

Part XXV
Groundwater

§2501 General Requirements and Applicability

A Scope.

These regulations constitute a primary drinking water regulation NNPDWR.

B. Applicability.

This part applies to all groundwater systems, which are defined as all public water systems that use groundwater, including consecutive systems receiving finished groundwater, except for public water systems that combine all of their groundwater with surface water or with groundwater under the direct influence of surface water prior to treatment under Part VIII of these regulations. For the purposes of this part, "ground water system" is defined as any public water system meeting this applicability statement.

C. General Requirements.

All groundwater systems must comply with the following requirements:

1. Sanitary survey information requirements for all groundwater systems as described in §303.
2. Microbial source water monitoring requirements for groundwater systems that do not treat all of their groundwater to at least 99.99% (4-log) treatment of viruses (using inactivation, removal, or an approved combination of 4-log virus inactivation and removal) before or at the first customer as described in §2503.
3. Treatment technique requirements, described in §2504, that apply to groundwater systems that have fecally contaminated source waters, as determined by source water monitoring conducted under §2503, or that have significant deficiencies that are identified by the Director. A groundwater system with fecally contaminated source water or with significant deficiencies subject to the treatment technique requirements of this part must implement one or more of the following corrective action options:
 - a. correct all significant deficiencies;
 - b. provide an alternate source of water;
 - c. eliminate the source of contamination; or
 - d. provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or an approved combination of 4-log virus inactivation and removal) before or at the first customer.
4. Groundwater systems that provide at least 4-log treatment of viruses (using inactivation, removal, or an approved combination of 4-log virus inactivation and removal) before or at the first customer are required to conduct compliance monitoring to demonstrate treatment effectiveness, as described in §2503(B).
5. If requested by the Director, groundwater systems must provide the Director with any existing information that will enable the Director to perform a hydrogeologic sensitivity assessment. For the purposes of this part, "hydrogeologic sensitivity assessment" is a determination of whether groundwater systems obtain water from hydrogeologically sensitive settings.

D. Compliance date.

Unless otherwise noted, groundwater systems must comply with the requirements of this part beginning July 8, 2010.

§2502 Sanitary Surveys for Groundwater Systems.

- A. Groundwater systems must provide the Director, at the Director's request, any existing information that will enable the PWSSP to conduct a sanitary survey as prescribed in § 300.
- B. For the purposes of this subpart, a "sanitary survey," as conducted by the PWSSP, includes but is not limited to, an onsite review of the water source(s) (identifying sources of contamination by using results of source water assessments or other relevant information where available), facilities, equipment, operation, maintenance, and monitoring compliance of a public water system to evaluate the adequacy of the system, its sources and operations and the distribution of safe drinking water.

- C. The sanitary survey must include an evaluation of the applicable components listed below:
1. Source;
 2. Treatment;
 3. Distribution system;
 4. Finished water storage;
 5. Pumps, pump facilities, and controls;
 6. Monitoring, reporting, and data verification;
 7. System management and operation; and
 8. Operator compliance with PWSSP requirements.

§2503 Groundwater Source Microbial Monitoring and Analytical Methods.

A. Triggered Source Water Monitoring.

1. General requirements

A groundwater system must conduct triggered source water monitoring if the conditions identified in paragraphs (A)(1)(a) and (A)(1)(b) of this section exist.

- a. The system does not provide at least 4-log treatment of viruses (using inactivation, removal, or an approved combination of 4-log virus inactivation and removal) before or at the first customer for each groundwater source; and
- b. The system is notified that a sample collected under §404(A) is total coliform-positive and the sample is not invalidated under §404(D).

2. Sampling Requirements.

A groundwater system must collect, within 24 hours of notification of the total coliform-positive sample, at least one groundwater source sample from each groundwater source in use at the time the total coliform-positive sample was collected under §404(A), except as provided in paragraph (A)(2)(b) of this section.

- a. The Director may extend the 24-hour time limit, on a case-by-case basis, if the system cannot collect the groundwater source water sample within 24 hours due to circumstances beyond its control. In the case of an extension, the Director must specify how much time the system has to collect the sample.
- b. If approved by the Director, systems with more than one groundwater source may meet the requirements of this paragraph (A)(2) by sampling a representative groundwater source or sources. If required by the Director, systems must submit for Director approval a triggered source water monitoring plan that identifies one or more groundwater sources that are representative of each monitoring site in the system's sample siting plan under §404(A) and that the system intends to use for representative sampling under this paragraph (A)(2).
- c. A groundwater system serving 1,000 people or fewer may use a repeat sample collected from a groundwater source to meet both the requirements of §404(B) and to satisfy the monitoring requirements of paragraph (A)(2) of this section for that groundwater source only if the Director approves the use of *E. coli* as a fecal indicator for source water monitoring under subsection (A) of this section. If the repeat sample collected from the groundwater source is *E. coli* positive, the system must comply with paragraph (A)(3) of this section.

