8) elements of the sanitary survey that will, in every instance, be considered a significant deficiency. Following consultation with experienced field

personnel and after a public negotiation process to allow interested persons to advise DEQ on this subject, the following list of significant deficiencies was developed. The rule citations are to IDAPA 58.01.08, *Idaho Rules for Public Drinking Water Systems*. It is important to note that many deficiencies other than those listed below may be identified during a sanitary survey and considered significant for regulatory purposes. The difference is that deficiencies listed below are *always* significant, while other deficiencies may or may not be considered significant, depending on site-specific circumstances.

- 1 Source: There is no sanitary well cap as specified in 511.06.b
- 2 Treatment: Chemical addition is not flow-proportioned or lacks emergency shut-off, as specified in 531.02.b.ii.
- 3 Distribution system: There is no means for flushing dead end mains, as specified in 542.09
- 4 Finished water storage: The roof is leaking, as specified in 544.09 and 544.09.c.
- 5 Pumps, pump facilities, and controls: There is no accessible check valve between the pump and the shut-off valve, as specified in 511.04.
- 6 Monitoring, reporting, and data verification: There has been repeated failure to collect the required number and type of Total Coliform Rule samples during the most recent two (2) year period, as specified in 100.01.a.
- 7 System management and operation: There has been a history of frequent depressurization in the distribution system in violation of 552.01.
- 8 Operator compliance with State licensing requirements: The responsible charge operator is not licensed as required in 554.02.

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Section 3 — Source Water Monitoring Requirements

3.A. Regulatory Authority

The requirements discussed in Source Water Monitoring Requirements section were promulgated as 40 CFR 141, Subpart S, of the Code of Federal Regulations, incorporated by reference in the *Idaho Rules for Public Drinking Water Systems* at IDAPA 58.01.08.323.

3.B. Applicability

The source water monitoring requirements apply to public water systems using ground water if they do not provide at least 4-log virus treatment of all their ground water sources before or at the first customer. Source water monitoring is triggered when the system owner is notified that a sample collected under the Total Coliform Rule (TCR) is total coliform positive and the sample is not invalidated under the provisions of the TCR.

3.C. Source Water Fecal Indicator Organism

For the purpose of triggered ground water source monitoring, DEQ will use *E. coli* as the fecal indicator organism. The reasons for this choice are as follows:

- 1 *E. coli* is a definitive indicator of recent fecal contamination. At least in temperate climates, it does not live for extended periods outside the gut of a warm-blooded animal.
- 2 Laboratory capacity for processing *E. coli* samples is well established within the state. Cost of sample analysis is affordable for small water systems.
- 3 Water system operators are accustomed to the collection and handling of *E. coli* samples.
- 4 It is not necessary to select a smaller indicator like coliphage (a virus that attacks *E. coli* bacteria) because most Idaho aquifers have the ability to transmit larger organisms when they are introduced to the aquifer from fecal contamination sources.

3.D. Source Water Monitoring Requirements

Ground water source samples must be collected at a location prior to any treatment, unless an alternative location is approved by DEQ (See Section 6.D, paragraph 5, on page 21). If the system's configuration does not allow sampling at the well itself, DEQ may allow an alternative sampling location if it is representative of the water quality of that well.

If the owner of a ground water system is notified of a total coliform positive result in a Total Coliform Rule sample, the owner must ensure that within 24 hours of notification, at least one ground water source sample is collected from each ground water source in use at the time the total coliform positive sample was collected and is analyzed for *E. coli*. For systems that have multiple ground water sources, this requirement may be met by sampling a representative source or sources. *If requested by DEQ*, the owner of a system that wishes to sample a representative source or sources must submit, for agency review, a triggered source water monitoring plan that identifies one or more ground water sources that are representative of each monitoring site in the system's Total Coliform Rule monitoring plan.

The owner of a consecutive water system that is notified of a total coliform positive sample collected under the Total Coliform Rule must notify the wholesale system owner(s) from which it receives water within 24 hours of being notified of the total coliform positive sample.

The owner of a wholesale water system that is notified of a total coliform positive sample by owners of a consecutive system to which it delivers water must, within 24 hours, collect a sample from the source or sources that were in use at the time that the consecutive system collected the total coliform positive sample and have it analyzed for *E. coli*.

