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Interim Enhanced Surface Water Treatment Rule

Disinfection of drinking water is one of the major public health advances in the 20th century. One hundred years ago, typhoid and cholera epidemics were common through American cities and disinfection was a major factor in reducing these epidemics. However, the disinfectants themselves can react with naturally-occurring materials in the water to form unintended byproducts which may pose health risks.

In the past ten years, however, we have learned that there are specific microbial pathogens, such as *Cryptosporidium*, that are resistant to traditional disinfection practices. In 1993, *Cryptosporidium* caused 400,000 people in Milwaukee to experience intestinal illness. More than 4,000 were hospitalized, and at least 50 deaths have been attributed to the disease. There have also been cryptosporidiosis outbreaks in Nevada, Oregon, and Georgia over the past several years.

Amendments to SDWA in 1996 require EPA to develop rules to balance the risks. It is important to strengthen protection against microbial contaminants, especially *Cryptosporidium*, and at the same time, reduce potential health risks from disinfection byproducts. The new Interim Enhanced Surface Water Treatment Rule and Stage 1 Disinfectants and Disinfection Byproducts Rule are among the first of a set of rules under the Amendments. This fact sheet focuses on the Interim Enhanced Surface Water Treatment Rule. A separate fact sheet focuses on the Stage 1 Disinfectants and Disinfection Byproducts Rule (EPA 816-F-01-014).

PUBLIC HEALTH CONCERNS FROM MICROBIAL CONTAMINANTS IN DRINKING WATER

In 1990, EPA's Science Advisory Board concluded that exposure to microbial contaminants such as bacteria, viruses, and protozoa (e.g., *Giardia lamblia* and *Cryptosporidium*) was likely the greatest remaining health risk management challenge for drinking water suppliers. Acute health effects from exposure to microbial pathogens is documented and associated illness can range from mild to moderate cases lasting only a few days to more severe infections that can last several weeks and may result in death for those with weakened immune systems.

WHO MUST COMPLY WITH THE RULE?

The Interim Enhanced Surface Water Treatment Rule applies to public water systems that use surface water or ground water under the direct influence of surface water (GWUDI) and serve at least 10,000 people. In addition, states are required to conduct sanitary surveys for all surface water and GWUDI systems, including those that serve fewer than 10,000 people.

WHAT DOES THE RULE REQUIRE?

The Interim Enhanced Surface Water Treatment Rule amends the existing Surface Water Treatment Rule to strengthen microbial protection, including provisions specifically to address *Cryptosporidium*, and to address risk trade-offs with disinfection byproducts. The final rule includes treatment requirements for the waterborne pathogen *Cryptosporidium*. In addition, systems must continue to meet existing requirements for *Giardia lamblia* and viruses. Specifically, the rule includes:

1. Maximum contaminant level goal (MCLG) of zero for *Cryptosporidium*.

2. 2-log *Cryptosporidium* removal requirements for systems that filter.

3. Strengthened combined filter effluent turbidity performance standards for systems using conventional and direct filtration.

4. Individual filter turbidity monitoring provisions for systems using conventional and direct filtration.

5. Disinfection profiling and benchmarking provisions.

6. Systems using ground water under the direct influence of surface water now subject to the new rules dealing with *Cryptosporidium*.

7. Inclusion of *Cryptosporidium* in the watershed control requirements for unfiltered public water systems.

8. Requirements for covers on new finished water storage facilities.

9. Sanitary surveys, conducted by states, for all surface water systems regardless of size.

The rule, with tightened turbidity performance criteria and individual filter monitoring requirements, is designed to optimize treatment reliability and to enhance physical removal efficiencies to minimize the *Cryptosporidium* levels in finished water. Turbidity requirements for combined filter effluent will remain at least every four hours, but continuous monitoring (record results every 15 minutes) will be required for individual filters at conventional and direct filtration plants. In addition, the rule includes disinfection profiling and benchmarking provisions to assure continued levels of microbial protection while facilities take the necessary steps to comply with new DBP standards.

WHAT ARE THE COMPLIANCE DEADLINES?

States have until December 16, 2000 to adopt and implement the requirements of this regulation. States may request up to a two year extension to adopt the rule. Simultaneous compliance with the Stage 1 Disinfectants and Disinfection Byproduct Rule, promulgated at the same time as IESWTR, will be achieved as follows:

Public water systems that use surface water or ground water under the direct influence of surface water, either in whole or in part, and serve a population of 10,000 or more generally must comply with requirements of this rule by January 1, 2002. Systems with elevated levels of disinfection by-products were required to develop a disinfection profile beginning no later than March 31, 2000. In cases where capital improvements are needed to comply with the rule, states may grant systems up to an additional two years to comply.

WHAT ARE THE COSTS AND BENEFITS OF THE RULE?

EPA estimates that implementation of the Interim Enhanced Surface Water Treatment Rule will:

1. Improvements in filtration at water systems will increase public health protection by reducing the level of exposure to *Cryptosporidium* and other pathogens (i.e., *Giardia*, or other waterborne bacterial or viral pathogens) in drinking water supplies ;

2. Decrease the likelihood of endemic (constant low-level presence of a disease or infection) illness from *Cryptosporidium* by 110,000 to 463,000 cases annually and related health costs, as well as incidences of illness from *Giardia* and other waterborne pathogens; and,

3. Reduce the likelihood of the occurrence of outbreaks of cryptosporidiosis (illness from *Cryptosporidium)* and their associated economic costs by providing a larger margin of safety against such outbreaks for some systems.

