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40 CFR Parts 9, 141, and 142
National Primary Drinking Water Regulations: Long Term 1 Enhanced Surface Water Treatment Rule; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 9, 141, and 142

[WH–FRL–7124–2]

RIN 2040–AD18

National Primary Drinking Water Regulations: Long Term 1 Enhanced Surface Water Treatment Rule

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: In this document, EPA is finalizing the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR). The purposes of the LT1ESWTR are to improve control of microbial pathogens, specifically the protozoan *Cryptosporidium,* in drinking water and address risk trade-offs with disinfection byproducts. The rule will require systems to meet strengthened filtration requirements as well as to calculate levels of microbial inactivation to ensure that microbial protection is not jeopardized if systems make changes to comply with disinfection requirements of the Stage 1 Disinfection and Disinfection Byproducts Rule (DBPR). The LT1ESWTR applies to public water systems that use surface water or ground water under the direct influence of surface water and serve fewer than 10,000 persons. The LT1ESWTR builds upon the framework established for systems serving a population of 10,000 or more in the Interim Enhanced Surface Water Treatment Rule (IESWTR). This rule was proposed in combination with the Filter Backwash Recycling Rule (FBRR) in April 2000.

DATES: This regulation is effective February 13, 2002. As discussed in the supplementary information section and consistent with sections 1412(b)(10) and 1445 of SDWA, regulated entities must comply with this rule starting March 15, 2002. For judicial review purposes, this final rule is promulgated as of 1 p.m. eastern time on January 14, 2002.

ADDRESSES: Public comments, the comment/response document, applicable **Federal Register** notices, other major supporting documents, and a copy of the index to the public docket for this rulemaking (W–99–10, Final Long Term 1 Enhanced Surface Water Treatment Rule) are available for review at EPA's Drinking Water Docket: 401 M Street, SW., Rm. EB57, Washington, DC 20460 from 9 a.m. to 4 p.m., Eastern Time, Monday through Friday, excluding legal holidays. For access to docket materials or to schedule an appointment please call (202) 260–3027.

FOR FURTHER INFORMATION CONTACT: For technical inquiries contact Tom Grubbs at 1200 Pennsylvania Avenue, NW., MC4607, Washington, DC 20460, (202) 564–5262. For general information contact the Safe Drinking Water Hotline, telephone (800) 426–4791. The Safe Drinking Water Hotline is open Monday through Friday, excluding Federal holidays, from 9 a.m. to 5:30 p.m. Eastern Time.

SUPPLEMENTARY INFORMATION:

Regulated Entities

Entities potentially regulated by the LT1ESWTR are public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI) and serve fewer than 10,000 persons. Regulated categories and entities include:

Category	Examples of regulated entities
Industry	PWSs that use surface water or GWUDI.
State, Local, Tribal or Federal Governments.	PWSs that use surface water or GWUDI.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by the LT1ESWTR. This table lists the types of entities that EPA is now aware could potentially be regulated by this rule. Other types of entities not listed in this table could also be regulated. To determine whether your facility is regulated by this action, you should carefully examine the definition of PWS in § 141.2 of title 40 of the Code of Federal Regulations and applicability criteria in § 141.501 of today's final rule. If you have questions regarding the applicability of the LT1ESWTR to a particular entity, consult the person listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

List of Abbreviations Used in This Document:

AWWA American Water Works Association
AWWSCo American Water Works Service Company
°C Degrees Celsius
CCP Composite Correction Program
CCR Consumer Confidence Report
CDC Centers for Disease Control
CFR Code of Federal Regulations
CFSII Continuing Survey of Food Intakes by Individuals
COI Cost of Illness
CPE Comprehensive Performance Evaluation
CTA Comprehensive Technical Assistance
DAF Dissolved Air Flotation
DBP Disinfection Byproducts
DBPR Disinfectants and Disinfection Byproduct Rule
EPA Environmental Protection Agency
ESWTR Enhanced Surface Water Treatment Rule
FACA Federal Advisory Committee Act
FBRR Filter Backwash Recycle Rule
FR Federal Register
gpm Gallons per Minute
GWUDI Ground Water Under Direct Influence of Surface Water
HAA5 Haloacetic Acids (Monochloroacetic, Dichloroacetic, Trichloroacetic, Monobromoacetic and Dibromoacetic Acids)
HRRCA Health Risk Reduction and Cost Analysis
ICR Information Collection Request
IESWTR Interim Enhanced Surface Water Treatment Rule
LT1ESWTR Long Term 1 Enhanced Surface Water Treatment Rule
MCLG Maximum Contaminant Level Goal
M-DBP Microbial and Disinfectants/Disinfection Byproducts
NDWAC National Drinking Water Advisory Council
NPDWR National Primary Drinking Water Regulation
NODA Notice of Data Availability
NTTAA National Technology Transfer and Advancement Act
NTU Nephelometric Turbidity Units
O&M Operation and Maintenance
OMB Office of Management and Budget
PBMS Performance-based Measurement System
PRA Paperwork Reduction Act
PWS Public Water System
PWSS Public Water Supply Supervision
RFA Regulatory Flexibility Act
RIA Regulatory Impact Analysis
SAB Science Advisory Board
SBA Small Business Administration
SBAR Small Business Advocacy Review
SBREFA Small Business Regulatory Enforcement Fairness Act of 1996
SDWA Safe Drinking Water Act
SDWIS Safe Drinking Water Information System
SWTR Surface Water Treatment Rule
TTHM Total Trihalomethanes
UMRA Unfunded Mandates Reform Act
WTP Willingness to Pay

Table of Contents

I. Summary

A. Why Is EPA Promulgating the LT1ESWTR?

The Safe Drinking Water Act (SDWA) requires EPA to set enforceable standards to protect public health from contaminants that may occur in drinking water. As explained in more detail in the April 10, 2000 proposal for today's rule (65 FR 19046), EPA has determined that the presence of microbiological contaminants is a substantial health concern. If finished water supplies contain microbiological contaminants, disease outbreaks may result. Disease symptoms may include diarrhea, cramps, nausea, jaundice, headaches, and fatigue. EPA has set enforceable drinking water treatment techniques to reduce the risk of waterborne disease outbreaks. Treatment technologies such as filtration and disinfection can remove or inactivate microbiological contaminants.

Physical removal is critical to the control of *Cryptosporidium* because it is highly resistant to standard disinfection practices. Cryptosporidiosis, the infection caused by *Cryptosporidium*, may manifest itself as a severe infection that can last several weeks and may cause the death of individuals with compromised immune systems. In 1993, *Cryptosporidium* caused over 400,000 people in Milwaukee, WI to experience intestinal illness. More than 4,000 were hospitalized and at least 50 deaths were attributed to the cryptosporidiosis outbreak. There have also been cryptosporidiosis outbreaks in Nevada, Oregon, and Georgia over the past several years.

In 1990, the EPA Science Advisory Board (SAB) cited drinking water contamination as one of the most important environmental risks and indicated that disease causing microbial contaminants (i.e., bacteria, protozoa, and viruses) are probably the greatest remaining health risk management challenge for drinking water suppliers (USEPA/SAB, 1990). The LT1ESWTR addresses this challenge by improving the control of a wide range of microbial pathogens in public drinking water systems and, specifically addressing *Cryptosporidium* for the first time in systems serving fewer than 10,000 people.

B. What Is Cryptosporidium?

Cryptosporidium is a protozoan parasite found in humans, other mammals, birds, fish, and reptiles. It is common in the environment and widely found in surface water supplies (Rose, 1998; LeChevallier and Norton, 1995; Atherholt *et al.*, 1998; EPA, 2000a). In the infected animal, the parasite multiplies in the gastrointestinal tract. The animal then excretes oocysts of the parasite in its feces. These oocysts are tiny spore-like organisms 4 to 6 microns in diameter (too small to be seen without a microscope), which carry within them the infective sporozoites. The oocysts of *Cryptosporidium* are very resistant to adverse factors in the environment and can survive dormant for months in cool, dark conditions such as moist soil, or for up to a year in clean water. When ingested by another animal they can transmit the cryptosporidiosis disease and start a new cycle of infection. Cryptosporidiosis is primarily a waterborne disease, but has also been transmitted by consumption of contaminated food, unhygienic diaper changing practices (and other person-to-person contact), and contact with young farm animals.

Cryptosporidium oocysts are not easily killed by commonly-used disinfectants. They are relatively unaffected by chlorine and chloramines in the concentrations that are used for drinking water treatment. Oocyst infectivity appears to persist under normal temperatures, although oocysts may lose infectivity if sufficiently cooled or heated (USEPA, 2000a). Research indicates that oocysts may remain viable even after freezing (Fayer and Nerad, 1996).

C. What Are the Health Concerns Associated With Cryptosporidium?

When someone is infected with *Cryptosporidium*, they may contract cryptosporidiosis, a disease which can cause diarrhea, stomach cramps, nausea, loss of appetite, and a mild fever. *Cryptosporidium* has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. The parasite is found in every region of the United States and throughout the world (*www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/factsht_cryptosporidiosis.htm*). The symptoms of cryptosporidiosis begin an average of seven days after infection. Persons with a normal, healthy immune system can expect their illness to last for two weeks or less, with constant or intermittent diarrhea. However, even after symptoms cease, an individual can still pass *Cryptosporidium* in the stool for up to two months, and may be a source of infection for others.

Cryptosporidiosis is not treatable with antibiotics, so prevention of infection is critical. People with weakened immune systems (those with HIV/AIDS, on cancer chemotherapy, or who have received organ transplants) will have cryptosporidiosis for a longer period of time, and it could become life-threatening. Young children, pregnant women, or the elderly infected with cryptosporidiosis can quickly become severely dehydrated.

Twelve waterborne cryptosporidiosis outbreaks have occurred at drinking water systems since 1984 (Craun, 1998; USEPA, 2000a). The largest of the known outbreaks occurred in Milwaukee and was responsible for over 400,000 illnesses and at least 50 deaths (Hoxie, *et al.*, 1997; MacKenzie *et al.*, 1994); other known outbreaks have occurred in smaller communities and have involved many fewer people. An incident such as a rainstorm that flushes many oocysts into the source water or causes a sanitary sewer overflow combined with a water treatment plant upset could allow a large pulse of oocysts to move past the multiple barriers of a water treatment plant.

D. Does This Regulation Apply to My Water System?

Today's final regulation applies to all small (serving less than 10,000 people) public water systems (PWSs) that use surface water or ground water under the direct influence of surface water (GWUDI).

E. How Is the EPA Regulating Cryptosporidium in the LT1ESWTR?

In the IESWTR (63 FR 69478), EPA established a maximum contaminant level goal (MCLG) of zero for *Cryptosporidium.* When establishing an MCLG, EPA must also establish either a corresponding Maximum Contaminant Level (MCL) or a treatment technique. In the IESWTR and in today's LT1ESWTR, the Agency chose to establish a treatment technique that relies on strengthening water treatment processes already in place. For filtered systems this means achieving at least 2-log (99 percent) removal of *Cryptosporidium* by meeting strengthened combined filter effluent turbidity limits as established by today's rule. For unfiltered systems it means maintaining and improving *Cryptosporidium* control under existing watershed control plans.

F. What Other Requirements Are Included in This Rule?

Today's final regulation includes several requirements.

—All surface water and GWUDI systems serving fewer than 10,000 people must meet the requirements for achieving a 2-log removal or control of *Cryptosporidium*;
—Conventional and direct filtration systems must comply with specific combined filter effluent turbidity requirements while alternative filtration systems (systems using filtration other than conventional filtration, direct filtration, slow sand filtration, or diatomaceous earth filtration), must demonstrate the ability to achieve 2-log removal of *Cryptosporidium* and comply with specific State-established combined filter effluent turbidity requirements;
—Conventional and direct filtration systems must continuously monitor the turbidity of individual filters and perform follow-up activities if this monitoring indicates a potential problem;
—Systems must develop a disinfection profile unless they can demonstrate that their TTHM and HAA5 disinfection byproduct (DBP) levels are less than 0.064 mg/L and 0.048 mg/L respectively;
—Systems considering a significant change to their disinfection practice must develop a disinfection inactivation benchmark of their existing level of microbial protection and consult with the State for approval prior to implementing the disinfection change;
—Finished water reservoirs for which construction begins after the effective date of today's rule must be covered; and
—Unfiltered systems must comply with updated watershed control requirements that add *Cryptosporidium* as a pathogen of concern.