The owner of a wholesale system that is notified of a fecal indicator positive source sample must notify all owners of consecutive systems of the positive source sample and meet the additional requirements described in paragraph 3.E.

DEQ may extend the 24 hour time limit on a case-by-case basis if the owner of a system cannot collect the source sample within 24 hours due to circumstances beyond its control. If the time limit is extended by DEQ, the agency will specify how much time the system owner has to take the source sample.

The owner of a system serving 1,000 or fewer people may use a repeat sample collected from a ground water source to meet the requirements of the Total Coliform Rule and to satisfy the triggered source water monitoring requirement of the Ground Water Rule.

3.E. Additional Requirements if Source Sample is Fecal Indicator Positive

Five (5) additional source water samples from the same source must be taken within 24-hours of being notified of a fecal indicator positive source water sample unless:

- 1 The system owner is required by DEQ to take corrective action under the treatment technique requirements of the Ground Water Rule (see Section 4); or,
- 2 The positive source sample is invalidated by DEQ or the laboratory.

If any of the five (5) additional source water samples are fecal indicator positive, the system will be required to meet the treatment technique requirements described in Section 4.

3.F. Exceptions to the Triggered Source Water Monitoring Requirements

The owner of a ground water system is not required to comply with the source water monitoring requirements if DEQ determines and documents in writing that the total coliform positive sample collected under the TCR was caused by a distribution system deficiency. See Section 6.D, paragraph 3 on page 19 for the criteria DEQ will use in making this determination.

3.G. Assessment Source Water Monitoring

If directed by DEQ, a ground water system owner must conduct assessment source water monitoring. This is a measure which DEQ is authorized to take under the drinking water – ground water rule when the agency believes that triggered source water monitoring is not sufficient to characterize the microbial quality of a system's source or sources. The following criteria apply:

- 1 Collect twelve (12) ground water source samples that represent each month that the system provides ground water to the public.
- 2 Collect samples from each well unless the system obtains written DEQ approval to conduct monitoring at one or more wells that are representative of multiple wells used by the system and that draw water from the same hydrogeologic setting.
- 3 Collect samples with standard volume of at least 100 milliliters (mL) each for fecal indicator analysis and have them analyzed using one of the analytical methods listed in Appendix B.
- 4 Collect each source sample from a point prior to any treatment unless DEQ approves another location.
- 5 Source samples must be collected at the well itself unless the system's configuration does not allow sampling at the well itself and DEQ approves an alternate sampling location that is representative of the quality of that well.

3.H. Violations and Public Notification

The owner of a ground water system (including consecutive systems) that has a fecal indicator positive source sample that is not invalidated must provide Tier 1 Public Notification.

The owner of a system that fails to conduct source water monitoring as described in this section has a monitoring violation and is required to provide Tier 2 Public Notification.

DEQ will assist systems that find it necessary to issue public notification. Templates for this purpose will be made available on the DEQ web site.

Section 4 — Treatment Technique Requirements

4.A. Regulatory Authority

The requirements discussed in the Treatment Technique Requirements section were promulgated as 40 CFR 141, Subpart S, of the Code of Federal Regulations, incorporated by reference in the *Idaho Rules for Public Drinking Water Systems* at IDAPA 58.01.08.323. Language related to sanitary surveys for ground water systems is found at IDAPA 58.01.08.303.

4.B. Systems with Significant Deficiencies or Source Water Fecal Contamination

See Section 2.D on page 4 for discussion of significant deficiencies. Source water monitoring requirements are discussed in Section 3 beginning on page 7.

The owner of a public drinking water – ground water system that has significant deficiencies or source water fecal contamination is required to implement one or more of the following corrective action alternatives in accordance with a plan and schedule approved by DEQ:

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

4.C. Compliance Monitoring for Systems that Provide 4-log Virus Treatment

The owner of a public drinking water – ground water system that provides at least 4-log treatment of viruses at any source, using inactivation or a DEQ-approved combination of inactivation and removal, must notify DEQ in writing by December 1, 2009, and begin compliance monitoring in accordance with the requirements listed below. Notification to DEQ must include engineering, operational, or other information that DEQ requests in order to evaluate the submission. Further discussion of how DEQ will determine if a system is achieving 4-log virus treatment may be found in Section 6.D on page 18.