3. Additional Requirements.

If the Director does not require corrective action under §2504(A)(2) for a fecal indicator-positive source water sample collected under paragraph (A)(2) of this section that is not invalidated under (D) of this section, the system must collect five additional source water samples from the same source within 24 hours of being notified of the fecal indicator-positive sample.

4. Consecutive and Wholesale Systems.

- a. In addition to the other requirements of this subsection (A), a consecutive groundwater system that has a total coliform-positive sample collected under §404(A) must notify the wholesale system(s) within 24 hours of being notified of the total coliform sample.
- b. In addition to the other requirements of subsection (A) of this section, a wholesale groundwater system must comply with paragraphs (A)(4)(b)(i) and (A)(4)(b)(ii) of this section.

- i. A wholesale groundwater system that receives notice from a consecutive system it serves that a sample collected under §404(A) is total coliform-positive must, within 24 hours of being notified, collect a sample from its groundwater source(s) under paragraph (A)(2) of this section and analyze it for a fecal indicator under subsection (C) of this section.
- ii. If the sample collected under paragraph (A)(4)(b)(i) of this section is fecal indicator-positive, the wholesale groundwater system must notify all consecutive systems served by that groundwater source of the fecal indicator source water positive within 24 hours of being notified of the groundwater source sample monitoring result and must meet the requirements of paragraph (A)(3) of this section.

5. Exceptions to the Triggered Source Water Monitoring Requirements.

A groundwater system is not required to comply with the source water monitoring requirements of subsection (A) of this section if either of the following conditions exists:

- a. The Director determines, and documents in writing, that the total coliform-positive sample collected under §404(A) is caused by a distribution system deficiency; or
- b. The total coliform-positive sample collected under §404(A) is collected at a location that meets Director-approved criteria for distribution system conditions that will cause total coliform-positive samples.

B. Assessment Source Water Monitoring.

If required by the Director, groundwater systems must conduct assessment source water monitoring that meets Director-determined requirements for such monitoring. A groundwater system conducting assessment source water monitoring may use a triggered source water sample collected under paragraph (A)(2) of this section to meet the requirements of this subsection (B). Assessment source water monitoring requirements may include:

1. Collection of a total of 12 groundwater source samples that represent each month the system provides groundwater to the public,
2. Collection of samples from each well unless the system obtains written Director approval to conduct monitoring at one or more wells within the groundwater system that are representative of multiple wells used by that system and that draw water from the same hydrogeologic setting,
3. Collection of a standard sample volume of at least 100 mL for fecal indicator analysis regardless of the fecal indicator or analytical method used,
4. Analysis of all groundwater source samples using one of the analytical methods listed in paragraph (C)(2) of this section for the presence of *E. coli*, enterococci, or coliphage,
5. Collection of groundwater source samples at a location prior to any treatment of the groundwater source unless the Director approves a sampling location after treatment, and
6. Collection of groundwater source samples at the well itself unless the system's configuration does not allow for sampling at the well itself and the Director approves an alternate sampling location that is representative of the water quality of that well.

C. Analytical Methods.

1. A groundwater system subject to the source water monitoring requirement of subsection (A) of this section must collect a standard sample volume of at least 100mL for fecal indicator analysis regardless of the fecal indicator or analytical method used.
2. A groundwater system must analyze all groundwater sources samples collected under subsection (A) of this section using one of the analytical methods listed in Appendix H for the presence of *E. coli*, enterococci, or coliphage.

D. Invalidation of a Fecal Indicator-Positive Groundwater Source Sample.

1. A groundwater system may obtain Director invalidation of a fecal indicator-positive groundwater source sample collected under subsection (A) of this section only under the conditions specified in paragraphs (D)(1)(a) and (b) of this section.