G. How Will This Regulation Protect Public Health?

Today's rule for the first time establishes *Cryptosporidium* control requirements for small systems by requiring a minimum 2-log removal for *Cryptosporidium.* The rule also strengthens filter performance requirements to ensure 2-log *Cryptosporidium* removal, establishes individual filter monitoring to minimize contaminant pass-through and support improved performance, includes *Cryptosporidium* in the definition of GWUDI, and explicitly considers unfiltered system watershed control provisions. Today's rule also reflects a commitment to the importance of maintaining existing levels of microbial protection in public water systems as plants take steps to comply with newly applicable DBP standards. Systems considering significant changes to their disinfection practices must first evaluate current levels of *Giardia* inactivation (and virus inactivation if applicable) and consult with their State Primacy Agency for approval before implementing those changes to assure that current microbial protection is not significantly reduced. Thus, compliance with the provisions of today's rule will improve public health protection by reducing the risk of exposure to *Cryptosporidium* in small systems serving fewer than 10,000 people even as those systems begin to take steps to comply with related DBP standards.

II. Background

A. What Is the Statutory Authority for the LT1ESWTR?

The Safe Drinking Water Act (SDWA or the Act), as amended in 1986, requires EPA to publish a maximum contaminant level goal (MCLG) for each contaminant which in the judgement of the EPA Administrator, may have an adverse effect on the health of persons, occurs in public water systems with a frequency and at a level of public health concern, and whose regulation would represent a meaningful public health risk reduction (Section 1412(b)(1)(A)). MCLGs are non-enforceable health goals to be set at a level at which no known or anticipated adverse effect on the health of persons occur and which allows an adequate margin of safety (Section 1412(b)(4)). The Act was again

amended in August 1996 (Public Law 104–83), resulting in the renumbering and augmentation of certain sections with additional statutory language. New sections were added establishing new drinking water requirements.

The 1986 Amendments to SDWA requires EPA to publish an enforceable National Primary Drinking Water Regulation (NPDWR) that specifies either a maximum contaminant level (MCL) or treatment technique (Sections 1401(1) and 1412(7)(a)) at the same time it publishes an MCLG. EPA is authorized to promulgate a NPDWR that requires the use of a treatment technique in lieu of establishing an MCL, if the Agency finds that it is not economically or technologically feasible to ascertain the level of the contaminant. Today's rule relies upon the treatment technique of improved filter performance based on strengthened turbidity limits to control for Cryptosporidium because an analytical method suitable for finished water compliance purposes is currently not economically or technologically feasible. In accordance with a schedule established by Section 1412(b)(2)(C) of SDWA as added by the 1996 Amendments to SDWA, EPA is required to promulgate today's rule by November 2000.

B. What Is the Regulatory History for the LT1ESWTR?

In 1989, EPA promulgated the Surface Water Treatment Rule (SWTR) (54 FR 27486, June 29, 1989 (USEPA, 1989)) that set MCLGs of zero for *Giardia lamblia*, viruses, and *Legionella* and promulgated regulatory requirements for all PWSs using surface water or GWUDI. The SWTR includes treatment technique requirements for filtered and unfiltered systems that are intended to protect against the adverse health effects of exposure to *Giardia lamblia*, viruses, and *Legionella*, as well as many other pathogenic organisms. Briefly, those requirements include (1) requirements for maintenance of a disinfectant residual in the distribution system; (2) removal and/or inactivation of 3-log (99.9 percent) for *Giardia* and 4-log (99.99 percent) for viruses; (3) combined filter effluent turbidity performance standard of 5 nephelometric turbidity units (NTU) as a maximum and 0.5 NTU at the 95th percentile monthly, based on 4-hour monitoring for treatment plants using conventional treatment or direct filtration (with separate standards for other filtration technologies); and (4) watershed protection and other requirements for unfiltered systems. Systems seeking to avoid filtration were required to meet avoidance criteria and obtain avoidance determinations from States by December 30, 1991, otherwise filtration must have been provided by June 29,1993. For systems properly avoiding filtration, later failures to meet avoidance criteria triggered a requirement that filtration be provided within 18 months.

The intention of the SWTR was to provide appropriate multiple barriers of treatment to control pathogen occurrence in finished drinking water. *Cryptosporidium,* however, was not addressed under the SWTR, because EPA lacked sufficient health, occurrence, and water treatment control data regarding this organism at the time of the rule's development. The IESWTR and today's final rule address these gaps in microbial protection.

In 1992, EPA initiated a negotiated rulemaking (Reg-Neg) to develop a disinfectants and disinfection byproducts rule. The Reg-Neg Committee consisting of a variety of stakeholder groups met from November 1992 through June 1993. As part of this effort, the Committee concluded that the SWTR needed to be revised to address the health risk of high densities of pathogens in poorer quality source waters than the SWTR addressed as well as the health risks of *Cryptosporidium*. The Committee recommended the development of three sets of rules: a two-staged Disinfectants/Disinfection Byproducts Rule (DBPR), an ''interim'' Enhanced Surface Water Treatment Rule (IESWTR), a ''long term'' Enhanced Surface Water Treatment Rule (LT1ESWTR), and an Information Collection Rule. The IESWTR was only to apply to those systems serving 10,000 or more persons. The Committee agreed that the ''long term'' Enhanced Surface Water Treatment Rule would be needed for systems serving fewer than 10,000 persons.

Congress legislatively affirmed this Microbial/Disinfection Byproduct (M-DBP) strategy as part of the 1996 SDWA Amendments. As part of those new Amendments, Congress also established a new schedule for EPA promulgation of these rules (which is the basis for the November 2000 schedule for today's rule). EPA established the M-DBP Advisory Committee under the Federal Advisory Committee Act (FACA) in 1997 to seek advice on how to proceed towards these deadlines in light of new information available since the 1993 negotiated rulemaking discussions. The Committee met five times in March through July 1997 to discuss issues related to the IESWTR and the Stage 1 DBPR. The Committee reached agreement in July of 1997 and its recommendations are embodied in an Agreement in Principle document dated July 15, 1997, which is also found in two Notices of Data Availability (NODA) (USEPA1997a,b). The major issues addressed in the Agreement in Principle were discussed in the NODA for the IESWTR (62 FR 59486, November 3, 1997) and Stage 1 DBPR (62 FR 59388, November 3, 1997).

On December 16, 1998, EPA promulgated the IESWTR (63 FR 69478), which applies to surface water and GWUDI systems serving 10,000 or more persons. The purposes of the IESWTR are to improve control of microbial pathogens (specifically Cryptosporidium) and to address risk trade-offs with DBPs. Key provisions established in the IESWTR include: (1) An MCLG of zero for *Cryptosporidium;* (2) a 2-log *Cryptosporidium* removal requirements for systems that filter; (3) strengthened combined filter effluent turbidity performance standards and individual filter turbidity provisions; (4) disinfection benchmarking provisions to assure continued levels of microbial protection while facilities take the necessary steps to comply with new DBP standards; (5) inclusion of *Cryptosporidium* in the definition of GWUDI, as another pathogen that would indicate the presence of GWUDI, and in the watershed control requirements for unfiltered public water systems; (6) requirements for covers on new finished water reservoirs; and (7) sanitary surveys for all surface water and GWUDI systems regardless of size.

Today's rule is based in large part upon the data, research, and technical analysis that supported the major components included in the 1998 IESWTR. To that degree, it reflects the national interim microbial protection control strategy ratified by a wide range of experts and stakeholders as part of the 1997 M/DBP Agreement in Principle. However, as was discussed in the April 10, 2000 proposal, today's rule also is based on new small system information that became available since 1998 and, equally important, it also reflects a major commitment to significantly reduce small system compliance burdens wherever possible, while maintaining public health protection.

C. How Were Stakeholders Involved in the Development of the LT1ESWTR?

EPA began outreach efforts to develop the LT1ESWTR in the summer of 1998 with two public meetings: one in Denver, Colorado and the other in Dallas, Texas (USEPA, 1999a,b). Building on these two public meetings, EPA has also held a number of additional meetings with stakeholders,

trade associations, environmental groups, and representatives of State and local elected officials. Of particular importance for this rule, given its focus on small systems, EPA received valuable input from small entity representatives as part of the Small Business Regulatory Enforcement Fairness Act (SBREFA) panel. The panel was initiated in April of 1998 and officially convened in August of 1998. Many of the panel's recommendations are reflected in today's rule.

EPA provided numerous opportunities for stakeholder and public involvement. In early June 1999, EPA mailed an informal draft of the LT1ESWTR preamble to the approximately 100 stakeholders who attended either of the public stakeholder meetings. Members of trade associations and the SBREFA panel also received the draft preamble. EPA received valuable suggestions and stakeholder input from 15 State representatives, trade associations, environmental interest groups, and individual stakeholders. EPA proposed the LT1ESWTR on April 10, 2000. During the comment period, the Agency held a public meeting in Washington D.C. on April 14, 2000. Additionally, the proposed rule was presented to industry, State representatives, and the public in nearly 50 meetings across the US, including a May 30, 2000 meeting in Washington, D.C. with ten representatives of elected State and local officials (USEPA 2000g,h). Finally, EPA mailed approximately 200 copies of the proposed rule to stakeholders.

D. What Did the April 10, 2000 Proposal Contain?

The proposed rulemaking package, which is the basis for today's final rule, was entitled The Long Term 1 Enhanced Surface Water Treatment and Filter Backwash Proposed Rule (USEPA, 2000b).

The proposed rule included two distinct sets of provisions: LT1ESWTR provisions and Filter Backwash Recycling Rule (FBRR) provisions. The Agency promulgated the final FBRR in a **Federal Register** announcement on June 8, 2001 (66 FR 31086), separate from today's final rule. The LT1ESWTR proposed rule provisions applied to surface and GWUDI systems serving fewer than 10,000 persons and included the following provisions:

—2-log removal of *Cryptosporidium*;
—Compliance with specific combined filter effluent turbidity requirements;
—Continuous turbidity monitoring for individual filters with follow-up activities if monitoring results indicated a potential problem;
—Development of a disinfection profile unless optional monitoring at a particular plant demonstrated TTHM and HAA5 levels less than 0.064 mg/L and 0.048 mg/L respectively;
—Development of a *Giardia* inactivation disinfection benchmark and consultation with the State for approval before making a significant change in disinfection practices;
—Mandatory covers for all newly constructed finished water reservoirs; and
—Unfiltered system compliance with updated watershed control requirements that add *Cryptosporidium* as a pathogen of concern.

III. Discussion of the Final Rule

A. What Level of Cryptosporidium Removal Does the LT1ESWTR Require?

1. What Does Today's Rule Require?

Today's final rule establishes a treatment technique requirement for 2-log removal of *Cryptosporidium* for surface water and GWUDI systems serving fewer than 10,000 persons. This requirement applies between a point where the raw water is not subject to contamination by surface water runoff and a point downstream before or at the first customer.

2. How Was This Requirement Developed?

As discussed previously in today's rule, *Cryptosporidium* is a microbiological contaminant that has caused several outbreaks of cryptosporidiosis and poses serious health risks. For these reasons, the Agency set forth to develop requirements to minimize risks associated with *Cryptosporidium* in drinking water. In the IESWTR, EPA established a MCLG of zero for *Cryptosporidium*. EPA decided to establish 2-log removal of *Cryptosporidium* as the accompanying treatment technique for this MCLG. This requirement is based on a number of treatment effectiveness studies that demonstrate the ability of well-operated conventional and direct filtration plants to achieve at least a 2-log removal of *Cryptosporidium* (Patania *et al.,* 1995; Nieminski and Ongerth, 1995; Ongerth and Pecoraro, 1995; LeChevallier and Norton, 1992; LeChevallier *et al.,* 1991; Foundation for Water Research, 1994; Kelly *et al.,* 1995; and West *et al.,* 1994). The information and data in these eight studies provide convincing evidence that conventional and direct filtration plants that employ coagulation, flocculation, sedimentation (in conventional filtration only), and filtration steps, have the ability to achieve a minimum of 2-log removal of *Cryptosporidium* when meeting specific turbidity limits. EPA has also provided data in the proposal for today's final rule that indicate the ability of slow sand filtration, diatomaceous earth filtration, and alternative filtration (membrane filtration, cartridge filtration, etc.) to achieve at least 2-log removal of *Cryptosporidium* (Jacangelo *et al.,* 1995; Drozd & Schartzbrod, 1997; Hirata & Hashimoto, 1998; Goodrich *et al.,* 1995; Collins *et al.,* 1996; Lykins *et al.,* 1994; Adham *et al.,* 1998; Shuler & Ghosh, 1991; Timms *et al.,* 1995; Shuler *et al.,* 1990; and Ongerth & Hutton, 1997). The Agency believes that the technological feasibility for 2-log removal is demonstrated for both large and small systems and therefore today's rule extends the 2-log *Cryptosporidium* removal requirement established for large and medium systems in the 1998 IESTWR to small systems serving fewer than 10,000 persons.

