

Ground Water Rule Sample Collection and Transport: A Quick Reference Guide

Overview of the Rule

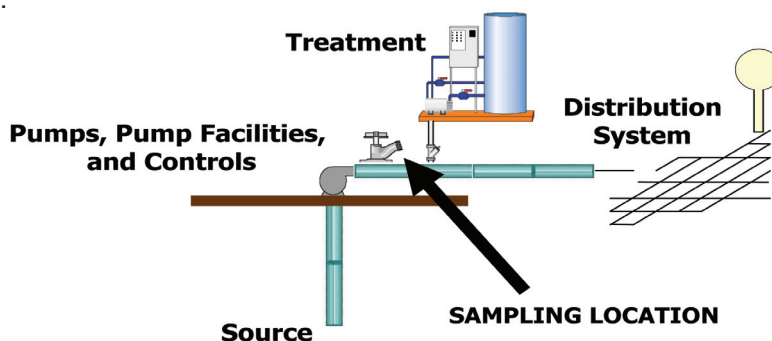
Title	Ground Water Rule (GWR) 71 FR 65574, November 8, 2006, Vol. 71, No. 216 Correction 71 FR 67427, November 21, 2006, Vol. 71, No. 224
Purpose	Reduce the risk of illness caused by microbial contamination in public ground water systems (GWSs).
General Description	The GWR establishes a risk-targeted approach to identify GWSs susceptible to fecal contamination and requires corrective action to correct significant deficiencies and address source water fecal contamination in all public GWSs.
Utilities Covered	The GWR applies to all public water systems (PWSs) that use ground water, including consecutive systems, except that it does not apply to PWSs that combine all of their ground water with surface water or with ground water under the direct influence of surface water prior to treatment.

GWR Situations Requiring Sample Collection and Transport

- ▶ The GWR requires that systems that do not provide 4-log treatment of viruses for all their ground water sources collect at least one source water sample after detection of total coliform in a routine Total Coliform Rule (TCR) (40 CFR 141.21) sample. These triggered source samples must be collected from ground water sources in use at the time of the TC positive. Samples must be collected within 24 hours unless the State allows an extension and the State will specify how long the extension is. Samples must be analyzed for the presence of one of three fecal indicators, ***E. coli***, **enterococci**, or **coliphage**. See *Ground Water Rule Triggered and Representative Monitoring: A Quick Reference Guide* (EPA 815-F-08-004) for more information.
- ▶ If a fecal indicator is found to be present in a triggered source sample and the State does not require corrective action, the GWR requires systems to collect five additional source water samples and analyze the samples for the presence of one of the three fecal indicators.
- ▶ Assessment source water monitoring may be required by the State for systems with sources that may be at risk for fecal contamination. Systems must meet State requirements for the number of samples collected and the analyses (*E. coli*, enterococci, coliphage) conducted.

Sampling Location

- ▶ For both triggered source water monitoring and assessment source water monitoring, samples must be collected at the ground water source **before treatment**, unless another location is approved by the State.
- ▶ GWSs should install a sample tap at each source to enable source water monitoring.
- ▶ The diagram below represents an appropriate sampling location for source water monitoring.



Sample Collection

Sample Containers

- ▶ Samples should be collected in sterile, plastic or glass containers with a leak-proof lid.
- ▶ The GWR requires GWSs conducting source water monitoring to analyze at least a **100-mL sample volume**.
 - However, EPA recommends that the GWS collect and ship more than 100-mL of sample to ensure that a minimum of 100 mL is available for analysis (see below).
- ▶ The sample containers should be large enough to allow at least **1-inch of headspace** to facilitate mixing of the sample by shaking prior to analysis.
- ▶ Sample volume and container size recommendations for samples of various types are provided below.

E. coli and Enterococci Samples

- ▶ **Sample volume:** At least **120 mL** of sample should be collected to ensure sufficient volume for sample analysis is available in the event of spillage at the laboratory.
- ▶ **Container Size:** The capacity of sample containers should allow at least a **1-inch headspace** to facilitate mixing of the sample by shaking prior to analysis.