- a. The system provides the Director with written notice from the laboratory that improper sample analysis occurred; or
 - b. The Director determines and documents in writing that there is substantial evidence that a fecal indicator-positive groundwater source sample is not related to source water quality.
2. If the Director invalidates a fecal indicator-positive groundwater source sample, the groundwater system must collect another source water sample under subsection (A) of this section within 24 hours of being notified by the Director of its invalidation decision and have it analyzed for the same fecal indicator using the analytical methods in Appendix H of these regulations. The Director 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 Director must specify how much time the system has to collect the sample.

E. Sampling Location.

1. Any groundwater source sample required under subsection (A) of this section must be collected at a location prior to any treatment of the groundwater source unless the Director approves a sampling location after treatment.
2. If the system's configuration does not allow for sampling at the well itself, the system may collect a sample at a Director-approved location to meet the requirements of subsection (A) of this section if the sample is representative of the water quality of that well.

F. New Sources.

If required by the Director, a groundwater system that places a new groundwater source into service after November 30, 2009, must conduct assessment source water monitoring under subsection (B) of this section. If required by the Director, the system must begin monitoring before the groundwater source is used to provide water to the public.

G. Public Notification.

A groundwater system with a groundwater source sample collected under subsection (A) or (B) of this section that is fecal indicator-positive and that is not invalidated under subsection (D) of this section, including consecutive systems served by the groundwater source, must conduct public notification under §603.

H. Monitoring Violations.

Failure to meet the requirements of subsections (A)-(F) of this section is a monitoring violation and requires the groundwater system to provide public notification under §605.

§2504 Treatment Technique Requirements for Groundwater Systems

A. Groundwater Systems with Significant Deficiencies or Source Water Fecal Contamination.

1. The treatment technique requirements of this section must be met by groundwater systems when a significant deficiency is identified or when a groundwater source sample collected under §2503(A)(3) is fecal indicator-positive.
2. If required by the Director, a groundwater system with a groundwater source sample collected under §2503(A)(2), §2503(A)(4), or §2503(B) that is fecal indicator-positive must comply with the treatment technique requirements of this section.
3. When a significant deficiency is identified at a Part 800 public water system that uses both groundwater and surface water or groundwater under the direct influence of surface water, the system must comply with the provisions of this paragraph except in cases where the Director determines that the significant deficiency is in a portion of the distribution system that is served solely by surface water or groundwater under the direct influence of surface water.
4. Unless the Director requires the groundwater system to implement a specific corrective action, the groundwater system must consult with the Director regarding the appropriate corrective action within 30 days of receiving written notice from the Director of a significant deficiency, written notice from a laboratory that a groundwater source sample collected under §2503(A)(3) was found to be fecal indicator-positive, or written notice from the Director that a fecal indicator-positive collected under §2503(A)(2), §2503(A)(4), or §2503(B) requires corrective action. For the purposes of this part,

significant deficiencies include, but are not limited to, defects in design, operation, or maintenance, or failure or malfunction of the sources, treatment, storage, or distribution system that the Director determines to be causing, or have potential for causing, the introduction of contamination into the water delivered to consumers.

5. Within 120 days (or earlier if required by the Director) of receiving written notification from the Director of a significant deficiency, written notice from a laboratory that a groundwater source sample collected under §2503(A)(3) was found to be fecal indicator-positive, or written notice from the Director that a fecal indicator-positive sample collected under §2503(A)(2), §2503(A)(4), or §2503(B) requires corrective action, the groundwater system must either:
 - a. Have completed corrective action in accordance with applicable PWSSP plan review processes or other guidance or direction, if any, including Director-specified interim measures; or
 - b. Be in compliance with a Director-approved corrective action plan and schedule subject to the conditions specified in (A)(5)(b)(i) and (A)(5)(b)(ii) of this section.
 - i. Any subsequent modifications to an approved corrective action plan and schedule must also be approved by the Director.
 - ii. If the Director specifies interim measures for protection of the public health pending Director-approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system must comply with these interim measures as well as with any schedule specified by the Director.