3. What Major Comments Were Received?

The majority of the commenters on the proposed rule agreed with the appropriateness of establishing a 2-log removal requirement for *Cryptosporidium*. A few commenters noted that small systems should not be required to meet the same *Cryptosporidium* log removal requirements as large systems. EPA disagrees. The technological feasibility of 2-log removal is well demonstrated (as shown in the studies discussed in the proposal for today's final rule) and the Agency believes that persons served by all sized systems should be afforded comparable levels of public health protection (i.e., the small systems subject to the LT1ESWTR should have the same MCLG, and the 2-log *Cryptosporidium* removal treatment technique as large systems subject to the IESWTR).

B. What Combined Filter Effluent Requirements Does the LT1ESWTR Contain?

1. What Does Today's Rule Require?

Today's final rule requires strengthened combined filter effluent performance for conventional filtration, direct filtration, and alternative filtration systems (systems using filtration technologies other than conventional filtration, direct filtration, diatomaceous earth filtration, or slow sand filtration) as the treatment technique for achieving a 2-log removal of *Cryptosporidium*. For conventional and direct filtration systems, the

turbidity level of representative samples of a system's combined filter effluent water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month. The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU. Under today's rule, conventional and direct filtration plants meeting these filter performance requirements are presumed to achieve at least a 2-log removal of *Cryptosporidium*. Slow sand and diatomaceous earth filtration plants are presumed to achieve at least 2-log removal of *Cryptosporidium* if they continue to meet the existing filter performance requirements established in the SWTR. Systems using alternative filtration (i.e., membrane filtration, cartridge filtration, etc.) must demonstrate to the State that their system achieves 2-log removal of *Cryptosporidium*. The State will then establish appropriate turbidity limits to reflect this performance. At the end of each month, systems must report the total number of combined filter effluent turbidity measurements taken each month, as well as the number and percentage of turbidity measurements that exceeded their 95th percentile turbidity limit and the number of measurements that exceeded their maximum turbidity limit. Combined filter effluent turbidity measurements must be kept for at least three years.

2. How Was This Requirement Developed?

In establishing the 2-log removal as a treatment technique for *Cryptosporidium*, the Agency relied on the aforementioned studies to demonstrate the technological feasibility of establishing the 2-log removal. These studies demonstrated that specific treatment would achieve 2-log removal of *Cryptosporidium* when operated to achieve specific turbidity performance limits. For conventional and direct filtration systems, studies demonstrated that achieving a turbidity of 0.3 NTU 95 percent of the time and never exceeding 1 NTU would ensure at least 2-log removal of *Cryptosporidium*. For slow sand and diatomaceous earth filtration systems, the studies demonstrated that meeting existing SWTR turbidity limits would ensure at least 2-log removal of *Cryptosporidium*. Alternative filtration systems were shown to achieve at least 2-log removal of *Cryptosporidium* at a variety of turbidities based on the type of filtration and other site-specific characteristics. The requirements of today's final rule reflect the recommendations of the 1997 M-DBP Committee.

As part of the LT1ESWTR development process, EPA analyzed performance data from 211 small systems in 15 different States. That data indicated that a substantial number of small systems are presently meeting the tighter performance standards of today's rule. For example, 50 percent of the 211 systems are currently meeting 0.3 NTU 12 months out of the year. In addition, 93 percent of the 211 systems never exceeded the 1 NTU maximum 12 months out of the year. Therefore, EPA believes that the strengthened filter performance standards established for small systems in today's final rule are feasible and achievable.

3. What Major Comments Were Received?

The majority of the commenters on the proposal agreed with the appropriateness of the combined filter effluent requirements. Many commenters raised concerns with the proposal's reliance on turbidity as an indicator for demonstrating that membrane filtration meets the same *Cryptosporidium* removal requirements as conventional and direct filtration systems. Commenters indicated that although turbidity is the most prevalent form of water quality monitoring, establishing a 0.3 NTU 95th percentile limit and 1 NTU maximum limit would not be as appropriate an indicator of the performance of membranes than other parameters such as flux or membrane integrity. They noted that using turbidity was appropriate if site specific turbidity limits were utilized. At most facilities these limits would typically be much lower than 0.3 NTU. Additionally, commenters asserted that since the typical operational turbidities of membranes (< 0.05 NTU) were so much lower than those of conventional filtration, it would be inappropriate to require membranes to meet turbidity limits that were significantly higher than standard operating practices. In response, EPA notes that in the proposed rule, EPA allowed membrane systems to meet either conventional filtration or alternative filtration combined filter effluent requirements. After further evaluating existing studies and information provided by commenters, EPA agrees that other appropriate indicators may be used to determine the treatment efficiency of membrane filtration, and that given the different operational turbidities of conventional filtration and membrane filtration, different turbidity limits are appropriate. Therefore, today's final rule treats membrane filtration as an available alternative filtration technology, instead of requiring membranes to meet the same turbidity limits as conventional and direct filtration.

C. What Individual Filter Monitoring Requirements Does the LT1ESWTR Contain?

1. What Does Today's Rule Require?

Today's final rule establishes a requirement that all systems using surface water or GWUDI, serving fewer than 10,000 persons, and utilizing conventional or direct filtration must continuously monitor the individual filter turbidity for each filter used at the system. For purposes of this rule, continuous monitoring means at least every 15 minutes. Systems must keep the results of this monitoring for at least three years. Each month systems must report to the State that they have conducted individual filter turbidity monitoring, and are required to indicate the dates, filter number, and turbidities of any measurements that exceeded 1.0 NTU. Today's rule provides that systems with two or fewer filters may monitor combined filter effluent turbidity continuously, in lieu of individual filter turbidity monitoring. Based on this monitoring, if a system exceeds 1.0 NTU in two consecutive measurements the system must include the filter number, date, time and reason for the exceedance at the end of the month in its monthly filter performance report to the State. If this occurs three months in a row for the same filter, a system is required to conduct a self-assessment of the filter. If a self-assessment is required, it must take place within 14 days of the day the filter exceeded 1.0 NTU in two consecutive measurements for the third straight month. The system must report to the State that the self-assessment was completed. A self-assessment must include at least the following components:

—Assessment of filter performance;
—Development of a filter profile;
—Identification and prioritization of factors limiting filter performance;
—Assessment of the applicability of corrections; and
—Preparation of a self-assessment report.

If a system exceeds 2.0 NTU (in two consecutive measurements 15 minutes apart) for two months in a row, the system must contact the State to arrange for the State or an approved third party to conduct a Comprehensive Performance Evaluation (CPE) not later than 60 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month. The CPE must be completed and

submitted to the State no later than 120 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month.

2. How Was This Requirement Developed?

Performance of individual filters within a plant is of paramount importance in preventing pathogen breakthrough. Two important concepts regarding individual filters underlie today's individual filter monitoring requirement. First, as discussed in more detail in the April 10, 2000 proposal, poor performance (and potential pathogen breakthrough) of one filter can be masked by optimal performance of the remaining filters, without exceeding combined filter effluent turbidity performance standards. Second, recent filter performance research demonstrates that individual filters are susceptible to turbidity spikes of short duration that may not be captured by four-hour combined filter effluent measurements. Several studies (Amirthatajah, 1988; Bucklin *et al.,* 1988; Cleasby 1990; Hall and Croll 1996; and McTigue *et al.,* 1998) have confirmed the frequency and magnitude of individual filter turbidity spikes. To address these spikes and the potential for masking, and provide system operators with information and advanced warning with regards to individual filter performance problems before they lead to treatment technique violations, the Agency proposed individual filter turbidity monitoring. EPA proposed one option and requested comment on two alternative approaches. The alternatives consisted of an approach identical to the IESWTR that entailed significantly more burden, and an approach that included 95th percentile and maximum triggers instead of a trigger based on two consecutive measurements. The proposed option has been revised in three minor ways. In today's rule:

—Systems with two or fewer filters may monitor combined filter effluent turbidity continuously, in lieu of individual filter turbidity (the proposal required all filters be monitored);

—Systems must schedule CPEs within 60 days and complete them within 120 days (the proposal required 30 and 90 days);

—A system has 14 days following a turbidimeter malfunction to resume continuous individual filter monitoring before a violation occurs (the proposal required 5 days).

3. What Major Comments Were Received?

The majority of the commenters on the proposal agreed with the appropriateness of the individual filter monitoring requirements. The Agency requested comment on a variety of issues to which commenters responded. Most commenters supported the modification that States be provided the opportunity to allow systems with two or fewer filters to monitor combined filter effluent turbidity continuously, in lieu of individual filter turbidity indicating that poor performance of one filter could not simply be masked by optimal performance of an additional filter. The Agency has included this modification in today's final rule because it reduces the burden on small systems while still providing continuous monitoring that can be used to indicate whether filters are performing poorly.

Several commenters supported a modification to lengthen CPE schedules by 30 days. The Agency has included this modification in today's final rule in order to provide States added flexibility in performing these activities. The extra 30 days will provide States the opportunity to marshal unique resources (specifically, employees trained in conducting CPEs) and prioritize the conduct of CPEs, when several systems trigger them during the same time period.

Several commenters indicated that allowing only five working days for an on-line turbidimeter to be off-line before a violation resulted would be inappropriate for small systems. Commenters indicated that smaller systems often do not have back-up units onsite and would be required to contact manufacturers and await shipping and installation which could easily exceed the five days. EPA agrees and has modified the requirement to allow systems serving fewer than 10,000 persons, 14 days to resume online monitoring prior to incurring a violation.

Several commenters noted that systems serving fewer than 10,000 persons should be subject to less frequent monitoring of individual filter effluent. EPA believes that continuous individual filter monitoring is feasible and assures improved performance of filtration systems. As explained in the proposal, continuous filter monitoring is necessary to identify short duration turbidity spikes which are likely to be missed with less frequent monitoring. This is true for systems of all sizes. Less frequent monitoring would not identify many turbidity spikes and accordingly would not provide a comparable level of public health protection as that of continuous monitoring required for large systems under the IESWTR. In fact, the actual frequency of individual filter monitoring has little effect on burden as much of the costs associated with monitoring are derived from the purchase of the necessary equipment and would be incurred regardless of the frequency. Reduced monitoring would represent reduced public health protection and the Agency firmly believes that the consumers of these small systems should be afforded a comparable level of public health protection as larger systems.

D. What Disinfection Profiling and Benchmarking Requirements Does the LT1ESWTR Contain?

1. What Does Today's Rule Require?

Today's final rule requires community and non-transient non-community systems that use surface water or GWUDI and serve fewer than 10,000 persons to develop a disinfection profile based on a 52 week period. Systems serving between 500 and 9,999 must begin profiling and notify the State to this effect by July 1, 2003. Systems serving fewer than 500 must begin profiling and notify the State to this effect by January 1, 2004. To conduct the profile, systems must:

—Monitor disinfectant residual concentration, water temperature in degrees Celsius, pH, and contact time during peak hourly flow once a week (on the same calendar day) during all months that the system is operational;

—Calculate Giardia lamblia inactivation for each of the 52 weeks; and

—Plot graphically, the 52 weekly inactivations.

