



Fact Sheet

Commonwealth of Pennsylvania • Department of Environmental Protection

SURFACE WATER IDENTIFICATION FOR GROUNDWATER SOURCES COMMUNITY WATER SYSTEM

Overview

During the late 1970s and into the 1980s, Pennsylvania and other states experienced numerous waterborne giardiasis outbreaks. Giardiasis is a disease caused by *Giardia lamblia* which is a protozoan that, in the cyst form, is 7 to 12 microns in size. These protozoan are quite common in Pennsylvania's surface water sources and are resistant to normal disinfection practices. In March 1989, Pennsylvania passed regulations, known as the "Surface Water Treatment Rule", requiring all surface water sources serving public water systems to be filtered as well as disinfected. No new surface water sources for public water supplies are permitted without continuous filtration and disinfection.

Why is DEP Evaluating Groundwater Sources?

The definition of surface water changed in the 1989 Surface Water Treatment Rule to include "water directly influenced by surface water, which may include springs, infiltration galleries, cribs or wells." Groundwater sources near streams or those subject to rapid recharge could be contaminated by *Giardia lamblia* cysts or other pathogenic cysts, and pose a public health threat if not treated as a surface water source.

EPA requires DEP to evaluate all groundwater sources serving public water systems to identify those sources that are "under the direct influence of surface water."

What is the "direct influence of surface water?"

The direct influence of surface water occurs when a groundwater source is susceptible to contamination by *Giardia lamblia* or other pathogenic cysts. This condition can be identified by rapid shifts in water quality characteristics due to precipitation, or by the identification of microscopic particles and organisms indicative of surface water.

How are sources being identified?

The evaluation of the state's groundwater sources is a multi-step process. Certain sources are considered protected while other sources, because of their potential for maximum contaminant level violations and potential health hazards, are considered questionable. The sources are considered questionable based upon the source's depth, geology, location, construction and/or type.

DEP will notify the water supplier using a questionable source to conduct special monitoring of the raw water. The results of the monitoring will be evaluated to determine if the source is being influenced by nearby surface water or by precipitation and rapid infiltration. If it is impacted by either, DEP will conduct a microscopic particulate evaluation of a raw water sample to determine whether the direct influence of surface water is occurring.

What are questionable groundwater sources?

The water system will be required to conduct special monitoring of all springs, infiltration galleries, ranney wells and crib intakes because these types of sources are susceptible to the direct influence of surface water.

If the source is a well, is the well located . . .

- Yes No Less than or equal to 200 feet from a surface water body or recharge boundary?
- Yes No In a carbonate aquifer with static water elevation less than or equal to 100 feet below ground level?
- Yes No In an unconfined aquifer with static water elevation less than or equal to 50 feet below ground level?
- Yes No In a confined aquifer which is located less than or equal to 50 feet below ground level?

If the answer to any of these questions is YES, the source will probably be required to conduct the special monitoring.

If the answer to all of these questions is NO, further evaluation is normally not necessary. However, DEP may require evaluation of the source at any time based upon the source water quality, construction, siting or possible involvement in a waterborne disease outbreak.

What is required for special monitoring?

The water system must submit a monitoring plan based upon the particular location, design and construction of the source and the system. All construction deficiencies which would affect the sampling must be identified in the plan by the water supplier. All major, accessible problems must be remediated prior to the sampling. The plan will be reviewed by DEP's regional office (or the county health department if appropriate). Monitoring shall not begin until the operator has approval of the monitoring plan.

Samples are taken from the source or the collection system prior to treatment. If the groundwater is being pumped from the aquifer, the samples must be collected at production pumping rates and during times when pumping conditions are established in the groundwater flow system.

The water system must take a daily sample from the approved sampling point and take measurements of turbidity, pH, specific conductance (or total dissolved solids) and temperature. Daily measurements must be made of the flow and/or water level from the source. The water level from a well can be either static or pumping water level; however, all future readings must be of the same type. Weekly total and, if positive, fecal coliform samples must be taken in accordance with Standard Methods from the approved sample point.

Monitoring shall be conducted for six months and include both a traditionally high groundwater flow period (April-June or October-December) and low flow period (July-September) of the year. Monitoring results shall be submitted monthly, within 30 days of the end of the month.

Daily measurements and/or recordings must be made of precipitation and local surface water conditions (river stage or flow). If information from a local rain gauge is not available (less than or equal to 20 miles), the operator must install and maintain one. The National Weather Service receives information from rain gauges across the state and can provide location and gauge data for each site. Likewise, the U.S. Geological Survey has installed and maintains gauges on most of the major creeks and rivers in the state. However, if the nearest surface water body is not gauged, the operator will install and maintain a method to measure its flow.

When is the microscopic particulate analysis done?

A microscopic particulate analysis will be conducted by DEP if the results of the special monitoring show a relationship between the raw source water quality and precipitation or surface water conditions. In addition, the special monitoring results will be used to target a sampling period to best represent the direct influence of surface water for microscopic particulate evaluation.

What if the source is under the direct influence of surface water?

If the source is under the direct influence of surface water, the supplier will be required to meet the treatment requirements for a surface water source as specified under DEP's rules and regulations. A second option allows the water system to correct identified deficiencies in the source construction that have resulted in the surface water contamination and noted prior to sampling. The third option is to abandon the source.

How does this program affect source permitting?

If a permit is being sought for a groundwater source, the source must be evaluated for the direct influence of surface water. If the source is a free flowing source, such as a spring, the special monitoring must be conducted prior to submission of an application. If the source is a well or other non-flowing source and a potential public health threat, the applicant will be required, prior to receiving a permit, to develop contingency plans and schedules to establish treatment or abandon the source if needed. DEP will sample the source during the new source pump test and conduct a microscopic particulate evaluation to determine if surface water organisms or organic debris are present. If the analysis is negative, the permit will require the special monitoring for six months after the source goes into production. If the special monitoring shows a relationship to precipitation events or surface water conditions, the source will be resampled for a microscopic particulate evaluation. If, after the permit is issued, the source is determined to be under the direct influence of surface water, the water supplier will be required to implement the contingency plan. A wellhead protection plan could be developed at this time to help protect the source from future contamination.

If you have more questions concerning Surface Water Identification and how it applies to public water systems, please contact DEP's Bureau of Water Supply Management at 717-772-4018 or call your regional DEP office.

This fact sheet and related environmental information are available electronically via Internet. For more information, visit us through the Pennsylvania homepage at <http://www.state.pa.us> or visit DEP directly at <http://www.dep.state.pa.us> (choose directLINK "Drinking Water Publications").



www.GreenWorksChannel.org - A web space dedicated to helping you learn how to protect and improve the environment. The site features the largest collection of environmental videos available on the Internet and is produced by the nonprofit Environmental Fund for Pennsylvania, with financial support from the Pennsylvania Department of Environmental Protection. 800.334.3100

