

**Transient Non-community Water Systems
Groundwater Under the Direct Influence of Surface Water**

Surface water is vulnerable to microbial contamination from a variety of sources, including sewage and animal waste. Thus, *Giardia lamblia*, *Cryptosporidium*, viruses, and other pathogens are often found in surface water. If consumed, these pathogens can cause severe gastrointestinal illness. Symptoms include diarrhea, nausea, and/or stomach cramps. Although gastrointestinal illness does not pose a grave danger for most people, it can be fatal to the elderly, young children, and individuals with deficient immune systems.

Some wells and springs may be directly impacted by surface water. Poor source design, construction, or integrity, and certain geological features (e.g., unconfined aquifers) can provide a direct conduit for surface water to enter groundwater. Such sources are vulnerable to microbial contamination and are considered groundwater under the direct influence of surface water (GWUDI).

Groundwater Under the Direct Influence of Surface Water Determination

Federal and State Regulations require all TNC systems using a groundwater source to obtain a determination as to whether the drinking water source is under the direct influence of surface water (GWUDI). Based on source design and construction, source protection, local geology, and a review of historical testing data, the Water Supply Division (WSD) will determine whether the source is not GWUDI, "high-risk" to be GWUDI, or GWUDI.

For sources found not to be GWUDI, the WSD will send the system a letter documenting that no further testing is required to make the GWUDI determination. However, monitoring is required for high-risk sources. The monitoring may include monthly total coliform samples and/or a microscopic particulate analysis test (MPA). The WSD will notify the system if testing is required. **All shallow water sources (i.e., dug wells and springs) are considered high-risk and require additional testing.**

Water Quality Testing to Help Make the GWUDI Determination

Testing is required for each source that the WSD determines is high-risk to be GWUDI. The WSD will notify systems with a high-risk source and will describe the testing requirements (e.g., test type, frequency, and collection period). **An MPA test must be conducted for all spring sources.** The requirements are summarized in Figure 1.

All samples must be representative of the source (i.e., collected before treatment and storage) and analyzed by a certified laboratory. Before testing, systems are encouraged to make improvements to any source construction defects that increase the source's vulnerability to surface water. Based on source design and construction, source protection, local geology, and a review of historical testing data and results of the additional testing, the Water Supply Division (WSD) will determine whether the source is GWUDI.

Figure 1 – Summary of the Testing Requirements for Sources High Risk to be GWUDI

Step 1 Monitoring: Total Coliform Sampling¹

- Collect and analyze for total coliform one sample per month for six consecutive months.
- If coliform is detected in any of the six samples, the system must conduct a microscopic particulate analysis test (MPA) during the following spring (see Step 2); or make improvements to the source and start a second round of coliform samples for six consecutive months. If coliform is detected in any sample during the second round, the system must conduct a MPA test the following spring.
- If coliform is not detected in any of the six samples and the WSD does not find other convincing evidence that the source is GWUDI, the division will determine the source to not be GWUDI. However, the WSD may still require a MPA test on a source without coliform detects if other characteristics strongly indicate GWUDI.

Step 2 Monitoring: Microscopic Particulate Analysis Test (MPA)¹

- Conduct a MPA test on the source. The sample must be collected between **April 1st and June 1st** and the test results submitted to the WSD before **July 1st**.
- Depending on the results of the MPA, the source may be determined to be GWUDI, not to be GWUDI, or another MPA may be required the following spring.

¹ - All samples must be collected from the source prior to treatment and storage. The WSD may require a system to skip Step 1 and conduct a MPA test (Step 2). **A MPA (Step 2) must be conducted for all spring sources (i.e., skip Step 1).** The WSD may determine that a source is GWUDI prior to or during any phase of testing.

Options for Sources Determined to be GWUDI

Because some pathogens found in surface water (e.g., *Giardia lamblia* and *Cryptosporidium*) are extremely hard to kill with conventional amounts of chlorine or ultraviolet light (UV), GWUDI sources must be treated more thoroughly than groundwater. If a source is determined to be under the direct influence of surface water, the system must develop a new source; install chlorine disinfection and obtain an avoidance of filtration waiver from the WSD; or install chlorine disinfection and filtration in accordance with the Surface Water Treatment Rule. Currently, UV is not acceptable as a sole means of disinfection for GWUDI sources. The system must obtain a Source and Construction Permit from the WSD prior to developing a new source or installing treatment.

This fact sheet and related environmental information are available electronically via the internet. For information visit us through the Vermont Homepage at <http://www.vermont.gov> or visit VT WSD directly at <http://www.vermontdrinkingwater.org>

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