Results of the profile must be kept indefinitely. EPA is developing guidance materials that provide detailed information on this procedure. A State may determine that a system's profile is unnecessary where a system submits TTHM and HAA5 data that:

—Is taken during the month of warmest water temperature (beginning no earlier than 1998);

—Is taken at the point of maximum residence time; and

—Reports levels of TTHM and HAA5 of less than 0.064 mg/L and 0.048 mg/L respectively.

Today's final rule also requires any system which developed a profile and which decides to make a significant change to their disinfection practice to determine their disinfection benchmark (the average microbial inactivation during the month with the lowest

inactivation), consult with the State for approval, and provide the following information during consultation:

—Description of the proposed change;
—Disinfection profile (and data used to develop profile); and
—Analysis of how the proposed change will affect the current levels of disinfection.

Results of the disinfection benchmark (including the raw data and analysis) must be kept indefinitely.

2. How Was This Requirement Developed?

The disinfection benchmarking requirements provide the necessary link between simultaneous compliance with microbial protection requirements of the IESWTR and LT1ESWTR and disinfection byproduct requirements of the DBPR. The requirements were established pursuant to the authority of Section 1445 of SDWA to ensure that systems would not jeopardize microbial protection when making changes in disinfection practices to comply with the DBPR.

During the 1997 M/DBP FACA deliberations, all participants agreed to the fundamental premise that new standards for control of DBPs must not lead to significant reductions in existing levels of microbial protection. This premise is reflected in the 1997 M–DBP Advisory Committee Agreement in Principle document. The Advisory Committee reached agreement on the use of a microbial profiling and benchmarking process, whereby a system and State, working together, could assure that there would not be a significant increase in microbial risk as a result of modifying disinfection practices to meet MCLs for TTHM and HAA5. The final IESWTR established the disinfection benchmark procedure to require large systems (serving 10,000 or more persons) that might be considering a significant change to their disinfection practice (defined as systems with TTHM or HAA5 concentrations at or above 80 percent of the respective MCLs (e.g., 0.064 mg/L TTHM or 0.048 mg/L HAA5)) to evaluate the impact on microbial risk. Under the IESWTR, large systems whose TTHM and/or HAA5 average levels exceeded the aforementioned values were required to develop a disinfection profile of microbial inactivation over the course of a year by calculating the daily level of *Giardia* inactivation. Those large systems required to develop a disinfection profile that also plan to make a significant change to disinfection practices were required to develop a ''benchmark'' of existing levels of *Giardia* microbial protection and to consult with the State prior to implementing the change.

In developing the disinfection benchmarking requirements of the LT1ESWTR, EPA used the IESWTR requirements as a starting point and, using significant input from stakeholders, modified the requirements to significantly reduce burden yet maintain a comparable level of public health protection. The April 10, 2000 proposal included several alternatives for establishing the microbial profiling and benchmarking process.

Of the four TTHM and HAA5 monitoring alternatives, the first was identical to the IESWTR, and included four quarters of monitoring at four points in the distribution system. The second alternative matched DBP compliance monitoring, requiring systems serving fewer than 500 to monitor once per year, and systems serving 500 or greater to monitor quarterly. A third alternative required only one sample taken at the point of maximum residence time for all systems. The fourth alternative (which was proposed) made TTHM and HAA5 monitoring optional. This alternative was chosen over the others, because it significantly reduces burden and the concern about ''early implementation,'' that is, the need for systems to comply with requirements of a rule before primacy states have adopted new conforming regulations, while still retaining the ability for systems and States to utilize monitoring data to demonstrate low TTHM and HAA5 levels, and therefore avoid profiling. Since this monitoring is no longer required to determine the applicability of systems to conduct profiles, the final LT1ESWTR refers to this monitoring as ''optional monitoring.'' The associated TTHM and HAA5 samples that must be conducted under this optional monitoring, are described in section 141.531. Of the four profiling alternatives, the first was identical to the IESWTR, requiring daily profiling for a year. The second alternative did not require profiling. The third alternative, which was proposed, required weekly profiling for a year. The fourth alternative required daily profiling during a single month. The Agency proposed weekly profiling over the course of a full year because it significantly reduces burden associated with conducting profiling (as compared to the first alternative), but still provides information on the seasonal variation associated with microbial inactivation, and develops an accurate microbial benchmark as systems moved to comply with the Stage 1 DBPR. The second and fourth profiling alternatives would not provide such information. The Agency has revised the proposed option in one minor way. In today's rule:

—Systems serving between 500 and 9,999 persons must begin weekly profiling no later than July 1, 2003, and systems serving fewer than 500 persons must begin weekly profiling no later than January 1, 2004 (the proposal required all systems to begin profiling no later than January 7, 2003).

3. What Major Comments Were Received?

The Agency received significant comment on the disinfection benchmarking provisions of the proposed rule. Commenters both supported and opposed the proposed ''optional'' TTHM and HAA5 monitoring. Several commenters argued that EPA should not require systems or states to undertake activities, even optional monitoring, before three years from the date a rule is promulgated because it would result in early implementation of the rule. While the Agency agrees that to the extent possible, implementation should be minimized in the first three years after the promulgation of a national primary drinking water regulation, as required by Section 1412(b)(10) of SDWA, the Agency continues to believe that allowing systems to conduct optional monitoring prior to three years after promulgation is appropriate and authorized under section 1445 of SDWA.

Several commenters raised ''early implementation'' concerns with profiling as well, and suggested profiling should take place only after using the first round of DBP monitoring in 2004 as optional monitoring for profiling activities. The Agency does agree, that to the extent possible, early implementation should be minimized in the first two years after the promulgation of the rule. However, the Agency believes that developing a microbial profile and benchmark prior to compliance monitoring under the Stage 1 DBPR is key to ensuring that systems do not jeopardize existing microbial protection when making changes to their disinfection practices to comply with the Stage 1 DBPR. Consequently, today's final rule requires systems serving fewer than 500 persons to begin profiling in January 2004, while systems serving greater than 500 to 9,999 persons are required to begin profiling in July 2003.

Other commenters believed that the proposed requirement represented burden reduction for small systems and

States while still achieving the goals of optional monitoring and profiling as developed by the 1997 FACA and EPA. Additionally, commenters noted that EPA should provide States and systems the ability to use more representative data if available (i.e., allowing systems to average over several quarters of data similar to the IESWTR requirements). EPA agrees that systems and States should be allowed the opportunity to use more representative samples, and today's final rule affords States the opportunity to allow more representative data for optional monitoring and profiling.

E. How Does the Definition of Ground Water Under the Direct Influence of Surface Water Change?

1. What Does Today's Rule Require?

Today's final rule modifies the definition of ground water under the direct influence of surface water (GWUDI) to include *Cryptosporidium*, as another pathogen that would indicate the presence of GWUDI, for all PWSs.

2. How Was This Requirement Developed?

Although ground water is typically protected from microbial contaminants that are characteristic of surface water supplies, some ground water systems are susceptible to microbial contamination from surface water. Ground water that exhibits physical water quality indicators that closely correlate with nearby surface water and which contain surface water indicator organisms is ''under the influence,'' of that surface water. In order to protect customers of such systems from illnesses resulting from exposure to Giardia and other microbial pathogens, the Agency addressed this issue during development of the 1989 SWTR. The final SWTR requires that systems with source water found to be GWUDI are subject to the filtration and disinfection requirements of Section 141 subpart H.

During development of today's final rule, the Agency proposed to modify the definition of GWUDI to include *Cryptosporidium*, as another pathogen that would indicate the presence of GWUDI. This is consistent with the approach taken by the Agency in the IESWTR and is further supported by recently available data indicating *Cryptosporidium* occurrence in 21 public water system wells (Hancock et al., 1998). As a result, EPA believes it appropriate and necessary to include *Cryptosporidium* in the definition of GWUDI for systems serving fewer than 10,000 persons in today's rule.

3. What Major Comments Were Received?

Commenters agreed with the appropriateness of modifying the definition of GWUDI to include *Cryptosporidium* for all PWSs. Today's final rule reflects the GWUDI definition as proposed.

F. What Additional Requirements Does the LT1ESWTR Contain for Unfiltered Systems?

1. What Does Today's Rule Require?

Today's rule modifies the requirements for surface water or GWUDI systems serving fewer than 10,000 persons that do not provide filtration by including *Cryptosporidium* in the watershed control provisions everywhere *Giardia lamblia* is mentioned.

2. How Was This Requirement Developed?

Watershed control requirements were initially established in 1989 as part of the SWTR. The SWTR contains specific conditions that a system must meet in order to avoid filtration. These conditions include good source water quality disinfection requirements, periodic on-site inspections, the absence of waterborne disease outbreaks, compliance with the Total Coliform Rule, and a watershed control program. The SWTR requires that the watershed control program must be maintained specifically to minimize the potential for contamination by *Giardia lamblia* cysts and viruses in the source water.

During development of today's rule, the Agency proposed that *Cryptosporidium* should also be included as a focus in watershed program for unfiltered systems. For the same public health reasons explained in detail as part of the April 10, 2000 proposal and outlined earlier regarding the risks associated with exposure to *Cryptosporidium,* the Agency believes it is important that watershed control requirements for unfiltered systems be revised to include *Cryptosporidium.* This is particularly important since such systems do not have the additional treatment barrier provided by filtration to protect against possible pass-through of *Cryptosporidium* into the distribution system.

3. What Major Comments Were Received?

Commenters agreed with the appropriateness of including *Cryptosporidium* in the watershed control program requirements for unfiltered systems. No substantive changes were made to this provision between proposal and today's final rule.

G. What Does the LT1ESWTR Require for Finished Water Reservoirs

1. What Does Today's Rule Require?

Today's final rule requires that all finished water reservoirs, holding tanks, or storage water facilities for finished water at systems serving fewer than 10,000 persons, for which construction begins after March 15, 2002 must be covered.

2. How Was This Requirement Developed?

Open finished water reservoirs, holding tanks, and storage tanks are utilized by PWSs throughout the country. Because these reservoirs are open to the environment and outside influences, they can be subject to the reintroduction of contaminants that the treatment plant was designed to remove. Existing EPA guidelines recommend that all finished water reservoirs and storage tanks be covered (USEPA, 1991). Additionally, many States currently require that finished water storage be covered, and the American Water Works Association (AWWA) has issued a policy statement strongly supporting the covering of reservoirs that store potable water (AWWA, 1983). In the July 29, 1994 IESWTR proposal (59 FR 38832), the Agency requested comment on whether to issue regulations requiring systems to cover finished water storage. Most commenters supported either Federal or State requirements, with some suggesting requirements should only apply to newly constructed reservoirs. In the final IESWTR, the Agency required systems using surface water and GWUDI and serving 10,000 persons or more to cover any newly constructed finished water reservoirs, holding tanks, or storage tanks. Through discussions with stakeholders and evaluations of available information, the Agency is unaware of any newly constructed uncovered finished water reservoirs at small systems since discussions with stakeholders regarding the LT1ESWTR began in 1998. The Agency is furthermore unaware of any future plans of small systems to construct uncovered finished water reservoirs. In fact the drinking water industry (regulators, consultants, and industry groups) have discouraged the construction of new uncovered reservoirs for many years. Furthermore, creating a prohibition on newly constructed uncovered finished water reservoirs would not affect current unfinished water reservoirs or even any system, which, despite the industry

standard of constructing only covered finished water reservoirs, may have already commenced construction on an uncovered finished water reservoir unbeknownst to the Agency or stakeholders which provided input on the rule. Therefore, in accordance with Section 1412(b)(10) of SDWA, the Agency has determined it is practicable to require as part of today's rule that systems serving fewer than 10,000 people provide covers for all finished water reservoirs, holding tanks, or storage reservoirs constructed after March 15, 2002.

3. What Major Comments Were Received?

Commenters agreed with the appropriateness of requiring that newly constructed finished water storage be covered. Several States noted that they currently require that all finished water reservoirs be covered. No substantive changes were made to this provision between proposal and today's final rule.