The compliance monitoring requirements are:

- 1 **For systems serving more than 3,300 persons** and practicing chemical disinfection—continuously monitor disinfection residual at a location approved by DEQ and record the lowest disinfectant concentration each day that water from the ground water source is served to the public. Grab sampling every four (4) hours is required when continuous monitoring equipment fails. Monitoring equipment must be repaired and returned to service within fourteen (14) days.
- 2 **For systems serving 3,300 or fewer persons** and practicing chemical disinfection—monitor the disinfectant residual concentration at a location approved by DEQ and record the disinfectant concentration for each day that water from the ground water source is served to the public. The disinfectant residual concentration shall be measured in a daily grab sample taken during the hour of peak flow, or at another time approved by DEQ. If the residual concentration measured in any grab sample measurement is less than the minimum required by DEQ, the system owner must ensure grab samples are taken at four (4) hour intervals until the residual disinfectant concentration is restored to the required level. Systems in this category have the option of monitoring disinfectant residual continuously and meeting the requirements specified for systems serving more than 3,300 people.
- 3 **For systems using membrane filtration**—operate the membrane process in accordance with DEQ-approved criteria found in IDAPA 58.01.08.323.01 and referenced in Section 6.D, paragraph 10, on page 22. A system using membrane filtration will be in compliance with the 4-log virus treatment requirement if:
 - a. The membrane has an absolute molecular weight cut-off, or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses.
 - b. The membrane process is operated in accordance with DEQ-specified compliance requirements.
 - c. The integrity of the membrane is intact, as demonstrated by routine direct integrity testing of each membrane module.
- 4 **For systems using alternative treatment**—DEQ will consider alternative treatment methods and will specify compliance monitoring criteria that are appropriate for the technology. See Section 6.D, page 18. In addition to any design and construction requirements specified in the *Idaho Rules for Public Drinking Water Systems*, DEQ will evaluate the following points in determining whether to approve alternative technologies:
 - a. Virus removal efficiencies demonstrated during third-party challenge testing or based on documentation of an absolute physical barrier.

- b. Site-specific pilot testing to determine operating criteria and requirements for compliance monitoring, or documentation of pilot testing previously conducted on comparable waters.
- c. Evaluation of system components for leaching of contaminants.

4.D. Treatment Technique Violations

- 1 A ground water system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days of receiving written notice from DEQ of the significant deficiency (or earlier if directed by DEQ), the system owner:
 - a. Has not completed corrective action in accordance with any applicable DEQ plan review processes or other DEQ guidance and direction, including DEQ specified interim actions and measures, or
 - b. Is not in compliance with a DEQ-approved corrective action plan and schedule.
- 2 Unless the State invalidates a fecal indicator positive ground water source sample, a ground water system is in violation of the treatment technique requirement if, within 120 days of notification of the positive result (or earlier if directed by DEQ), the system owner:
 - a. Has not completed corrective action in accordance with any applicable DEQ plan review processes or other DEQ guidance and direction, including DEQ-specified interim measures, or
 - b. Is not in compliance with a DEQ-approved corrective action plan and schedule.
- 3 A system practicing 4-log virus treatment that fails to maintain this treatment 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 achieving the required treatment at or before the first customer.

A system in violation of the treatment technique requirements must provide a Tier 2 public notice. Templates for public notification of treatment technique violations will be available on the DEQ Web site and from DEQ or Health District offices.

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Section 5 — Reporting and Recordkeeping for Water Systems

5.A. Regulatory Authority

The requirements discussed in the Reporting and Recordkeeping for Water Systems section were promulgated as 40 CFR 141, Subpart S, of the Code of Federal Regulations, incorporated by reference in the *Idaho Rules for Public Drinking Water Systems* at IDAPA 58.01.08.323.

5.B. Applicability

All systems that meet the applicability statement in Section 1.A are subject to the requirements in this section.

5.C. Reporting

- 1 The owner of a public drinking water – ground water system conducting compliance monitoring as described in Section 4.C must notify DEQ any time the system fails to meet any DEQ-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four (4) hours. This notification must occur as soon as possible, but in no case later than the end of the next business day.
- 2 The owner of a public drinking water – ground water system must notify DEQ within thirty (30) days of completing any corrective action(s) required as a result of significant deficiencies or source water fecal contamination.
- 3 The owner of a system that does not conduct source water monitoring because the total coliform positive distribution sample met state criteria to avoid source water monitoring (see 3 on page 19) must provide documentation to DEQ within thirty (30) days of the total coliform positive sample.