6. Corrective Action Alternatives.

Groundwater systems that meet the conditions of paragraph (A)(1) or (A)(2) of this section must implement one or more of the following corrective action alternatives:

- a. Correct all significant deficiencies;
 - b. Provide an alternate source of water;
 - c. Eliminate the source of contamination; or
 - d. Provide treatment that reliably achieves at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source.
7. Special Notice to the Public of Significant Deficiencies or Source Water Fecal Contamination.
- a. In addition to the applicable public notification requirements of §2503, a community groundwater system that receives notice from the Director of a significant deficiency or notification of a fecal indicator-positive groundwater source sample that is not invalidated by the Director under §2503(D) must inform the public served by the water system under §1204(H)(6) of the fecal indicator-positive source sample or of any significant deficiency that has not been corrected. The system must continue to inform the public annually until the significant deficiency is corrected or the fecal contamination in the groundwater source is determined by the Director to be corrected under paragraph (A)(5) of this section.
 - b. In addition to the applicable public notification requirements of §603, a non-community groundwater system that receives notice from the Director of a significant deficiency must inform the public served by the water system in a manner approved by the Director of any significant deficiency that has not been corrected within 12 months of being notified by the Director, or earlier if required by the Director. The system must continue to inform the public annually until the significant deficiency is corrected. The information must include:
 - i. The nature of the significant deficiency and the date the significant deficiency was identified by the Director;
 - ii. The Director-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim

measures completed; and

iii. For systems with a large proportion of non-English speaking consumers, as determined by the Director, 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.

c. If required by the Director, a non-community water system with significant deficiencies that have been corrected must inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction under paragraph (A)(7)(b) of this section.

B. Compliance Monitoring.

1. Existing Groundwater Sources.

A groundwater system that is not required to meet the source water monitoring requirements of this part for any groundwater source because it provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for any groundwater source before the compliance date of this part, must notify the Director in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the specified groundwater source and being compliance monitoring in accordance with paragraph (B)(3) of this section by the compliance date for this part. Notification to the Director must include engineering, operational, or other information that the Director requests to evaluate the submission. If the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source, the system must conduct groundwater source monitoring as required under §2503.

2. New Groundwater Sources.

A groundwater system that places a groundwater source in service on or after the compliance date for this part that is not required to meet the source water monitoring requirements of this part because the system provides at least 4-log treatment of viruses (using inactivation, removal, or a Director approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source must comply with the requirements of paragraphs (B)(2)(a), (B)(2)(b), and (B)(2)(C) of this section.

a. The system must notify the Director in writing that it provides at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source. Notification to the Director must include engineering, operational, or other information that the Director requests to evaluate the submission.

b. The system must conduct compliance monitoring as required under §2504(B)(3) of this part within 30 days of placing the source in service.

c. The system must conduct groundwater source monitoring under §2503 if the system subsequently discontinues 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for the groundwater source.

3. Monitoring Requirements.

A groundwater system subject to the requirements of subsection (A) or paragraph (B)(1) or (B)(2) of this section must monitor the effectiveness and reliability of treatment for that groundwater source before or at the first customer as follows:

a. Chemical Disinfection

i. Groundwater systems serving more than 3,300 people.

A groundwater system that serves more than 3,300 people must continuously monitor the residual disinfectant concentration using analytical methods specified in Appendix D, §801-D (A)(2) at a location approved by the Director and must record the lowest residual disinfectant concentration each

day that water from the groundwater source is served to the public. The groundwater system must maintain the Director-determined residual disinfectant concentration every day the groundwater system serves water from the groundwater source to the public. If there is a failure in the continuous monitoring equipment, the groundwater system must conduct grab sampling every four hours until the continuous monitoring equipment is returned to service. The system must resume continuous residual disinfectant monitoring within 14 days.

- ii. Groundwater systems serving 3,300 or fewer people.

A groundwater system that serves 3,300 or fewer people must monitor the residual disinfectant concentration using analytical methods specified in Appendix D, §801-D (A)(2) at a location approved by the Director and record the residual disinfection concentration each day that water from the groundwater source is served to the public. The groundwater system must maintain the Director-determined residual disinfectant concentration every day the groundwater system serves water from the groundwater source to the public. The groundwater system must take a daily grab sample during the hour of peak flow or at another time specified by the Director. If any daily grab sample measurement falls below the Director-determined residual disinfectant concentration, the groundwater system must take follow-up samples every four hours until the residual disinfectant concentration is restored to the Director-determined level. Alternatively, a groundwater system that serves 3,300 or fewer people may monitor continuously and meet the requirements of paragraph (B)(3)(a)(i) of this section.

b. Membrane Filtration

A groundwater system that uses membrane filtration to meet the requirements of this part must monitor the membrane filtration process in accordance with all Director-specified monitoring requirements and must operate the membrane filtration in accordance with all Director-specified compliance requirements. A groundwater system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when:

- i. The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses;
- ii. The membrane process is operated in accordance with Director-specified compliance requirements; and
- iii. The integrity of the membrane is intact.

c. Alternative Treatment

A groundwater system that uses a Director-approved alternative treatment to meet the requirements of this part by providing at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer must:

- i. Monitor the alternative treatment in accordance with all Director-specified monitoring requirements; and
- ii. Operate the alternative treatment in accordance with all compliance requirements that the Director determines to be necessary to achieve at least 4-log treatment of viruses.