H. What Is the Compliance Schedule for the LT1ESWTR?

1. When Must My System Comply With Each of the Requirements of the Rule?

Each of the components of the final LT1ESWTR has a specific compliance date. The following table lists each requirement, along with the appropriate **Federal Register** citation and the compliance date:

Rule requirements	FR citation	Compliance date
Cover new finished water reservoirs	§ 141.511	March 15, 2002.
Comply with updated watershed control requirements (unfiltered PWSs).	§§ 141.520, 141.521 & 141.522	January 14, 2005.
Begin Developing Disinfection Profile	§§ 141.530–141.536	July 1, 2003 for systems serving between 500 and 9,999 persons and January 1, 2004 for systems serving fewer than 500 persons.
Complete the Disinfection Profile	§§ 141.530–141.536	July 1, 2004 for systems serving between 500 and 9,999 persons and January 1, 2005 for systems serving fewer than 500 persons.
Combined Filter Effluent Turbidity Limits	§§ 141.550, 141.551, 141.552, & 141.553.	January 11, 2005.
Individual Filter Turbidity Monitoring	§§ 141.560, 141.561, 141.562, 141.563, 141.564.	January 11, 2005.

2. What Major Comments Were Received?

Many commenters noted that they would not support requirements that would take place prior to two years after the promulgation of today's final rule. Several others recommended requiring that no portions of the rule should take effect until three years after the date of promulgation. The Agency does agree that to the extent possible, implementation should be minimized in the first two years after the promulgation of the rule. However, today's final rule requires systems serving fewer than 500 persons to begin profiling in January 2004, while systems serving greater than 500 to 9,999 persons are required to begin profiling in July 2003. This would allow time for States to work with systems, yet still provide profiling data prior to compliance sampling under the Stage 1 DBPR.

I. What Public Notification and Consumer Confidence Report Requirements Are Contained in the LT1ESWTR?

Today's final rule modifies the Public Notification (PN) requirements found in Appendix A and B of subpart Q of Part 141 to include public notification requirements for systems subject to the LT1ESWTR that are consistent with those for systems subject to the IESWTR.

Today's rule does not specifically modify the Consumer Confidence Report (CCR) Requirements found in subpart O of Part 141. However, consumer confidence reports must contain any violations of treatment techniques or requirements of NPDWRs as specified in § 141.153(d)(6) and § 141.153(f). This includes any such violations of the LT1ESWTR.

Updated CCR and PN appendices can be found on the Agency's Web site at *http://www/epa.gov/safewater/tables.html*.

IV. State Implementation

A. What Special State Primacy Requirements does the LT1ESWTR Contain?

In addition to adopting drinking water regulations at least as stringent as the Federal regulations of the LT1ESWTR, EPA requires that States adopt certain additional provisions related to this regulation to have their program revision application approved by EPA. This information advises the regulated community of State requirements and assists EPA in its oversight of State programs.

Under the final LT1ESWTR, there are several special primacy requirements that a State's application must include:

—Description of how the State will consult with the system and approve modifications to disinfection practices;

—Description of how the State will approve a more representative data set for optional monitoring and profiling under §§ 141.530–141.536.

—Description of how existing rules, adoption of appropriate rules or other authority under § 142.16(i)(1) require systems to participate in a Comprehensive Technical Assistance (CTA) activity, and the performance improvement phase of the Composite Correction Program (CCP);

—Description of how the State will approve a method to calculate the logs of inactivation for viruses for a system that uses either chloramines, chlorine dioxide, or ozone for primary disinfection; and

—For alternative filtration technologies (filtration other than conventional filtration treatment, direct filtration, slow sand filtration or diatomaceous earth filtration), a description of how the State will determine under § 142.16(i)(2)(iv), that a PWS may use a filtration technology if the PWS demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with the disinfection treatment that meets the requirements of subpart T of this title, consistently achieves 3-log (99.9 percent) removal and/or inactivation of *Giardia lamblia* cysts and 4-log (99.99 percent) removal and/or inactivation of viruses, and 2-log (99 percent) removal of *Cryptosporidium* oocysts; and a description of how, for the

system that makes this demonstration, the State will set turbidity performance requirements that the system must meet 95 percent of the time and that the system may not exceed at any time.

B. What State Recordkeeping Requirements Does the LT1ESWTR Contain?

Today's rule includes changes to the existing recordkeeping provisions to implement the requirements in today's final rule. States must maintain records of the following:

(1) Records of turbidity measurements;

(2) Records of disinfectant residual measurements and other parameters necessary to document disinfection effectiveness;

(3) Decisions made on a system-by-system basis and case-by-case basis under provisions of section 141, subpart H or subpart P or subpart T;

(4) Records of systems consulting with the State concerning a significant modification to their disinfection practice (including the status of the consultation);

(5) Records of decisions that a system using alternative filtration technologies can consistently achieve a 2-log (99 percent) removal of *Cryptosporidium* oocysts, as well as the required levels of removal and/or inactivation of Giardia and viruses for systems using alternative filtration technologies, including State-set enforceable turbidity limits for each system. A copy of the decision must be kept until the decision is reversed or revised and the State must provide a copy of the decision to the system, and;

(6) Records of those systems required to perform filter self-assessments, CPE or CCP.

C. What State Reporting Requirements Does the LT1ESWTR Contain?

Currently States must report information to EPA under section 142.15 regarding violations, variances and exemptions, enforcement actions and general operations of State public water supply programs. There are no additional requirements under this rule, but States are required to report violations, variances and exemptions, and enforcement actions related to this rule.

D. How Must a State Obtain Interim Primacy for the LT1ESWTR?

To maintain primacy for the Public Water Supply Supervision (PWSS) program and to be eligible for interim primacy enforcement authority for future regulations, States must adopt today's final rule. A State must submit a request for approval of program revisions that adopt the revised MCL or treatment technique and implement regulations within two years of promulgation, unless EPA approves an extension per § 142.12(b). Interim primacy enforcement authority allows States to implement and enforce drinking water regulations once State regulations are effective and the State has submitted a complete and final primacy revision application. To obtain interim primacy, a State must have primacy with respect to each existing NPDWR. Under interim primacy enforcement authority, States are effectively considered to have primacy during the period that EPA is reviewing their primacy revision application.

V. Economic Analysis (Health Risk Reduction and Cost Analysis)

This section summarizes the Health Risk Reduction and Cost Analysis (HRRCA) in support of the LT1ESWTR as required by section1412(b)(3)(C) of the 1996 SDWA. In addition, under Executive Order 12866, Regulatory Planning and Review, EPA must estimate the costs and benefits of the LT1ESWTR. EPA has prepared an economic analysis to comply with the requirements of this order and the SDWA Health Risk Reduction and Cost Analysis (USEPA, 2001a). The final economic analysis has been published on the Agency's Web site, and can be found at *http://www.epa.gov/safewater/lt1eswtr*. The analysis can also be found in the docket for this rulemaking.

EPA has estimated the total annualized cost for implementing the LT1ESWTR and analyzed the total benefits that result from the rule. Total annual costs for the rule are $39.5 million, in 1999 dollars, using three percent discount rate [$44.8 million using a seven percent discount rate]. The cost estimate includes capital costs for treatment changes and start-up and annual labor costs for monitoring and reporting activities. More detailed information, including the basis for these estimates and alternate cost estimates using different cost of capital assumptions are described in the LT1ESWTR economic analysis (USEPA, 2001a). Combining the value of illness and mortalities avoided, the estimate of the total quantified annual benefits of the LT1ESWTR range from $18.9 million to $90.9 million. However, this range does not incorporate many of the sources of uncertainty related to quantifying benefits, including many benefits the Agency was unable to evaluate. Accordingly, incorporating additional uncertainties would necessarily increase the size of the range. For example, the number of avoided cases of cryptosporidiosis might be higher or lower than the number reflected in this range. More detailed information, including the basis for these estimates, are described in the LT1ESWTR economic analysis (USEPA, 2001a).

A. What Are the Costs of the LT1ESWTR?

In estimating the costs of today's final rule, the Agency considered impacts on PWSs and on States (including territories and EPA implementation in non-primacy States). The LT1ESWTR will result in increased costs to public water systems for implementing the components of today's final rule. States will also incur implementation costs. EPA estimates that the annualized cost of today's final rule will be $39.5 million using a three percent discount rate ($44.8 million using a seven percent discount rate).

Approximately 84 percent ($33.1 million using a 3 percent discount rate and $38.2 million using a 7 percent discount rate) of the rule's total annual costs are imposed on drinking water utilities. States incur the remaining 16 percent ($6.4 million using 3 percent and $6.6 million using 7 percent) of the LT1ESWTR's total annual cost. The turbidity provisions, which include treatment changes, monitoring, and reporting, account for the largest portion of the total rule costs ($37.7 million using 3 percent and $42.7 million using 7 percent). Systems will incur most of the turbidity provision costs and this is discussed in more detail in the next section. The national estimate of annual system costs is based on estimates of system-level costs for the rule and estimates of the number of systems expected to incur each type of cost. Total capital costs for the LT1ESWTR (non-annualized) is $173.6 million.

Turbidity Provision Costs—The turbidity provisions are estimated to cost both public drinking water systems and States approximately $37.7 million annually using a three percent discount rate ($42.7 million using 7 percent). However, the majority of these costs will be borne by the systems and are the result of treatment changes to meet the 0.3 NTU turbidity standard as well as the cost for some systems to purchase turbidimeters in order to meet the monitoring requirements of this rule. The Agency estimates that 2,207 systems will modify their water treatment in response to this rule provision while 2,327 conventional and direct filtration systems will need to install turbidimeters. In addition to the capital costs associated with this rule

provision there will also be increases in operation and maintenance (O&M) costs. These combined capital and O&M costs have an estimated cost to systems of $27.1 million annually using a 3 percent discount rate ($31.8 million using a 7 percent discount rate). The O&M expenditures account for 59 percent of the $27.1 million using a 3 percent discount rate ($31.8 million using a 7 percent discount rate) while the remaining 41 percent represents annualized capital costs. In addition to the turbidity treatment costs, turbidity monitoring costs apply to all small surface water or GWUDI systems using conventional or direct filtration methods. There are an estimated 5,817 systems that fall under this criterion. The annualized individual filter turbidity monitoring cost to PWSs is approximately $4.5 million using a 3 percent discount rate ($4.7 million using 7 percent). In addition to the turbidity treatment and monitoring costs, individual filter turbidity exceedance reporting is estimated to cost systems $0.6 million annually (using either a 3 percent or 7 percent discount rate).

The Agency estimated that the total State cost for the turbidity provision (monitoring and exceptions) is $6.1 million annually (using either a 3 percent or 7 percent discount rate), with start-up and monitoring comprising of 81 percent of these annual costs ($4.9 million annually using either a 3 percent or 7 percent discount rate). The remaining $1.2 million (using either a 3 percent or 7 percent discount rate) in annual costs includes the costs for States to review the individual filter turbidity exceedance reports and individual filter self-assessment costs.

Disinfection Benchmarking Costs—The disinfection benchmarking provision involves three components: benchmarking, profiling, and optional monitoring. The start-up costs for this provision are estimated to cost systems $2.9 million ($0.2 million annualized using a three percent discount rate and $0.3 million using a seven percent discount rate). Disinfection benchmarking and profiling are estimated to cost systems approximately $0.4 million annually using a 3 percent discount rate ($0.5 million using 7 percent). TTHM and HAA5 monitoring is optional and estimated to cost $0.3 million annually using a 3 percent discount rate ($0.4 million using a 7 percent discount rate). State disinfection benchmarking annualized costs are estimated to be $0.4 million using a 3 percent discount rate ($0.5 million using a 7 percent discount rate). This estimate includes start-up, compliance tracking/recordkeeping, and consultation costs.

Covered Finished Water Reservoir Provision Costs—The LT1ESWTR requires that small systems cover all newly constructed finished water reservoirs, holding tanks, or other storage facilities for finished water. Total annual costs, including annualized capital costs and one year of O&M costs are expected to be $0.8 million (using either a 3 percent or 7 percent discount rate) for this provision. This estimate is calculated from a projected construction rate of new reservoirs and unit cost assumptions for covering new finished water reservoirs. Also, the Agency believes that this is an overestimate since there may be additional States that currently require finished water requirement.

Although EPA has estimated the cost of all the rule's components on drinking water systems and States, there are some costs that the Agency did not quantify. These non-quantifiable costs result from uncertainties surrounding rule assumptions and from modeling assumptions. For example, EPA did not estimate a cost for systems to acquire land if they needed to build a treatment facility or significantly expand their current facility because the need for and cost of land is highly system specific. Additionally, if the cost for land was prohibitive, an alternative compliance option may be available (such as connecting to another source). Once again, the Agency has not quantified costs for this scenario due to the high degree of site specificity. However, based on evaluations of Comprehensive Performance Evaluations (CPEs), EPA believes that most systems possess more than adequate property to construct new facilities.