5.D. Recordkeeping

The owner of a public drinking water system subject to the Drinking Water – Ground Water Rule must maintain the following records:

- 1 Documentation of all corrective actions undertaken in compliance with this rule. These records must be kept for not less than ten (10) years.
- 2 Documentation of notices to the public. This documentation must be kept for not less than three (3) years.

- 3 Records of decisions related to total coliform positive samples that met DEQ criteria for samples that came from an area known to produce positive results associated with the distribution system (see page 27). Records of invalidation for fecal-indicator positive samples that were invalidated. These records must be kept for not less than five (5) years.
- 4 For owners of consecutive systems, documentation of notification to the wholesale system(s) of total-coliform positive samples that are not invalidated under the Total Coliform Rule. This documentation must be kept for a period of not less than five (5) years.
- 5 For owners of public drinking water systems, including wholesale systems, that are required to perform compliance monitoring as discussed in Section 4.C:
 - a. Records of DEQ-specified minimum disinfectant residual must be kept for not less than ten (10) years.
 - b. Records must be kept of the lowest daily residual disinfectant concentration and of the date and duration of any failure to maintain the DEQ-prescribed minimum residual disinfectant concentration for a period of more than four (4) hours. This documentation must be kept for a period of not less than five (5) years.
 - c. Records must be kept of State-specified compliance requirements for membrane filtration and of parameters specified by DEQ for alternative treatment and of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four (4) hours. This documentation must be kept for a period of not less than five (5) years.

Section 6 — Primacy Agency Reporting, Recordkeeping, and Special Primacy Requirements

6.A. Regulatory Authority

As primacy agency, DEQ is subject to reporting and recordkeeping requirements set forth in 40 CFR 142.14 and 142.15 respectively. The special primacy requirements are in 40 CFR 142.16. Special primacy requirements apply to DEQ, but they will be of interest to public water system owners and operators because they describe procedures and decision-making criteria that DEQ will use in implementing the Drinking Water – Ground Water Rule. When these procedures impose explicit requirements on water systems they have been written into the *Idaho Rules for Public Drinking Water Systems* following a public negotiation process. Citations are given below. Pertinent rule text may be found in Appendix A.

6.B. Idaho DEQ Reporting Requirements

DEQ is required to report the following information to the US Environmental Protection Agency:

- 1 The month and year in which the most recent sanitary survey was conducted for each system meeting the applicability statement in Section 1.A.
- 2 The date that drinking water –ground water systems completed any corrective actions that were imposed by DEQ upon detection of significant deficiencies in a sanitary survey or detection of source water fecal contamination.
- 3 A current list of all drinking water – ground water systems that provide 4-log virus treatment before the first customer for any ground water source.

Although these reports are submitted to EPA, DEQ will make them available for public inspection on request.

6.C. Idaho DEQ Recordkeeping Requirements

DEQ is required to maintain the following records related to the Drinking Water –Ground Water Rule:

- 1 Records of each written notice of significant deficiencies provided to a water system as a result of sanitary surveys.
- 2 Records of corrective action plans, schedule approvals, and any interim measures specified by DEQ.

- 3 Records of confirmations that significant deficiencies have been corrected or the fecal contamination in a ground water source has been addressed.
- 4 Records of primacy agency determinations and ground water system documentation for not conducting source water monitoring.
- 5 Records of invalidations of fecal indicator positive ground water source samples.
- 6 Records of primacy agency approval of source water monitoring plans.
- 7 Records of notices by the primacy agency 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.
- 8 Records of notices by the primacy agency regarding the monitoring and compliance requirements for systems using a combination of inactivation and removal of viruses to achieve the 4-log treatment requirement.
- 9 Records of submittals from drinking water – ground water systems documenting 4-log virus treatment (inactivation, or combination of inactivation and removal) before or at the first customer for a ground water source.
- 10 Records of primacy agency determinations that a drinking water – ground water system may discontinue 4-log treatment of viruses at a ground water source.

These records will reside in the system file maintained at each DEQ or District Health Department office, or in the SDWISS database.

