

Surface Water Treatment Rules

NONCOMMUNITY PUBLIC WATER SUPPLY PROGRAM

Applicability of Regulations

The Safe Drinking Water Act (SDWA) sets regulations for all Public Water Systems (PWS). PWS are facilities that provide water for human consumption and regularly serve an average of 25 or more people per day for at least 60 days out of the year. The Surface Water Treatment Rules apply to those PWSs that utilize surface water sources, including lakes, rivers, springs, and wells classified as Groundwater Under the Direct Influence of Surface Water (GWUDI).

The requirements of the SDWA do not apply to private residences or facilities that do not serve enough people to qualify as a PWS, such as many vacation rental homes and bed and breakfasts, though lodging licensing agencies may impose similar regulations.

History of Surface Water Treatment Rules

Surface water has been used as a source of drinking water for thousands of years but has only been subjected to regulatory requirements in the United States (U.S.) since the mid-20th century. Prior to regulation, waterborne diseases such as typhoid and cholera were commonly attributed to drinking contaminated surface water. The SDWA was passed in 1974 to improve public health and reduce the occurrence of outbreaks associated with drinking water. It did not originally include requirements for the treatment of surface water, though many water systems voluntarily treated their water using filtration and disinfection. In response to

continued outbreaks associated with *Giardia* and viruses, the Surface Water Treatment Rule was added in 1989, requiring filtration and disinfection to remove or inactivate those pathogens. However, outbreaks associated with *Cryptosporidium* continued, including an outbreak in Milwaukee, Wisconsin in which 400,000 people were infected and at least 69 people died. The rules were again amended in 1998 to include more rigorous filtration requirements, greatly reducing the incidence of outbreaks. Collectively, these rules have nearly eliminated the occurrence of waterborne diseases associated with inadequately treated surface water within public drinking water supplies in the U.S.

Treatment Requirements

The Surface Water Treatment Rules require a PWS using a surface water source to provide treatment for *Cryptosporidium*, *Giardia*, and viruses. *Cryptosporidium* and *Giardia* are single-celled microorganisms called protozoans. They are naturally occurring and common in surface waters contaminated with animal feces. If consumed, *Cryptosporidium* and *Giardia* may cause the diseases Cryptosporidiosis and Giardiasis respectively. Viruses are another class of microscopic pathogen and are ubiquitous in the natural environment. Treatment for these pathogens requires a combination of filtration and disinfection. 99 percent (%), or 2-log, removal of *Cryptosporidium* by filtration is required. *Giardia* must be removed and/or inactivated in the amount of 99.9%, or 3-log, through either filtration or disinfection

or a combination of the two. Similarly, 99.99% (4-log) removal or inactivation of viruses must be accomplished through either filtration or disinfection or a combination of the two.

Regardless of which methods are used for inactivation or removal of these pathogens, a free chlorine residual of no less than 0.2 mg/L must be maintained in the distribution system at all times.

Monitoring Requirements

The Surface Water Treatment Rule requires PWSs using surface water sources to monitor for turbidity and free chlorine residual to ensure filtration and disinfection treatment is operating properly.

Turbidity and free chlorine residual measurements must be recorded daily if the system serves less than 500 people. For larger systems, monitoring frequency will increase. For small systems, these measurements can be taken using simple hand-held instruments. The turbidity measurements should be taken from the effluent of the final filter. The free chlorine residual measurements should be taken from the Entry Point, defined as the first available tap after all treatment and storage. The recorded measurements must be sent to MDH each month.

Under the Revised Total Coliform Rule (RTCR), if the system serves less than 1000 people, a total coliform bacteria sample must be collected from the distribution system once per month and sent to a certified laboratory for analysis. For larger systems, monitoring for total coliform bacteria will be more frequent.

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