In addition, other LT1ESWTR provisions may affect some systems but the Agency was not able to quantify these costs. These non-quantified costs include those for systems that incur incremental costs increases as a result of including *Cryptosporidium* in the definition of GWUDI and also by including *Cryptosporidium* in the watershed control requirements for unfiltered systems. The Agency lacked data on the number of systems potentially affected by these two provisions and was therefore, unable to estimate their costs. By including *Cryptosporidium* in the definition, more ground water systems may be determined to be under the direct influence of surface water resulting in additional cost because these systems must comply with the 1989 Surface Water Treatment Rule and today's rule. EPA also did not estimate the costs for unfiltered systems to control *Cryptosporidium* in their watersheds. These systems already control for other pathogens from similar sources as *Cryptosporidium* so it is likely that this provision will have a relatively minor impact.

B. What Are the Household Costs of the LT1ESWTR?

The mean annual cost per household is $6.24 and the cost per household is less than $15 for 90 percent of 6.3 million households potentially affected by today's final rule. Of the remaining households, nine percent will experience a range of annual costs from $15 to $120 ($10/month), while only one percent of households are estimated to experience annual costs exceeding $120.

As indicated in the economic analysis supporting today's final rule, per-household costs exceed $240/year for approximately 5,600 households out of the 6.3 million households potentially impacted by the LT1ESWTR. However, this analysis likely overestimates costs for most of these households, allowing that systems might choose to incur costs with up to 28 separate treatment changes when in fact it is likely to be more cost-effective to install a new treatment system. (This can be thought of as building an automobile piece by piece from an auto parts store compared to buying one at a dealership.) The aforementioned 5,600 households are associated with the end of the cost distribution where systems undertake an unrealistically large number of treatment changes.

C. What Are the Benefits of the LT1ESWTR?

The primary benefits of today's final rule come from reductions in the risks of microbial illness from drinking water. In particular, LT1ESWTR focuses on reducing the risk associated with disinfection resistant pathogens, such as *Cryptosporidium.* Exposure to other pathogenic protozoa, such as *Giardia,* or other waterborne bacteria, viral pathogens, and other emerging pathogens are likely to be reduced by the provisions of this rule as well, but are not quantified. In addition, LT1ESWTR produces non-quantifiable benefits associated with the risk reductions that result from the uncovered reservoir provision, including *Cryptosporidium* in GWUDI definition, and including *Cryptosporidium* in watershed requirements for unfiltered systems. Non-quantifiable benefits also include reducing the risks to sensitive subpopulations and the likelihood of

incurring costs associated with outbreaks.

1. Quantifiable Health Benefits

The quantified benefits from this rule are based solely on the reductions in the risk of cryptosporidiosis that result from the turbidity provision. As a result of data limitation, this analysis only addresses endemic illness and not illness that results from epidemic disease outbreaks. *Cryptosporidiosis* is an infection caused by *Cryptosporidium* which is an acute, self-limiting illness lasting 7 to 14 days, with symptoms that include diarrhea, abdominal cramping, nausea, vomiting and fever (Juranek, 1995). The monetized value of an avoided case of cryptosporidiosis is estimated to range from $796 to $1,411 per case based on a cost-of-illness methodology (Harrington et al., 1985; USEPA 2001a). The high end of the range includes losses for medical costs, work time, productivity, and leisure time. However, the low end of the range only values medical costs and work time. The medical costs may be overestimated as they are assumed to be the same as medical costs for a case of Giardiasis which has a significantly longer duration. However, the Agency believes it is appropriate not to prorate medical costs for the shorter duration of Cryptosporidiosis because (1) available data suggests that the median length of hospital stays is essentially the same for Cryptosporidiosis compared to Giardiasis; (2) the Harrington et al. study was conducted in the mid-1980's, and consequently, the higher direct medical costs associated with treating individuals with HIV/AIDS, who are more severely impacted by Cryptosporidiosis, was not included; and (3) Cryptosporidiosis has no known medical treatment and available data indicates that the range of the length of hospital stays for immunocompromised individuals is larger for cases of Cryptosporidiosis compared to Giardiasis. The Agency also recognizes however, that many individuals with Cryptosporidiosis do not seek medical treatment and thus have little or no associated medical cost, and that the percentage of such cases may be higher for Cryptosporidiosis than Giardiasis given its shorter duration.

The benefits of the turbidity provisions of LT1ESWTR come from improvements in filtration performance at water systems. The benefits analysis accounts for some of the variability and uncertainty in the analysis by estimating benefits under two different current treatment and three improved removal assumptions. In addition, EPA used Monte Carlo simulations to derive a distribution of estimates to address uncertainty.

In order to quantify the benefits of this rule, the Agency estimated changes in the incidence of cryptosporidiosis that would result from the rule. The analysis included estimating the baseline (pre-LT1ESWTR) level of exposure and risk from *Cryptosporidium* in drinking water and the reductions in such exposure and risk resulting from the turbidity provisions of the LT1ESWTR. Baseline levels of *Cryptosporidium* in finished water were estimated by assuming national source water occurrence distribution (based on data by LeChevallier and Norton, 1995) and a national distribution of *Cryptosporidium* removal by treatment.

In the LT1ESWTR economic analysis, the following two assumptions were made regarding the current *Cryptosporidium* oocyst removal performance to estimate finished water *Cryptosporidium* concentrations. First, based on treatment removal efficiency data presented in the proposal, EPA assumed a national distribution of physical removal efficiencies with a mean of 2.0 logs and a standard deviation of 0.63 logs. Because the finished water concentrations of oocysts represent the baseline against which improved removal from the LT1ESWTR is compared, variations in the log removal assumption could have considerable impact on the risk assessment. Second, to evaluate the impact of the removal assumptions on the baseline and resulting improvements, an alternative mean log removal/inactivation assumption of 2.5 logs and a standard deviation of 0.63 logs were also used to calculate finished water concentrations of *Cryptosporidium*.

For each of the two baseline assumptions, EPA assumed that a certain number of plants would show low, mid, or high improved removal as a result of the turbidity provisions. The amount of improved removal depends upon factors such as water matrix conditions, filtered water turbidity effluent levels, and coagulant treatment conditions. The low, mid, and high improved removals were derived from Patania et al., (1995). This study demonstrated that an incremental decrease in turbidity from 0.3 NTU to 0.1 NTU (or a 0.2 NTU reduction overall) resulted in increased oocyst removals of up to one-log. The Agency used this data to construct low, mid, and high removal assumptions that would capture uncertainty associated with improved removal. The Agency also utilized different low, mid, and high removal assumptions for distinct categories of current turbidity performance (<.2NTU, 0.2–0.3 NTU, 0.3–0.4 NTU, and > 0.4 NTU). For instance, systems currently operating at greater than 0.4 NTU would need to target 0.2 NTU to ensure compliance with the 0.3 NTU limit and EPA accordingly assumed a low improved removal of 0.5-log, a mid improved removal of 0.75-log and a high improved removal of 0.9-log. However, systems currently operating between 0.2 NTU and 0.3 NTU were only expected to minimally improve turbidity performance and would therefore only expect improved log removals of 0.15, 0.25, and 0.3 (low, mid, and high). As a result, the economic analysis considers various baseline and with-rule scenarios to develop a range of endemic health damages avoided. Additional information is found in the Benefits chapter of the Economic Analysis supporting today's final rule.

The finished water *Cryptosporidium* distributions that would result from additional log removal with the turbidity provisions were derived assuming that additional log removal was dependent on current removal, i.e., that systems currently operating at the highest filtered water turbidity levels would show the largest improvements or high improved removal assumption. For example, plants now failing to meet a 0.4 NTU limit would show greater removal improvements than plants now meeting a 0.3 NTU limit.

In addition to assuming the more conservative baseline and removal assumptions, the lower-end of the LT1ESWTR's benefit estimate does not include valuations for leisure time, productivity losses (returning to work but still experiencing symptoms), and other loss categories that the authors discuss but do not quantify (e.g., ''high valued'' leisure). The authors (Harrington *et al.*) were highly confident in the estimates for direct medical expenditures and work losses which comprise the lower benefit estimate; and less confident in the values for leisure time losses and productivity losses which are included in the upper benefit estimate only. The decreased level of confidence was based on the data and methods used to estimate only these losses. The authors also conclude that: ''* * * nonetheless, the loss categories in this group–[productivity, leisure time, etc.] are unquestionably present and therefore, raise losses above those reported in [the lower-end benefit estimate]''. The Agency believes that these categories have positive value as stated in Harrington *et al.* consequently the lower-end estimate for the

LT1ESWTR understates the true value of these loss categories.

The Agency further notes that the medical expense component of the valuation may be overstated because it is not prorated for the shorter duration of Cryptosporidiosis relative to Giardiasis (mean duration of 11.5 v. 41.6 days). The Agency believes this is appropriate however, because (1) available data suggests that the median length of hospital stays is essentially the same for Cryptosporidiosis compared to Giardiasis; (2) the Harrington et al. study was conducted in the mid-1980's, and consequently, the higher direct medical costs associated with treating individuals with HIV/AIDS, who are more severely impacted by Cryptosporidiosis, was not included; and (3) Cryptosporidiosis has no known medical treatment and available data indicates that the range of the length of hospital stays for immunocompromised individuals is larger for cases of Cryptosporidiosis compared to Giardiasis. The Agency also recognizes however, that many individuals with Cryptosporidiosis do not seek medical treatment and thus have little or no associated medical cost, and that the percentage of such cases may be higher for Cryptosporidiosis than Giardiasis given its shorter duration.

Table V.1 indicates estimated annual quantified benefits associated with implementing the LT1ESWTR. The benefits analysis examines only the endemic health damages avoided based on the LT1ESWTR for each of the turbidity provision scenarios discussed previously. For each of these scenarios, EPA calculated the mean of the distribution of the number of illnesses avoided. The 10th and 90th percentiles imply that there is a 10 percent chance that the estimated value could be lower than the 10th percentile and there is a 10 percent chance that the estimated value could be higher than the 90th percentile. The modeling assumptions used to obtain the distribution of illness and mortality avoided for each baseline and the removal scenarios considers both variability and uncertainty. Specifically, the Agency used a 2-dimensional Monte Carlo simulation to include both uncertainty and variability inputs. The components that EPA considered uncertain include the probability of illness given an infection, the variability of *Cryptosporidium* to cause either an infection or illness, and the infectivity dose-response factor. The variability components include: *Cryptosporidium* occurrence in the finished water, individual daily drinking water consumption, and the number of days per year of exposure.

In the 2-dimensional simulation structure, a set of values for the uncertainty parameters is chosen from their respective distributions. This set of values is then ''frozen'' and a specified number of iterations are run where different values are chosen for the variability factors. This process is repeated for some specified number of sets of uncertainty parameters. For this analysis, 250 sets of uncertainty parameters were used, with 1,000 variability iterations performed on each of the 250 uncertainty sets.

This modeling exercise provides the Agency with 250 sets of statistics for individual annual risk of illness (e.g., mean, standard deviation) that each reflect different possible combinations of uncertainty factors. The 250 estimates for each set of statistics (i.e., mean, confidence intervals) were then used to compute an overall population average annual risk of illness.

Next, the Agency estimates cases of illness and mortality from the average annual risk of illness estimates. In order to do this, the average annual probability of illness is multiplied by the number of exposed individuals. In a separate Monte Carlo simulation for this calculation, the average annual probability of illness is treated as an uncertainty variable. As a result, the Agency has mean estimates with confidence intervals for various baseline and post LT1ESWTR assumptions regarding *Cryptosporidium* removal from source water. The 90th percentile confidence bounds on the expected values largely reflect the following uncertainty variables: the probability of illness given infection, the variability of *Cryptosporidium* to cause either an infection or illness, and the infectivity dose-response factor.

The Agency has done its best to represent a reasonable range of quantifiable uncertainty using standard modeling techniques. However, the Agency recognizes that additional sources of uncertainty exist which could not be quantified. To the extent that these are significant, the true range of uncertainty may be greater than that reflected in the quantified analysis.