6.D. Special Primacy Requirements

Most special primacy requirements specified under the Public Drinking Water – Ground Water Rule are met by DEQ by adopting the federal rule. Others are satisfied by rule language added to the *Idaho Rules for Public Drinking Water Systems* in Sections 303 and 323 (see Appendix A). The remaining primacy requirements involve decision-making criteria or procedures to be followed when making certain determinations under the Public Drinking Water – Ground Water Rule. These are discussed below.

- 1 **Criteria for determining “outstanding performance” for purposes of sanitary survey interval.** With “outstanding performance,” a community water system may be eligible to have a sanitary survey performed every 5 years instead of every 3 years as required by the Public Drinking Water – Ground Water Rule (see IDAPA 58.01.08.303 in Appendix A). DEQ established criteria for “outstanding performance” in 2001 when the Interim Enhanced Surface Water Treatment Rule was adopted. A few surface water systems have qualified for this status and the result has been reduced pressure on limited state resources without any demonstrated loss in public health protection. DEQ believes that the Interim Enhanced Surface Water Rule criteria accurately reflect overall excellence in water system facilities, operation, and management. DEQ proposes to slightly

modify these criteria to determine which ground water systems may qualify for a longer interval between sanitary surveys. The criteria are listed below:

- Deficiencies noted in the current survey have been corrected in accordance with a schedule acceptable to DEQ.
- The system has had no Total Coliform Rule MCL violations since the last survey, unless it can be shown that any MCL violations that do exist are unrelated to deficiencies in system construction, treatment practices, operation, or management.
- The system has had no monitoring or reporting violations during the past five (5) years
- The system has had no waterborne disease outbreaks attributable to the system during the past five (5) years.
- In addition to the above criteria, DEQ may consider evidence of expert operation, including, but not limited to:
 - a) The system has an active cross-connection control program;
 - b) Operation and maintenance (O&M) manuals are current and accessible; and
 - c) Operators are up to date on training and other licensing requirements.

2 **Criteria for extending the 24-hour time limit to collect a triggered source water sample.** When notified that a total coliform sample taken in the distribution system is positive, a ground water system is required to collect a source water sample within 24 hours from the source or sources that were contributing water to the part of the distribution system where the positive sample occurred. DEQ is allowed to extend this time limit when circumstances warrant. The following criteria will be used:

- The lab is unavailable—closed for the weekend or holiday.
- Mail service is inadequate—unable to ship on time, or arrival at the lab will be delayed.
- Severe weather or other extreme circumstances—the sample can't be taken without personal danger, or weather will cause a delay in sampling or shipping.

3 **Criteria for determining that a total coliform positive sample is solely the result of a distribution system deficiency.** The Public Drinking Water – Ground Water Rule allows DEQ to waive the requirement for triggered source water

monitoring following a total coliform positive sample in the distribution system if it can be demonstrated that the positive sample resulted from a deficiency in the distribution system. The following circumstances will be considered by DEQ when making this determination:

- When 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 a main repair or after cleaning or repair of a storage tank.
- In a zone of the distribution system where water pressure is negative or low (less than twenty (20) psi).
- When it is likely that contamination is the result of a cross-connection in the distribution system.

The reasons for waiving triggered source water samples should be valid and defensible and previous distribution system problems supporting the total coliform positive result should have been documented before the positive coliform sample result was received.

- 4 **Criteria for invalidation of fecal indicator positive triggered source water samples.** Given the importance of these samples in terms of public health protection, and considering the implications that positive results could have for water system treatment requirements, DEQ believes that improper sampling technique or careless handling of samples is unlikely to occur with well-trained operators and should not serve as the basis for a decision to invalidate. DEQ will use the invalidation criteria given in the Total Coliform Rule when deciding whether or not to invalidate a fecal positive source sample. These criteria are as follows:

- The laboratory establishes that improper sample analysis caused the fecal indicator positive result.
- DEQ 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 owner must collect another source water sample within 24 hours of being notified by DEQ of its invalidation decision. DEQ may extend the 24-hour limit on a case by case basis if the system owner cannot collect the source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, DEQ will specify how much time the system owner has to collect the sample.

