

CHAPTER

9

Ground Water Rule (GWR)

The U.S. Environmental Protection Agency (EPA) published the Ground Water Rule (GWR) on November 8, 2006. One goal of the GWR is to provide increased protection against microbial pathogens, specifically bacterial and viral pathogens, in public water systems that use ground water. Instead of requiring enhanced disinfection for all ground water systems (GWSs), the GWR establishes a risk-targeted approach to identifying GWSs that are susceptible to fecal contamination. The GWR requires systems at risk of microbial contamination to take corrective action to protect consumers from harmful bacteria and viruses.

Illinois EPA Assistance

If a CWS is unsure of its requirements as described in this Chapter or in any Illinois EPA notification, it is very important that the CWS contact the Drinking Water Compliance Unit at 217/785-0561 for clarification. All GWR correspondence should be sent to:

GWR Coordinator
Illinois EPA /BOW/CAS #19
P.O. Box 19276
Springfield, IL 62794-9276
Telephone: 217-785-0561
Fax 217-557-1407

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Ground Water Rule (GWR) Applicability

The GWR applies to all public water systems (PWSs) that:

- Rely entirely on one or more ground water source;
- are consecutive systems receiving ground water;
- mix surface and ground water, where ground water is added directly to the distribution system and delivered to consumers without treatment equivalent to the treatment provided for surface water.

Basic Requirements of the GWR

The basic requirements of the GWR include:

- Source water monitoring.
- Sanitary surveys.
- Compliance monitoring.
- Corrective actions.

Sanitary surveys are primarily the responsibility of the Illinois EPA, while ground water systems (GWSs) are responsible for the other requirements.

The remainder of this chapter of the Handbook will briefly describe the four GWR requirements.

Source Water Evaluation

The Illinois EPA has selected *E. coli* as the fecal indicator to detect microbial contamination in the raw source. GWSs have already been required to monitor every active (primary, back-up, or emergency) well each month for both total coliform and *E. coli*.

Based on the well integrity, the monthly sample results, and other hydrogeological reviews, the Illinois EPA has classified each well as either:

- a “**non-vulnerable**” source to microbial contamination (free of contamination),
- a “**vulnerable**” source to microbial contamination (confirmed *E. coli* and/or total coliform detections or other noted well defect/hydrogeological issues that may lead to microbial contamination);
- or “**under review**” (data is still being collected to make a determination).

This well classification is an on-going process and wells are re-evaluated each month as new sample data is collected.

Triggered Source Water Monitoring (TSWM) Special Exceptions Permit (SEP)

One requirement of the GWR is triggered source water monitoring (TSWM). This is required for a GWS (which does not provide 99.99 percent, 4-Log, inactivation or removal of viruses) that has a positive sample during the system's distribution Total Coliform Rule (TCR) monitoring. In brief, when a GWS is notified that a total coliform distribution sample collected under the TCR is positive, the water system must collect at least one source water sample for Escherichia coli (E. coli) from each ground water source (well) within 24 hours. If the TSWM sample is positive for E. coli, a treatment technique violation is issued and a Tier 1 public notice is required. Please note that this is in addition to the repeat requirement under the TCR rule.

TSWM monitoring may be waived by the Illinois EPA via a Special Exceptions Permit (SEP) if it is determined that the positive distribution sample was caused by a distribution system deficiency and not a contaminated source/well.

As mentioned, the majority of wells have been classified as a “**non-vulnerable**” source to microbial contamination. If all the active wells for a GWS are deemed “**non-vulnerable**”, the Illinois EPA will issue the GWS a **TSWM SEP**.

Summary of SWTM SEP

If a GWS has been issued a TSWM SEP, they will not be required to conduct TSWM. If a GWS does not qualify for a TSWM SEP or a TSWM SEP is revoked, the GWS must conduct TSWM when the GWS has a positive sample during the system's distribution Total Coliform Rule (TCR) monitoring.

Please call the GWR Coordinator at 217-785-0561 with any questions concerning the TSWM SEP status for your system.

Triggered Source Water Monitoring (TSWM) Requirements

The requirements described below are not applicable to those GWS that have been issued a TSWM SEP (see above).

Once the GWS is notified of a positive routine distribution total coliform sample from their laboratory or the Illinois EPA, in addition to the distribution repeat monitoring requirements, the GWS has 24-hours to collect at least one ground water source (raw) sample from EACH active source (well). This 24-hour source (well) sample is referred to as a “**triggered source water sample**”.

The 24-hour notification “start clock” begins with the telephone call from your coliform laboratory or the Illinois EPA (or notification from a satellite system of a distribution positive sample).

The Illinois EPA Recommends.....

That every PWS keep an extra supply of coliform bottles on hand in the event of unexpected monitoring. This will ensure 24-hour sampling requirements are met. If extra bottles are needed, please contact your laboratory to place an order for extra bottles.

