



Department of Health Office of Drinking Water
Policy

Title: Ultraviolet Disinfection Monitoring for Filtered Water Systems Number: F.13

Procedure: Included

References: Group A Public Water Supplies, WAC 246-290 Part 6

Applies to: Group A Public Water Systems

Contact: Nancy Feagin, Engineering and Technical Services Section

Phone: (253) 395-6765

E-mail: nancy.feagin@doh.wa.gov

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POLICY STATEMENT

Ultraviolet (UV) light is a practical means of inactivating pathogenic protozoa. EPA formally recognized the effectiveness of UV disinfection for inactivating pathogenic protozoa, including *Giardia lamblia*, when the Long Term 2 Enhanced Surface Water Treatment Rule went into effect on January 5, 2006.

Water systems that choose to install UV treatment on filtered sources must provide continuous disinfection, conduct UV monitoring, and record the effectiveness of the UV reactors. The water system shall take follow-up action if the UV reactor does not provide the required UV dose for 15 or more minutes.

POLICY SCOPE

This policy clarifies the monitoring, operational, and reporting requirements for water systems that install UV reactors to inactivate *Giardia lamblia* to meet the disinfection requirements of the Surface Water Treatment Rule.

DEFINITIONS

Group A Public Water Supplies Definitions:

- Continuous monitoring means determining water quality with automatic recording analyzers that operate without interruption twenty-four hours per day.
- Disinfection means the use of chlorine or other agent or process the department approves for killing or inactivating microbiological organisms, including pathogenic and indicator organisms.

EPA’s Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule:

- UV Light – light emitted with wavelengths from 200 to 400 nm [nanometers].
- UV Reactor – the vessel or chamber where exposure to UV light takes place, consisting of UV lamps, quartz sleeves, UV sensors, quartz sleeve cleaning systems, and baffles or other hydraulic controls. The UV reactor also includes additional hardware for monitoring UV dose delivery; typically comprised of (but not limited to): UV sensors and UVT monitors.
- UV Reactor Validation – Experimental testing to determine the operating conditions under which a UV reactor delivers the dose required for inactivation credit of *Cryptosporidium*, *Giardia lamblia*, and viruses.

PROCEDURE

#	Action By	Action
1	Water System	For water systems that intend to install UV disinfection to treat for <i>Giardia lamblia</i> , submit UV reactor validation protocol for review and approval unless the validation protocol has been previously approved.
2	Regional Engineer	Review the validation protocol as outlined in Directive Memorandum L.01, Surface Water Treatment Review Team, unless the validation protocol has been previously approved.
3	Water System	Ensure and conduct validation according to the approved protocol. Provide validation data and a summary report to the Office of Drinking Water.
4	Regional Engineer	Review data and other validation information as outlined in Directive Memorandum L.01 to identify the operational conditions (<i>i.e.</i> flow, equipment settings, and water quality parameters) where the required UV dose is provided.

#	Action By	Action
5	Water System	Operate reactor within validated conditions that provide at least the minimum required UV dose. Document operations in a monthly report submitted to the Office of Drinking Water by the 10 th of the following month.
6	Water System	Notify the Office of Drinking Water, as soon as possible, but not later than 24-hours, if the water system fails to provide the required UV dose for two separate readings taken 15 minutes apart (<i>i.e.</i> a period of 15 or more minutes). Failure to provide the required level of treatment on more than one day per month is considered a treatment technique violation.
7	Regional Engineer	Ensure water systems that have treatment technique violations follow public notification requirements. Notify regional compliance manager, as necessary.

BACKGROUND

Water systems that treat surface water must provide water that is continuously disinfected. Failure to meet disinfection requirements for filtered water systems is a treatment technique violation. More specifically, failure to provide the required level of treatment on more than one day per month is considered a treatment technique violation.

In the case of UV light, treatment adequacy is established by the operational conditions (flow, equipment settings, and water quality parameters) where a UV reactor provides at least the minimum UV dose. A UV reactor validation is used to establish these operational conditions. All UV reactors include sensors, lamp status monitoring, and in some cases UV transmittance monitors, that provide continuous monitoring to confirm that the reactor is operated within validated conditions.

Public health protection requires continuous treatment. Water systems must monitor and submit data to confirm that disinfection is continuously provided. Continuous monitoring for individual treatment units is defined as results that are recorded at least every 15 minutes. While these requirements were written for individual filters, the standard is also appropriate for individual UV reactors. In both cases public health protection only occurs within the treatment process, and does not continue to be provided downstream as is the case with chemical disinfectants.

A water system will incur a treatment technique violation when any of their UV reactors does not provide the required UV dose for more than one day per month as measured in two separate readings taken 15 minutes apart (*i.e.* a period of 15 or more minutes). Treatment technique violations require public notification and may result in enforcement action.

A treatment process failure presents an acute public health risk. Therefore, water systems are required to notify the Office of Drinking Water, as soon as possible, but not later than 24-hours after the water systems learn of a treatment process failure based upon readings taken at least every 15 minutes.

Given the acute risk associated with surface water pathogens, public notifications could be required depending upon the nature of a failure in the UV disinfection process. A treatment process failure does not explicitly require public notification. However, public notification may be required by the Office of Drinking Water for situations with a significant potential to have serious adverse effects on human health as a result of short-term exposure.

REFERENCES

- Group A Public Water Supplies chapter 246-290 WAC
 - WAC 246-290-010 Definitions
 - WAC 246-290-632 Treatment technique violations
 - WAC 246-290-634 Follow-up to treatment technique violations
 - WAC 246-290, Subpart 6 – Requirements for Filtered Systems
 - WAC 246-290-662 Disinfection for filtered systems
 - WAC 246-290-664 Monitoring for filtered systems
 - WAC 246-290-666 Reporting for filtered systems
 - WAC 246-290-71001 Public notification

- Directive Memorandum L.01 Surface Water Treatment Review Team, effective October 24, 1001

- United States Environmental Protection Agency, Ultraviolet Disinfection Guidance Manual for the Final Long Term 2 Enhanced Surface Water Treatment Rule, November 2006 (EPA 815-R-06-007)

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