- DEQ will 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 of the person who recommended the decision and the document will be made available to EPA and the public. The documentation will state the specific cause of the fecal indicator positive sample and what action was taken by the system in response.
 - DEQ will not invalidate a fecal indicator positive sample solely on the grounds that repeat samples were fecal indicator negative.
- 5 **Criteria for approving a source sampling location after treatment.** The owner of a system is required by the Public Drinking Water – Ground Water Rule to take source water samples at a location prior to any treatment. The owner of a public drinking water system that wants to take source samples at a point following any treatment process will have the burden of demonstrating that the treatment will not interfere with the detection of microbial organisms in the raw water. In general, this will be difficult to do for most types of treatment, because any filtering or chemical changes that may occur have the potential to alter the abundance and distribution of organisms if any are present in the raw source water. Sampling after treatment will only be allowed if the following conditions can be met:
- The system owner can demonstrate that the treatment will have no effect on microbial quality of the water.
 - The system owner can show that it is not possible to directly sample the untreated water.
- 6 **Confirmation of achieving 4-log treatment of virus before or at the first customer.** Systems that believe they provide 4-log virus treatment at a ground water source must notify DEQ in writing by December 1, 2009, and provide engineering, operational, or other information that DEQ requests in order to evaluate the submission. This primacy requirement provides additional discussion of how DEQ will determine if a public drinking water system is achieving 4-log virus treatment.

DEQ will use EPA guidance, along with past experience gained in evaluating surface water treatment facilities, to determine when a ground water system is achieving 4-log treatment of viruses through disinfection or a combination of disinfection and removal. In general, this decision will be based on standard engineering analyses of retention time, baffling factors, flow characteristics, disinfectant concentration, pH and temperature of the water being treated (where applicable), CT calculations, and removal efficiencies for specific membrane technologies. DEQ believes that the language in 40 CFR 141.403(b) and in the facility standards sections of the *Idaho Rules for Public Drinking Water Systems* provides DEQ with authority to require submission of engineering data to support the determination by the Department of the level of virus treatment that is being

achieved before or at the first customer for each ground water source in use by the water system.

The owner of a public drinking water system that intends to submit evidence of 4-log virus treatment at one or more of ground water sources should contact DEQ well in advance of December 1, 2009, in order to clarify site-specific requirements.

- 7 **Determining the minimum residual disinfectant concentration for purposes of compliance monitoring.** The owner of a system that is able to demonstrate that it is achieving 4-log virus treatment at a ground water source will be required to conduct daily or continuous disinfectant residual monitoring (frequency of measurement depends on system size—see Section 4.C on page 11) to demonstrate that they are achieving the required treatment on a continuing basis. The required minimum disinfectant residual concentration will be derived from the analysis of CT under peak flow conditions that is submitted to DEQ by a system wishing to demonstrate 4-log virus treatment, as discussed in the preceding primacy requirement. Requirements pertaining to measurement and reporting of compliance monitoring data are discussed in Section 4.C.
- 8 **Approval of alternative technologies for achieving 4-log virus treatment at a ground water source.** DEQ has sufficient authority in its rules governing facility and design standards to require submittal of engineered plans and specifications demonstrating the effectiveness of alternative technologies. Due to current assessments of the ability of ultraviolet (UV) disinfection to inactivate certain types of pathogenic viruses, DEQ believes that this technology will have little applicability in the treatment of ground water due to cost. If the owner of a public drinking water – ground water system wishes to propose UV treatment as a compliance technology, their consulting engineer should refer to the Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule (see references on page 25), which will be the basis for any DEQ approval of this technology. Use of membranes to achieve all or part of the required 4-log treatment of viruses will be evaluated under DEQ’s plan and specification review process.
- 9 **Monitoring and compliance criteria for alternative technologies.** DEQ will develop protocols for compliance monitoring of alternative treatment technologies should owners of systems in Idaho submit plans and specifications for using these technologies for treatment of ground water sources. For UV disinfection, DEQ will use the EPA guidance manual specified in the previous paragraph to develop a compliance monitoring protocol.
- 10 **Monitoring, compliance, and membrane integrity testing requirements.** DEQ will require submittal of engineering plans and specifications that demonstrate the specific log removal capabilities for a given membrane technology. This will, in most cases, be drawn from manufacturer’s data regarding the absolute size characteristics of the membrane fibers. DEQ will require direct integrity testing

at least weekly for all banks of membranes, which dictates that a level of redundancy sufficient to allow this testing to occur under peak flow conditions is required. These requirements are specified in IDAPA 58.01.08.323.01 (see Appendix A for rule text).