C. Discontinuing Treatment

A groundwater system may discontinue 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source if the Director determines and documents in writing that 4-log treatment of viruses is no longer necessary for that groundwater source. A system that discontinues 4-log treatment of viruses is subject to the source water monitoring and analytical methods requirements of §2503.

- D. Failure to meet the monitoring requirements of subsection (B) of this section is a monitoring violation and requires the groundwater system to provide public notification under §605.

§2505 Treatment Technique Violations for Groundwater Systems

- A. A groundwater system with a significant deficiency is in violation of the treatment technique requirement if, within 120 days (or earlier if required by the Director) of receiving written notice from the Director of the significant deficiency, the system:
1. Does not complete corrective action in accordance with any applicable PWSSP plan review processes or other guidance and direction, including Director-specified interim actions and measures, or
 2. Is not in compliance with a Director-approved corrective action plan and schedule.
- B. Unless the Director invalidates a fecal indicator-positive groundwater source sample under §2503(D), a groundwater system is in violation of the treatment technique requirement if, within 120 days (or earlier if required by the Director) of meeting the conditions of §2504(A)(1) or §2504(A)(2), the system:
1. Does not complete corrective action in accordance with any applicable PWSSP plan review processes or other guidance and direction, including Director-specified interim measures, or
 2. Is not in compliance with a Director-approved corrective action plan and schedule.
- C. A groundwater system subject to the requirements of §2504(B)(3) that fails to maintain at least 4-log treatment of viruses (using inactivation, removal, or a Director-approved combination of 4-log virus inactivation and removal) before or at the first customer for a groundwater source is in violation of the treatment technique requirement if the failure is not corrected within four hours of determining the system is not maintaining at least 4-log treatment of viruses before or at the first customer.
- D. Groundwater systems must give public notification under §604 for the treatment technique violations specified in subsections (A), (B) and (C) of this section.

§2506 Reporting and Recordkeeping for Groundwater Systems

A. Reporting.

In addition to the requirements of §502, a groundwater system regulated under this part must provide the following information to the Director:

1. A groundwater system conducting compliance monitoring under §2504(B) must notify the Director any time the system fails to meet any Director-specified requirements including, but not limited to, minimum residual disinfectant concentration, membrane operating criteria or membrane integrity, and alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within four hours. The groundwater system must notify the Director as soon as possible, but in no case later than the end of the next business day.
2. After completing any corrective action under §2504(A), a groundwater system must notify the Director within 30 days of completion of the corrective action.
3. If a groundwater system subject to the requirements of §2503(A) does not conduct source water monitoring under §2503(A)(5)(b), the system must provide documentation to the Director within 30 days of the total coliform positive sample that it met the Director-specified criteria.

B. Recordkeeping.

In addition to the requirements of §503, a groundwater system regulated under this part must maintain the following information in its records:

1. Documentation of corrective actions. Documentation shall be kept for a period of not less than 10 years.
2. Documentation of notice to the public as required under §2504(A)(7). Documentation shall be kept for a period of not less than three years.
3. Records of decisions under §2504(A)(5)(b) and records of invalidation of fecal indicator-positive groundwater source samples under §2503(D). Documentation shall be kept for a period of not less than five years.
4. For consecutive systems, documentation of notification to the wholesale system(s) of total-coliform positive samples that are not invalidated under §404 (D). Documentation

shall be kept for a period of not less than five years.

5. For systems, including wholesale systems, that are required to perform compliance monitoring under §2504(B):
 - a. Records of the Director-specified minimum disinfectant residual. Documentation shall be kept for a period of not less than ten years.
 - b. Records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the Director-prescribed minimum residual disinfectant concentration for a period of more than four hours. Documentation shall be kept for a period of not less than five years.
 - c. Records of Director-specified compliance requirements for membrane filtration and of parameters specified by the Director for Director-approved alternative treatment and records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements for more than four hours. Documentation shall be kept for a period of not less than five years.