If there are **multiple total coliform positive samples in the distribution system** then an equal number of source water samples must be collected from each source. The intent of the GWR is to identify contamination of the source. Multiple TC+ in the distribution system means more triggered samples are collected, which means a better body of data is available on the quality of that source. Again, only those sources (wells) in operation at the time of the distribution monitoring need to be sampled.

Example

A GWS with two wells takes 4 total distribution coliform samples each month for the TCR. If three of those samples are total coliform positive, the system would be required (within 24 hours) to take three fecal indicator samples at each well or a total of 6 source samples (and 9 repeat distribution samples per the TCR rule). The three well samples from each of the two wells can be collected one right after another.

If a GWS feels that for circumstances out of its control they cannot collect the initial triggered source water samples **within 24 hours**, the GWS must call the Illinois EPA Total Coliform Rule (or GWR) Coordinator at 217-785-0561 or their local Regional Illinois EPA Office and request a time extension. **This request must be made and granted prior to initial 24 hour due date and not after the fact.**

GWSs serving fewer than 1,000 people that have a total coliform-positive result under the TCR may use the TSWM sample collected from the ground water source to meet both the triggered source water monitoring requirement of the GWR as well as part of the repeat sampling requirement of the TCR (i.e., well sample will count for one of the four repeats).

GWSs providing at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a state-approved combination of inactivation and removal) of all of their ground water are not required to conduct triggered source water monitoring. Those systems are, however, required to conduct compliance monitoring to show they are providing consistent and sufficient treatment. **Compliance Monitoring** is discussed later in this Chapter.

Post Triggered Source Water Monitoring (TSWM)

If any of the TSWM well samples are positive for *E. coli*, the Illinois EPA will require the system to take corrective action or require that the GWS take five **additional samples** from the same source within 24 hours of notification of the *E. coli* indicator-positive result. If any of the five additional samples are *E. coli*-positive, the system must take corrective actions.

It is recommended that the GWS sample collector contact the GWR coordinator at 217-785-0561 ASAP following a positive TSWM sample for further instructions/discussions.

Triggered Source Water Monitoring (TSWM) and Public Notification (PN)

If a GWS is notified of **E. coli positive** ground water source sample (either the initial TSWM sample or any one of the five additional samples required by a positive triggered TSWM sample), then the GWS must issue a Tier 1 public notice within 24 hours. See *Chapter 1 Public Notice* of this Handbook for requirements and template.

Failure to collect TSWM samples discussed under this section within the 24 hours will result in a monitoring violation and require a Tier 3 PN. See *Chapter 1 Public Notice* of this Handbook for requirements and template.

Triggered Source Water Monitoring (TSWM) Requirements for Water Systems that Purchase Ground Water and their Parent Supply

Parent GWS (See Appendix A for Example)

The following requirements are for those GWS systems that do not have a TSWM SEP (see page 9-4).

A parent/wholesale GWS that receives notice from a consecutive system of a positive distribution total coliform result under routine monitoring of the TCR must follow all requirements listed under “Triggered Source Water Monitoring (TSWM) Requirements” on page 9-4.

If the TSWM is positive for **E. coli**, the parent/wholesale system must notify all consecutive systems served by that source within 24 hours of the positive sample result. The operator should document whom he notified at the purchase supplies as well as the telephone numbers, date, time, and a very brief description of the conversation/situation.

Purchase GWS (See Appendix B for Example)

A consecutive system with a positive routine total coliform result under the TCR must notify its wholesale/parent system(s) within 24 hours of being notified of the positive sample. The notification start clock begins with the telephone call from your coliform laboratory or the Illinois EPA. The operator should document whom he notified at the parent supply as well as the telephone number, date, time, and a very brief description of the conversation/situation. If the purchase GWS is notified by the parent GWS of an **E. coli** positive source sample, then the purchase GWS must issue a Tier 1 public notice within 24 hours.

Sanitary Surveys

A sanitary survey (or engineering evaluation) provides an on-site review of how a GWS is maintained and operated. The survey is conducted by trained Illinois EPA staff. The inspector will review the system's water source, equipment, facilities, and treatment procedures. The purpose of the survey is to:

- Ensure that the GWS' operational, monitoring, reporting, and recordkeeping practices are in compliance with drinking water regulations.
- Identify any significant deficiencies.
- Better ensure that safe drinking water is distributed to the public.

For more information regarding sanitary surveys, please see *Chapter 13 – Engineering Evaluations* of this Handbook.

Compliance Monitoring

Systems providing at least 99.99 percent (4-log) treatment of viruses (using inactivation, removal, or a state-approved combination of inactivation and removal) of all of their ground water must notify the Illinois EPA of this treatment and are not required to conduct triggered source water monitoring. Those systems are, however, required to conduct **compliance monitoring** to show they are providing consistent and sufficient treatment. Compliance monitoring requirements depend on the system's size and the type of treatment it is using. In addition, any GWS that is required to provide 4-log treatment of viruses as a corrective action must also conduct compliance monitoring to ensure that the 4-log treatment is functioning properly.