EPA has evaluated drinking water consumption data from USDA's 1994–1996 Continuing Survey of Food Intakes by Individuals (CSFII) Study. EPA's analysis of the CSFII Study using the ''all sources, consumer only'' information resulted in a daily water ingestion lognormally distributed with a mean of 1.2 liters per person per day (USEPA, 2000j). Results of alternative model calculations based on USDA consumption data for ''community water supplies, all respondents'' (mean of 0.93 liters per person per day) are presented in the appendix to the economic analysis as a lower bound estimate.

TABLE V.1.—QUANTIFIED BENEFITS FROM ILLNESSES AND MORTALITIES AVOIDED ANNUALLY FROM TURBIDITY PROVISIONS

[$Millions]*

Quantified benefits	Daily drinking water ingestion and baseline Cryptosporidium log-removal assumptions, $Millions, 1999					
	2.0 log			2.5 log		
	Low	Mild	High	Low	Mid	High
Mean Benefit from Avoided Illnesses	$23.9–$42.4	$31.6–$56.0	$32.9–$58.3	$9.5–$16.8	$11.2–$19.8	$12.7–$22.6
10th Percentile	11.4–20.3	15.2–27.0	14.1–24.9	2.2–3.9	2.8–5.0	4.2–7.5
90th Percentile	50.1–88.8	58.8–104.2	56.5–100.2	26.6–47.2	27.6–48.9	33.6–59.5
Mean Benefits from Avoided Mortalities	23.7	31.3	32.5	9.4	11.1	12.6
10th Percentile	11.3	15.0	13.9	2.2	2.8	4.2
90th Percentile	49.6	58.2	55.9	26.3	27.3	33.2
Total Mean Quantified Benefits	47.6–66.1	62.9–87.3	65.4–90.9	18.9–26.2	22.2–30.9	25.4–35.2

*Totals may not equal due to rounding.

According to the economic analysis performed for the LT1ESWTR published today, the rule is estimated to reduce the mean annual number of illnesses caused by *Cryptosporidium* in water systems with improved filtration performance by 12,000 to 41,000 cases per year depending upon which of the six baseline and improved *Cryptosporidium* removal assumptions was used, and assuming the 1.2 liter drinking water consumption distribution. Based on these values, the mean estimated annual benefits of reducing the illnesses ranges from $9.5 million to $58.3 million per year. The economic analysis also indicated that the rule could result in a mean reduction of 1 to 5 fatalities each year, depending upon the varied baseline and improved removal assumptions. Using a mean value of $6.3 million per statistical life saved, reducing these fatalities could produce benefits in the range of $9.4 million to $32.5 million. Combining the value of illness and mortalities avoided, the estimate of the total quantified annual benefits of the LT1ESWTR range from $18.9 million to $90.9 million. However, this range does not incorporate many of the sources of uncertainty related to quantifying benefits, including many benefits the Agency was unable to evaluate. Accordingly, incorporating additional uncertainties would necessarily increase the size of the range.

New occurrence data and infectivity data is currently being evaluated by the Agency in the context of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). The analysis is currently ongoing and peer review has not been completed. EPA conducted a sensitivity analysis in the economic analysis supporting today's final rule to predict the effect that new data may have on the benefits presented earlier. Table V.2 provides a summary of this sensitivity analysis and depicts the cumulative change to the benefits range that each of the four new changes (new occurrence data, new infectivity data, new morbidity data, and new viability data) could have on benefits. The economic analysis includes a more detailed analysis using this data.

TABLE V.2.—SUMMARY OF RESULTS OF SENSITIVITY ANALYSIS TO PREDICT EFFECTS OF NEW DATA AND INFORMATION ON RANGE OF BENEFITS

	Current EA	New occurence data	New infectivity data	New morbidity data	New viability data
Change	No Changes	Occurrence changes from 4.7 oocyst/L to 1.06 oocyst/L.	Rate of infection from .00424 to .02317.	Morbidity changes from 0.39 to 0.5.	Viability changes from 16.4 percent to 55.2 percent.
Benefits Range	$18.9–$90.9	$5.4–$25.2	$17.3–$74.4	$22.5–$88.0	$51.2–$195.8

2. Non-Quantified Health and Non-Health Related Benefits

The quantified benefits from filter performance improvements do not fully capture all the benefits of the turbidity provision. Even the upper bound estimates, which are based on a cost-of-illness (COI) methodology (expanded to incorporate lost leisure time and lost productivity while working), may not fully capture the willingness-to-pay to avoid a case of Cryptosporidiosis. In addition, the Harrington, et al. study was conducted in the mid-1980's in a rural community and may not be fully representative of the current national population including individuals with HIV/AIDS and chemotherapy patients that are more severely impacted by Cryptosporidiosis. If this population was more accurately represented, it may be that the average per-case valuation would be higher than the range presented in this analysis. Further, the turbidity provisions are also expected to decrease the risk of waterborne disease outbreaks. However, the quantified benefits reflect only the reduction in endemic Cryptosporidiosis and not any outbreak-related illness or mortalities.

Other disinfection resistant pathogens may also be removed more efficiently due to implementation of the LT1ESWTR. Exposure to other pathogenic protozoa, such as *Giardia,* or other waterborne bacterial or viral pathogens are likely to be reduced by the provisions of this rule as well.

In addition to preventing illnesses, this rule is expected to have other non-health related benefits. During an outbreak, local governments and water systems must issue warnings and alerts and may need to provide an alternative source of water. Systems also face negative publicity and possibly legal costs. Businesses have to supply their customers and employees with alternative sources of water and some, especially restaurants, may even have to temporarily close. Households also have to boil their water, purchase water, or obtain water from another source. A study of a Giardia outbreak in Luzerne County, Pennsylvania showed that these non-health related outbreak costs can be quite significant (Harrington *et al.,* 1985). This outbreak resulted in an estimated loss to individuals of $31 million to $92 million. Additional losses were also calculated for restaurants and bars ($2 million to $7 million), government agencies ($0.4 million) and the water supply utility ($3 million).

The remaining rule provisions (disinfection benchmarking, covered finished water reservoirs, inclusion of *Cryptosporidium* in the GWUDI definition, and inclusion of *Cryptosporidium* in watershed control requirements for unfiltered systems) provide additional benefits. However, EPA is only able to discuss the benefits of these rule provisions qualitatively because of data limitations. The disinfection benchmark provision will ensure that adequate microbial protection is in place if a system must make changes to its disinfection practices as a result of the Stage 1 DBP rule. Covering finished water reservoirs will protect the finished water from becoming re-contaminated from such things as animal or bird droppings, surface water runoff, and algae. If *Cryptosporidium* is found in ground water supplies, they will be required to change treatment practice to prevent illness. Finally, by requiring *Cryptosporidium* control in watersheds of unfiltered systems, this will minimize the potential for illness and may also lower the overall costs of drinking water treatment.

D. What Are the Incremental Costs and Benefits?

EPA evaluated the incremental or marginal costs of today's final rule turbidity provision by analyzing various turbidity limits, 0.3 NTU, 0.2 NTU, and 0.1 NTU. For each turbidity limit, EPA developed assumptions about which process changes systems might implement to meet the turbidity level and how many systems would adopt each change. The comparison of total compliance cost estimates shows that costs are expected to increase

significantly across other turbidity limits considered by the Agency. The total cost of a 0.2 NTU limit is 346 percent higher than the final rule limit of 0.3 NTU, and a 0.1 NTU limit would be 1,192 percent higher.

E. Are There Benefits From the Reduction of Co-Occurring Contaminants?

If a system chooses to install treatment, it may choose a technology that would also address other drinking water contaminants. For example, some membrane technologies installed to remove bacteria or viruses can reduce or eliminate many other drinking water contaminants including arsenic.

The technologies used to reduce individual filter turbidities have the potential to reduce concentrations of other pollutants as well. Reductions in turbidity that result from today's proposed rule are aimed at reducing *Cryptosporidium* by physical removal. However, health risks from *Giardia lamblia* and emerging disinfection resistant pathogens, such as microsporidia, *Toxoplasma,* and *Cyclospora,* are also likely to be reduced as a result of improvements in turbidity removal. The frequency and extent that LT1ESWTR would reduce risk from other contaminants has not been quantitatively evaluated because of the Agency's lack of data on the removal efficiencies of various technologies for emerging pathogens and the lack of co-occurrence data for microbial pathogens and other contaminants from drinking water systems.

F. Is There Increased Risk From Other Contaminants?

It is unlikely that LT1ESWTR will result in any increased risk from other contaminants. Improvements in plant turbidity performance will not result in any increases in risk. In fact the disinfection benchmarking component of today's final LT1ESWTR will provide information to systems so they can minimize the increased risk from microbial contaminants as they take steps to address risks associated with DBPs under the Stage 1 DBPR.

G. What Are the Uncertainties in the Risk, Benefit and Cost Estimates for the LT1ESWTR?

EPA has included in the economic analysis, a detailed discussion of the possible sources of uncertainty in risk, benefit and cost estimates. Some sources of possible uncertainty associated with calculation of risk and benefits include occurrence of *Cryptosporidium* oocysts in source waters and finished waters, reduction of *Cryptosporidium* oocysts due to improved treatment, viability and infectivity of *Cryptosporidium* oocysts, characterization of risk, and willingness to reduce risk and avoid costs. Uncertainty associated with costs includes assumptions with respect to treatment a system might choose to employ to comply with the rule, assumptions about costs of labor, maintenance, and capital, and the number of systems expected to undertake certain activities. The Agency believes that the risks, benefits, and costs have been accurately portrayed. Discussions and analyses of risks, benefits, and costs in the economic analysis indicate where uncertainty may be introduced and to the extent possible, the effect uncertainty may have on analysis (USEPA, 2001a).

H. What Is the Benefit/Cost Determination for the LT1ESWTR?

The Agency has determined that the benefits of the LT1ESWTR justify the costs. As shown in Table V.3, the quantified net benefits of this rule based on the Agency's estimate range from $20.6 million to $51.4 million using the 3 percent discount rate ($25.9 million to $46.1 million at the 7 percent discount rate). Additionally, EPA believes that quantified net benefits would be larger if both unquantified benefits and costs were able to be monetized.

TABLE V.3.—ANNUALIZED NET BENEFITS OF THE LT1ESWTR, MILLIONS, 1999 DOLLARS

	Benefit range	Costs using a 3 percent discount rate	Costs using a 7 percent discount rate	Net benefits (3 percent)	Net benefits (7 percent)
Estimate of Benefits	$18.9–$90.9	$39.5	$44.8	$−20.6–$51.4	$−25.9–$46.1

VI. Other Requirements

A. Regulatory Flexibility Act (RFA), as Amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 U.S.C. 601 et seq.

The RFA generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

The RFA provides default definitions for each type of small entity. It also authorizes an agency to use alternative definitions for each category of small entity, ''which are appropriate to the activities of the agency'' after proposing the alternative definition(s) in the **Federal Register** and taking comment. 5 U.S.C. 601(3)–(5). In addition to the above, to establish an alternative small business definition, agencies must consult with SBA's Chief Counsel for Advocacy.

For purposes of assessing the impacts of today's rule on small entities, EPA considered small entities to be PWSs serving fewer than 10,000 persons. This is the cut-off level specified by Congress in the 1996 Amendments to the SDWA for small system flexibility provisions. In accordance with the RFA requirements, EPA proposed using this alternative definition in the **Federal Register** (63 FR 7620, February 13, 1998), requested comment, consulted with the Small Business Administration (SBA), and expressed its intention to use the alternative definition for all future drinking water regulations in the Consumer Confidence Reports regulation (63 FR 44511, August 19, 1998). As stated in that final rule, the alternative definition would be applied to this regulation as well.

After considering the economic impacts of today's final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities.