11 Discontinuation of 4-log virus inactivation, removal, or a state-approved combination of these technologies. DEQ has used EPA guidance to determine the criteria that will be used to approve discontinuation of 4-log virus treatment at a public drinking water – ground water source. These criteria are in rule at IDAPA 58.01.08.323.02 and are repeated here for ease of reference. The owner of a system that is granted approval for discontinuation of treatment at a source will be subject to the triggered source water monitoring requirements of the Public Drinking Water – Ground Water Rule. The criteria are:

- Demonstration that any known source of contamination has been removed.
- Demonstration that structural deficiencies of the well have been rehabilitated and no longer exist.
- Evidence that the well is drawing from a protected or confined aquifer.
- Results of one (1) year of monthly monitoring for a fecal indicator organism during which no positive results occurred.

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References and Additional Resources

General Information

This guidance and other publications for public water systems are available on DEQ's Web site at www.deq.idaho.gov/water/prog_issues/drinking_water/information_pws.cfm. Copies may also be requested from regional DEQ or District Health Department offices.

EPA guidance and the text of the federal rule are available at the Ground Water Rule website: <http://www.epa.gov/safewater/disinfection/gwr/index.html>.

Technologies

The owner of a system considering technologies to use in place of, or in combination with, chlorine disinfection for achieving 4-log treatment of viruses at a ground water source may be interested in the following publications. These may be obtained at www.epa.gov/safewater/disinfection/lt2/compliance.html.

Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule, EPA 815-R-06-007, November 2006

Membrane Filtration Guidance Manual, EPA 815-R-06-009, November 2005

Demonstration of Disinfection Effectiveness

An easily understandable discussion of CT calculation procedures may be found in the *LT1ESWTR Disinfection Profiling and Benchmarking Technical Guidance Manual, EPA 816-R-03-004, May 2003* available from the Internet at <http://www.epa.gov/safewater/mdbp/lt1eswtr.html>.

Owners of water systems that do not have Internet access may request copies of the listed EPA publications from the National Safe Drinking Water Hotline at (800) 426-4791. DEQ publications may be requested from Regional DEQ Offices or Health Districts.

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Appendix A—Selected Excerpts from *Idaho Rules for Public Drinking Water Systems*

Note: These excerpts are for general information only. The full text of the rules should be consulted. An official copy may be downloaded from:

<http://adm.idaho.gov/adminrules/rules/idapa58/58index.htm>

Sanitary Surveys

303. SANITARY SURVEYS FOR PUBLIC WATER SYSTEMS USING GROUND WATER. The Department shall conduct a sanitary survey of all public water systems that use ground water.

01. Frequency. For non-community water systems, a sanitary survey shall be conducted every five (5) years. For community water systems, a sanitary survey shall be conducted every three (3) years, except as provided below.

a. A community water system may have a sanitary survey conducted every five (5) years if the system provides at least a 4-log treatment of viruses (using inactivation, removal, or a Department approved combination of 4-log inactivation and removal) before or at the first customer for all of its ground water sources.

b. A community water system may have a sanitary survey conducted every five (5) years if it has an outstanding performance record, as determined by the Department and documented in previous sanitary surveys, and has no history of Total Coliform Rule MCL or monitoring violations under Subsection 100.01.a. since the last sanitary survey.

02. Report. A report describing the results of the sanitary survey shall be provided to the water system.

a. As part of the sanitary survey report or as an independent action, the Department shall provide written notice to the water system describing any significant deficiency within thirty (30) days after the Department identifies the significant deficiency. The notice may specify corrective actions and deadlines for completion of corrective actions.

b. The Department may, at its discretion, provide this written notice at the time of the sanitary survey.

03. Significant Deficiencies. For each of the eight (8) elements of a sanitary survey of a ground water system, the following deficiencies shall in all cases be considered significant for the purposes of the notice required in Subsection 303.02. Decisions about the significance of other deficiencies identified during the sanitary survey shall be at the Department's discretion, as indicated in the Department's sanitary survey protocol.

a. Source: Lack of a sanitary well cap as specified in Subsection 511.06.b.

b. Treatment: Chemical addition is not flow proportioned or lacks emergency shut-off, as specified in Subsection 531.02.b.ii.

c. Distribution system: No means for flushing dead end water mains, as specified in Subsection 542.09.