The total annualized national cost for implementing the Interim Enhanced Surface Water Treatment Rule is $307 million. EPA believes that the benefits exceed the costs. The rule will result in increased costs to public water systems for improved turbidity treatment, monitoring, disinfection benchmarking and covering new finished water storage facilities, as well as state implementation costs.

EPA estimates that 92 percent of households will incur an increase in their water bill of less than $1 per month; 7 percent of households will incur an increase in their water bills of between $1 - $5 per month; and less than 1 percent will incur an increase of between $5-8 per month.

WHAT TECHNICAL INFORMATION WILL BE AVAILABLE ON THE RULE?

A series of guidance manuals have been developed to support the Interim Enhanced Surface Water Treatment Rule. The manuals will aid EPA, state agencies and affected public water systems in implementing the IESWTR. The guidance manual are available on EPA's website at www.epa.gov/safewater/mdbp/implement.html.

Disinfection Benchmarking Guidance Manual

Objective: To help determine if a disinfection profile (an evaluation of current disinfection practice) is required and how to do one; when a disinfection benchmark must be determined and how to extract it from the profile; and how a public water system must use the benchmark, in consultation with the state, to assure protection from microbial risk is maintained when the system changes disinfection practice.

Contents: The manual provides detailed information on the following subjects: applicability of the profiling and benchmarking requirements to public water systems; procedures for generating a disinfection profile, including example profiles; methods for calculating the disinfection benchmark, including example calculations; the use of the benchmark in modifying disinfection practices, communicating with the state, and assessing significant changes to disinfection practices; the development of the profiling and benchmarking regulations; the significance of the log inactivation concept and CT values for inactivations achieved by various disinfectants; and the determination of contact time.

Guidance Manual for Compliance with the Interim Enhanced Surface Water Treatment Rule: Turbidity Provisions

Objective: The first section provides technical information regarding specific requirements of the Interim Enhanced Surface Water Treatment Rule relating to turbidity and is intended for experienced operators and others in the regulated community. The second section of the document provides background on concepts surrounding turbidity and serves as a primer for less experienced operators and individuals.

Contents: The first section contains key regulatory requirements including combined filter effluent monitoring and individual filter monitoring; recordkeeping and reporting requirements; additional compliance issues such as compliance schedule, public notification, variances/exemptions, and follow-up action requirements; approved methods and additional measurement and calibration issues; components and description of an filter self-assessment; and components and description of a Comprehensive Performance Evaluation. The second section of the manual includes more basic information on turbidity; description of the particles (both natural and man-made) which typically contribute to turbidity; discussion of typical steps in a treatment process and how turbidity is removed or created in each step; discussion of turbidity in different source waters with an emphasis of how changes in source water effect turbidity; and basic turbidimeter design.

Alternative Disinfectants and Oxidants Guidance Manual

Objective: To provide technical data and engineering information on disinfectants and oxidants that are not as commonly used as chlorine, so that systems can evaluate their options for developing disinfection schemes to control water quality problems such as zebra mussels and Asiatic clams, and oxidation to control water quality problems associated with iron and manganese.

Contents: The manual discusses six disinfectants and oxidants: ozone, chlorine dioxide, potassium permanganate, chloramines, ozone/hydrogen peroxide combinations, and ultraviolet light. A decision tree is provided to assist in evaluating which disinfectant(s) is most appropriate given certain site-specific conditions (e.g., water quality conditions, existing treatment and operator skill). The manual also contains a summary of existing alternative disinfectants use in the United States and cost estimates for the use of alternative disinfectants.

Microbial and Disinfection Byproducts Simultaneous Compliance Manual

Objective: To assist public water systems on complying simultaneously with various drinking water regulations (e.g., Stage 1 Disinfectants and Disinfection Byproducts Rule, Interim Enhanced Surface Water Treatment Rule, Lead and Copper Rule and the Total Coliform Rule). The manual discusses operational problems systems may encounter when implementing these rules.

Contents: The manual provides detailed information on the requirements in the Stage 1 Disinfectants and Disinfection Byproducts Rule and the Interim Enhanced Surface Water Treatment Rule and issues involved with simultaneously complying with other rules.

Guidance Manual for Conducting Sanitary Surveys of Public Water Systems

Objective: The guidance manual provides an overview of how to conduct a sanitary survey of all water systems using surface water and ground water under the direct influence of surface water. It is intended to help state agencies improve their sanitary survey programs where needed.

Contents: The manual provides information about the objective and regulatory context of sanitary surveys. It covers four principal stages of a sanitary survey: planning, including preparatory steps to be taken by inspectors before conducting the onsite portion; conducting the onsite survey; compiling a sanitary survey report; and performing follow-up activities.

Uncovered Finished Water Reservoirs

Contents: The manual provides detailed information on the following subjects: developing and implementing comprehensive open finished water reservoir management plans based on site-specific conditions; identifying potential sources of contamination in open finished water reservoirs and potential mitigation measures; employing different methods to control the degradation of water quality while it resides in the reservoir; monitoring schemes that can be used to characterize water quality and identify water quality degradation before it becomes severe and is difficult to correct.

For more information, contact EPA's Safe Drinking Water Hotline, 1.800.426.4791, or see the Office of Ground Water and Drinking Water web page at http://www.epa.gov/safewater/standards.html.