Those GWSs defined above that use chemical disinfection and **serve more than 3,300** people must continuously monitor their disinfectant concentration at a location approved by the Illinois EPA Agency and must record the lowest residual disinfectant concentration each day that water from the ground water source is served to the public. 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.

Those GWSs defined above that use chemical disinfection and **serve 3,300 people or fewer** must take daily grab samples at a location approved by the Illinois EPA and record the residual disinfection concentration each day that water from the ground water source is served to the public (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 Illinois EPA 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 Illinois EPA specified monitoring requirements and must operate the membrane filtration according to all Illinois EPA specified compliance requirements.

Systems may use alternative treatment technologies (e.g., ultraviolet [UV] radiation) approved by the Illinois EPA, 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 Illinois EPA specified monitoring requirements, and must operate the alternative treatment according to compliance requirements established by the Illinois EPA.

Systems with ground water sources placed into service after November 30, 2009, must notify the Illinois EPA in writing that they provide at least 4-log treatment of viruses of those sources and must begin compliance monitoring within 30 days of placing the source in service or conduct triggered source water monitoring as described earlier in this Chapter.

QUESTIONS?

Any questions concerning membrane filtration, alternative treatment technologies, 4-log treatment, and virus inactivation/removal can be answered by calling the Illinois EPA Permit Section at 217-782-9470.

Failure to conduct compliance monitoring as discussed under this section will result in a monitoring violation and require a Tier 3 PN. See *Chapter 1 Public Notice* of this Handbook for requirements and templates.

Corrective Actions

If corrective actions are required, you will be notified by the Illinois EPA via **Non-compliance Advisory (NCA)** or **Violation Notice (VN)**. You will then be required to respond in writing within 30 or 45 days and provide a plan and time specific schedule to achieve compliance.

GWSs must take corrective action if:

- A significant deficiency* is identified, or
- Source sample has tested positive for total coliform (confirmed detections over a two-month period of time) or a single *E. coli* contamination (confirmed), 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.

As a response to the VN or NCA, the GWS must commit to 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.

Violations (and Public Notice) Associated with the GWR

If a system is in violation of a GWR requirement, the GWS must notify the public. Below identifies GWR violations and public notice requirements.

Situation or Violation	Report to Illinois EPA	Notify Public ¹	Tier	PN Method
Source water monitoring sample fecal indicator-positive for E. coli, enterococci, or coliphage and not invalidated by the state	Within 24 hours	Within 24 hours	1	TV, hand-delivery, public postings, or other state-approved method (consult IEPA)
Failure to complete required corrective action	Within 48 hours	Within 30 days	2	Hand-delivery, direct mail, public postings, newspaper, or radio announcements
Failure to comply with a state-approved corrective action plan and schedule	Within 48 hours	Within 30 days	2	Hand-delivery, direct mail, public postings, newspaper, or radio announcements
For systems conducting compliance monitoring, failure to maintain 4-log treatment of viruses and restore 4-log treatment within 4 hours	Within 48 hours	Within 30 days	2	Hand-delivery, direct mail, public postings, newspaper, or radio announcements
Failure to conduct required source water monitoring (triggered, additional, or assessment)	Consult IEPA	Within 12 months	3	CCR
Failure to conduct required compliance monitoring	Consult IEPA	Within 12 months	3	CCR
Uncorrected significant deficiency	-	Annually	-	Special Notice
Unaddressed fecal contamination	-	Annually	-	Special Notice in CCR
1. Systems are required to send a copy of the PN to the state within 10 days of making the notification. 2. GWSs may use the Consumer Confidence Report (CCR) to make this notification if it meets the requirement to notify the public within 12 months.				

Please note: When a system has a ground water source with an E. coli positive sample, it is a situation and not a violation. In accordance with the GWR, the system must still meet the Tier 1 Public Notification (PN) requirements.

See *Chapter 1 Public Notice* of this Handbook for these requirements and templates.

CCR Requirements

GWSs 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 GWS requiring them to report additional information in their CCRs. Below are various situations or violations that require CCR notification:

- Fecal indicator-positive ground water source sample (consecutive systems served by the ground water source must also notify the public).
- Failure to take corrective action.
- Failure to maintain at least 4-log treatment of viruses.
- Failure to meet monitoring requirements.
- Uncorrected significant deficiency (systems must continue to notify the public annually until the significant deficiency has been corrected).
- Unaddressed fecal indicator-positive ground water source sample (systems must put a notice in the CCR annually until the positive source water sample has been addressed).

For detailed CCR requirements, see Chapter 2 Consumer Confidence Reports of this Handbook for detailed requirements and examples.