- d. Finished water storage: Roof leaking, as specified in Subsections 544.09. and 544.09.c.
- e. Pumps, pump facilities, and controls: No accessible check valve between pump and shut-off valve, as specified in Subsection 511.04.
- f. Monitoring, reporting, and data verification: Repeated failure to collect the required number and type of Total Coliform Rule samples during the most recent two (2) year period, as specified in Subsection 100.01.a.
- g. System management and operation: History of frequent depressurization in the distribution system in violation of Subsection 552.01.
- h. Operator compliance with state licensing requirements: Responsible charge operator is not licensed as required in Subsection 554.02.

04. Consultation with the Department. Public water systems shall consult with the Department prior to taking specific corrective actions in response to significant deficiencies identified during a sanitary survey, unless such corrective actions are specified in detail by the Department in its written notification under Subsection 303.02.

05. Violation. Failure to address significant deficiencies identified in a sanitary survey that are within the control of the public water system and its governing body shall constitute a violation of these rules.

Incorporation of the Federal Ground Water Rule and Associated Requirements

323. GROUND WATER RULE. 40 CFR 141, Subpart S, revised as of July 1, 2007, is herein incorporated by reference. “Implementation Guidance for the Ground Water Rule,” as referenced in Section 002, provides assistance to public water system owners and operators in understanding and achieving compliance with the requirements of 40 CFR 141, Subpart S.

01. Monitoring and Compliance Requirements for Membranes. Ground water systems that use membrane filtration (or a combination of membrane filtration and disinfection) to achieve a 4-log inactivation/removal of viruses at a ground water source must comply with the following requirements in addition to those specified in 40 CFR 141, Subpart S.

a. All membrane skids or modules must undergo direct integrity testing—a minimum of once each week that the source is contributing water to the distribution system. More frequent direct integrity testing may be required by the Department. Membrane systems shall contain sufficient redundancy to allow for offline direct integrity testing of all skids—at the required interval while retaining the capability to supply peak hour demand to the water system. No membrane system shall have fewer than two skids or modules.

i. The direct integrity test shall have a resolution capable of detecting a response at the absolute molecular weight cut-off or other parameter that describes the exclusion capability of the membrane, as provided by the manufacturer.

ii. The direct integrity test shall have a sensitivity capable of verifying 4-log virus removal (or a lesser Department approved log removal that achieves, in combination with disinfection, a total of 4-log virus treatment).

b. Systems using membrane filtration shall submit a monthly operating report which includes the following information.

- i. Verification of direct integrity testing of each membrane skid or module and action taken in response to a failure of the direct integrity test.
- ii. Records of any monitoring conducted for the purpose of indirect integrity verification.
- iii. Any additional information considered necessary by the Department on a case-specific basis to verify proper operation and maintenance of the membrane filtration process.

02. Discontinuation of Treatment. Systems that wish to discontinue 4-log virus treatment at a ground water source must meet the following criteria. Ground water sources on which treatment has been discontinued shall be subject to the triggered source water monitoring requirements of 40 CFR 141, Subpart S.

- a. Demonstration that any known source of contamination has been removed.
- b. Demonstration that structural deficiencies of the well have been rehabilitated and no longer exist.
- c. Provide evidence that the well is drawing from a protected or confined aquifer.
- d. Submit results of one (1) year of monthly monitoring for a fecal indicator organism during which no positive results occurred.

03. Chlorine Purging Prior to Triggered Source Sampling. 40 CFR 141.402(e), incorporated by reference into these rules at Section 323, requires that ground water source samples be collected at a location prior to any treatment. Pursuant to this requirement, systems that add chlorine to a source, either in the well bore or near enough to the wellhead that chlorinated water could backflow into the well, shall ensure that all chlorine residual has been purged prior to taking a triggered source water sample. This shall be accomplished by measuring chlorine residual in the source water until a reading of zero is obtained and recorded in the space provided for chlorine residual on the sample submittal form

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Appendix B—Analytical Methods

Analysis of source water samples must be performed by certified drinking water laboratories. The fecal indicator organism for triggered source water monitoring in Idaho is *E. coli*. Following are the analytical methods approved for use by certified labs.

Fecal Indicator	Methodology	Method Name
<i>E. coli</i>	Colilert	9223 B
	Colisure	9223 B
	Membrane Filter Method with MI Agar	EPA Method 1604
	m-ColiBlue24 Test	—
	E*Colite Test	—
	EC-MUG	9221 F
	NA-MUG	9222 G