Coliphage Samples

- ▶ **Sample volume:** If Method 1601 is used for coliphage sample analyses, either 100-mL or 1-L sample volumes may be analyzed (Method 1602 only accommodates 100-mL volumes).
 - While the minimum sample volume requirement for the GWR is 100 mL, systems may wish to collect and analyze a 1-L sample volume to increase the sensitivity of the Method 1601 analysis.
 - For all coliphage analyses, the GWS should collect **2.5 times** more of the sample than necessary (i.e., **250 mL** for 100 mL samples and **2.5 L** for 1 L samples) to allow for sample re-analysis, if necessary.*
- ▶ **Container size:** The capacity of sample containers should allow at least a 1-inch headspace to facilitate mixing of the sample by shaking prior to analysis.

* Alternatively, samples for male-specific and somatic coliphage analyses can be collected in separate containers.

Collection Procedures

Gloves and hand washing

- ▶ When collecting samples from a ground water source, individuals should wash their hands before collecting samples and if possible wear **gloves** (latex, etc.).

Records

- ▶ All samples taken should be recorded in an on-site **sample log book** or on a **sample collection form** if it is to be sent to a laboratory for analysis. Sample log books and sample collection forms should contain the following information:
 - Name of system (e.g., Public Water System Identification number)
 - Sample site location
 - Sample type (assessment, triggered)
 - Sampler's name
 - Sample number
 - Date of sample collection
 - Time of sample collection
 - Analysis requested

Water tap and service line

- ▶ **Water taps** used for sampling should be free of aerators, bubblers, strainers, hose attachments, mixing type faucets, and purification devices. The flow of water out of the tap should be adjusted so the water will not splash out when the sample is collected. The tap should be cleaned and flushed.
- ▶ The **service line** should be cleared before sampling by maintaining a steady water flow for at least two minutes (or until the water changes temperature).

Collecting samples

- ▶ Using **aseptic technique** (i.e., sanitize tap, do not touch the inside of the sample container), the individual taking the sample should fill the sample containers, leaving at least 1-inch of headspace.

Cap and label the container

- ▶ Immediately following sample collection, the sampler should tighten the sample container lid.
- ▶ The system name, sampler's name, sample number, sample type, date and time of sample collection, sample location, and analysis requested should be recorded on the sample container.
- ▶ **IMPORTANT:** If the sample will not be shipped off-site for analysis immediately, the sample should be placed upright in a refrigerator to maintain the sample at a temperature of $< 8^{\circ}\text{C}$ prior to shipment. If a refrigerator is unavailable, the sample should be insulated in some other manner to keep it cool.

Sample Collection

Sample Containers

Packaging	<ul style="list-style-type: none">▶ If the samples will be analyzed at a laboratory that is off-site, the water system should contact the laboratory as soon as possible (preferably prior to sampling) so that the laboratory can be prepared with the appropriate media.▶ As soon as the sample has been collected, labeled and capped, the sample should be packaged in a shipping cooler or foam box that is used exclusively for this purpose.<ul style="list-style-type: none">■ The cooler should be double lined with plastic (i.e., with trash bags) and contain ice (wet ice in ziplock bags, gel packs, or blue ice). The GWR recommends keeping samples below 10°C.▶ The signed and dated sample collection form should be included with the sample.▶ The lid of the cooler should be securely sealed and the joints of the container should be sealed with duct tape.▶ If the package is being shipped, a copy of the airbill or shipping record should be kept by the ground water system.▶ Packages should be sent priority overnight so that the arrangements for transport and shipping-time from collection to analysis does not exceed 30 hours as required by the GWR.
Chain-of-Custody	<ul style="list-style-type: none">▶ Sample collectors and laboratories should follow applicable State regulations pertaining to chain-of-custody procedures, since it is necessary to have an accurate written record to trace the possession and handling of samples from collection through reporting.<ul style="list-style-type: none">■ This procedure includes:<ul style="list-style-type: none">• Field records of sample collection (sample collection form),• Label or standardized tag on the sample container(s),• Package sent to lab with chain-of-custody record form, pertinent field records, and analysis request form.■ The procedure used by the water system and the laboratory should be documented.■ Every person who takes custody of the sample should fill in the appropriate section of the chain-of-custody record.■ See EPA's <i>Manual for the Certification of Laboratories Analyzing Drinking Water: Criteria and Procedures Quality Assurance (Fifth Edition)</i> for more information.