In accordance with section 603 of the RFA, EPA convened a Small Business Advocacy Review (SBAR) Panel to obtain advice and recommendations from representatives of small entities that would potentially be regulated by the rule in accordance with section 609(b) of the RFA. A detailed discussion of the Panel's advice and recommendations is found in the Panel Report found in the docket for today's final rule (USEPA, 1998k). The Panel recommendations emphasized the need to provide small systems flexibility. The Agency has structured today's final

LT1ESWTR with an emphasis on providing flexibility and reducing burden for small systems. For example, the Agency originally contemplated requiring four quarters of TTHM and HAA5 monitoring and disinfection profiling based on daily measurements. Today's final rule requires profiling based on weekly measurements and allows systems the option of using one quarter of TTHM and HAA5 monitoring to opt-out of profiling. Today's rule also provides systems with two or fewer filters the flexibility to monitor combined filter effluent in lieu of individual filter turbidity monitoring, effectively allowing these systems to reduce their recordkeeping burden. A complete summary of the Panel's recommendations is presented in the proposal (65 FR 19046, 19127–19130).

While EPA could have certified the proposed rule based on the proposed rule requirements, the Agency originally developed an IRFA (see 65 FR 19046, 19126–19127) and convened an SBAR Panel because several of the additional alternatives EPA was requesting comment on would have resulted in substantial costs for small systems thereby preventing the Agency from certifying. While EPA included these additional alternatives in the proposal and estimated costs in the economic analysis for the proposal, the Agency re-evaluated the economic effects on small entities after publication of the April 10, 2000 LT1ESWTR proposal using the rule requirements of today's final rule and was able to certify that today's final rule will not have a significant economic impact on a substantial number of small entities.

EPA's analysis showed that of the approximately 11,000 small entities potentially affected by the LT1ESWTR, over 5,000 are expected to incur average annualized costs of less than $70 dollars (0.003 percent of average annual revenue) while slightly more than 3,000 are expected to incur average annualized costs of less than $850 dollars (0.03 percent of average annual revenue). Of the remaining systems, approximately 500 systems are expected to incur average annualized costs of approximately $2,500 dollars (0.1 percent of average annual revenue), approximately 2,000 systems are expected to incur average annualized costs of approximately $13,000 dollars (0.6 percent of average annual revenue). Less than 100 systems are expected to incur average annualized costs of approximately $15,700 dollars (0.7 percent of average annual revenue). The Agency has included a detailed description of this analysis in the Regulatory Flexibility Screening Analysis prepared for the rule (USEPA, 2000e).

B. Paperwork Reduction Act

The Office of Management and Budget (OMB) has approved the information collection requirements contained in this rule under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq, and has assigned OMB control number 2040–0229. The information collected as a result of this rule will allow the States and EPA to determine appropriate requirements for specific systems, in some cases, and to evaluate compliance with the rule. For the first three years after February 13, 2002, the major information requirements are related to disinfection profiling activities. The information collection requirements in §§ 141.530–141.536, 141.540–141.544, 141.550–141.553, 141.560–141.564, and 141.570–141.571, for systems, and §§ 142.14 and 142.16, for States, are mandatory. The information collected is not confidential. The final estimate of aggregate annual average burden hours for LT1ESWTR is 330,329. Annual average aggregate cost estimate is $1,583,538 for capital (expenditures for monitoring equipment), and $1,919,563 for operation and maintenance including lab costs (which is a purchase of service). The burden hours per response is 21.8. The frequency of response (average responses per respondent) is 2.8 annually. The estimated number of likely respondents is 5,404 (the product of burden hours per response, frequency, and respondents does not total the annual average burden hours due to rounding).

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information; processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15. EPA is amending the table in 40 CFR part 9 of currently approved ICR control numbers issued by OMB for various regulations to list the information requirements contained in this final rule.

C. Unfunded Mandates Reform Act

1. Summary of UMRA Requirements

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA), Public Law 104–4, establishes requirements for Federal agencies to assess the effects of their regulatory actions on State, local, and Tribal governments and the private sector. Under UMRA section 202, EPA generally must prepare a written statement, including a cost-benefit analysis, for proposed and final rules with ''Federal mandates'' that may result in expenditures by State, local, and Tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. Before promulgating an EPA rule for which a written statement is needed, section 205 of the UMRA generally requires EPA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows EPA to adopt an alternative other than the least costly, most cost effective or least burdensome alternative if the Administrator publishes with the final rule an explanation why that alternative was not adopted.

Before EPA establishes any regulatory requirements that may significantly or uniquely affect small governments, including Tribal governments, it must have developed, under section 203 of the UMRA, a small government agency plan. The plan must provide for notifying potentially affected small governments, enabling officials of affected small governments to have meaningful and timely input in the development of EPA regulatory proposals with significant Federal intergovernmental mandates and informing, educating, and advising small governments on compliance with the regulatory requirements.

EPA has determined that this rule does not contain a Federal mandate that may result in expenditures of $100 million or more for State, local and Tribal governments, in the aggregate, or the private sector in any one year. The estimated annual cost of this rule is $39.5 million. Thus today's rule is not

subject to the requirements of sections 202 and 205 of the UMRA.

EPA has determined that this rule contains no regulatory requirements that might significantly or uniquely affect small governments. Of the approximately 6,500 small government entities potentially affected by the LT1ESWTR, approximately 3,000 are expected to incur average annualized costs of less than $70 dollars (0.003 percent of average annual revenue) while approximately 2,000 are expected to incur average annualized costs of less than $850 dollars (0.03 percent of average annual revenue). Of the remaining systems, less than 300 are expected to incur average annualized costs of approximately $2,500 dollars (0.1 percent of average annual revenue), approximately 1,200 systems are expected to incur average annualized costs of approximately $13,000 dollars (0.6 percent of average annual revenue). Less than 100 systems are expected to incur average annualized costs of approximately $15,700 dollars (0.7 percent of average annual revenue). While today's final rule only applies to systems serving fewer than 10,000, it is not unique as it provides a comparable level of health protection to individuals served by small systems as the IESWTR provided to individuals served by large systems. While there are small differences between the LT1ESWTR and IESWTR, these differences reflect an effort to reduce burden for small systems while still maintaining a comparable level of health protection. Thus, today's rule is not subject to the requirements of section 203 of UMRA.

Nevertheless, EPA has tried to ensure that State, local, and Tribal governments had opportunities to provide comment. EPA consulted with small governments to address impacts of regulatory requirements in the rule that might significantly or uniquely affect small governments. As discussed next, a variety of stakeholders, including small governments, were provided the opportunity for timely and meaningful participation in the regulatory development process. EPA used these opportunities to notify potentially affected small governments of regulatory requirements being considered.

EPA began outreach efforts to develop the LT1ESWTR in the summer of 1998. Two public stakeholder meetings, which were announced in the **Federal Register**, were held on July 22–23, 1998, in Lakewood, Colorado, and on March 3–4, 1999, in Dallas, Texas. Stakeholders include representatives of State, local and Tribal governments, environmental groups and publicly owned and privately owned public water systems. In addition to these meetings, EPA has held several formal and informal meetings with stakeholders including the Association of State Drinking Water Administrators and representatives of State and local elected officials. A summary of each meeting and attendees is available in the public docket for this rule. EPA also convened a Small Business Advocacy Review (SBAR) Panel in accordance with the RFA, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) to address small entity concerns including those of small local governments. The SBAR Panel allows small regulated entities to provide input to EPA early in the regulatory development process. In early June 1999, EPA mailed an informal draft of the LT1ESWTR preamble to the approximately 100 stakeholders who attended one of the public stakeholder meetings. Members of trade associations and the SBREFA Panel also received the draft preamble. EPA received valuable suggestions and stakeholder input from 15 State representatives, trade associations, environmental interest groups, and individual stakeholders. The majority of concerns dealt with reducing burden on small systems and maintaining flexibility.

To inform and involve Tribal governments in the rulemaking process, EPA presented the LT1ESWTR at three venues: the 16th Annual Consumer Conference of the National Indian Health Board, the annual conference of the National Tribal Environmental Council, and the EPA/Inter Tribal Council of Arizona, Inc. Tribal consultation meeting. Over 900 attendees representing Tribes from across the country attended the National Indian Health Board's Consumer Conference and over 100 Tribes were represented at the annual conference of the National Tribal Environmental Council. At the first two conferences, an EPA representative conducted two workshops on EPA's drinking water program and upcoming regulations, including the LT1ESWTR.

At the EPA/Inter Tribal Council of Arizona meeting, representatives from 15 Tribes participated. The presentation materials and meeting summary were sent to over 500 Tribes and Tribal organizations. Additionally, EPA contacted each of the 12 Native American Drinking Water State Revolving Fund Advisors to invite them, and representatives of their organizations to the stakeholder meetings described previously.

During the comment period for today's final rule, the Agency held a public meeting in Washington D.C. on April 14, 2000. Additionally, the proposed rule was either presented or discussed in nearly 50 meetings across the U.S. Finally, EPA mailed approximately 200 copies of the proposed rule to stakeholders requesting comment. EPA received 67 comments from a variety of stakeholders including 24 States, 21 municipalities, one Tribe, one elected official, two consultants, eight trade groups, and four private industries.

In addition, EPA will educate, inform, and advise small systems, including those run by small governments, about the LT1ESWTR requirements. The Agency is developing plain-English guidance that will explain what actions a small entity must take to comply with the rule. Also, the Agency has developed a fact sheet that concisely describes various aspects and requirements of the LT1ESWTR. This fact sheet is available by calling the Safe Drinking Water Hotline at 800–426–4791.

D. National Technology Transfer and Advancement Act

As noted in the proposed rule, section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law No. 104–113, section 12(d) (15 U.S.C. 272 note), directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through the Office of Management and Budget, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

Today's rule does not establish any technical standards, thus, NTTAA does not apply to this rule. It should be noted, however, that systems complying with this rule need to use one of three previously approved technical standards already included in § 141.74 (a). Method 2130B (APHA, 1995), is published in Standard Methods for the Examination of Water and Wastewater (19th ed.) and is a voluntary consensus standard. The Great Lakes Instrument Method 2, has been approved by USEPA as an alternate test procedure (Great Lakes Instruments, 1992). EPA Method 180.1 for turbidity measurement was published in August 1993 in Methods for the Determination of Inorganic

Substances in Environmental Samples (EPA–600/R–93–100) (USEPA, 1993).

Today's final rule also requires calibration of the individual turbidimeter to be conducted using procedures specified by the manufacturer. EPA encouraged comments on this aspect of the rulemaking and specifically invited the public to identify potentially applicable voluntary consensus standards and to explain why such standards should be used in this regulation. EPA received no comments on this issue.

E. Executive Order 12866: Regulatory Planning and Review

Under Executive Order 12866 (58 FR 51735, October 4, 1993), the Agency must determine whether the regulatory action is ''significant'' and therefore subject to OMB review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof, or;

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

Pursuant to the terms of the Executive Order 12866, it has been determined that this rule is a ''significant regulatory action.'' As such, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations are documented in the public record.

F. Executive Order 12898: Environmental Justice

Executive Order 12898 establishes a Federal policy for incorporating environmental justice into Federal agency missions by directing agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The Agency has considered environmental justice related issues concerning the potential impacts of this action and consulted with minority and low-income stakeholders.

This preamble has discussed how the IESWTR served as a template for the development of the LT1ESWTR. As such, the Agency also built on the efforts conducted during the IESWTRs development to comply with Executive Order 12898. On March 12, 1998, the Agency held a stakeholder meeting to address various components of pending drinking water regulations and how they may impact sensitive sub-populations, minority populations, and low-income populations. Topics discussed included treatment techniques, costs and benefits, data quality, health effects, and the regulatory process. Participants included national, State, Tribal, municipal, and individual stakeholders. EPA conducted the meetings by video conference call between 11 cities. This meeting was a continuation of stakeholder meetings that started in 1995 to obtain input on the Agency's Drinking Water Programs. The major objectives for the March 12, 1998 meeting were to:

—Solicit ideas from stakeholders on known issues concerning current drinking water regulatory efforts;
—Identify key issues of concern to stakeholders, and;
—Receive suggestions from stakeholders concerning ways to increase representation of communities in EPA's Office of Water drinking water regulatory efforts.

In addition, EPA developed a plain-English guide specifically for this meeting to assist stakeholders in understanding the multiple and sometimes complex issues surrounding drinking water regulation.

The LT1ESWTR applies to community water systems, non-transient non-community water systems, and transient non-community water systems that use surface water or GWUDI as their source water for PWSs serving less than 10,000 people. These requirements will also be consistent with the protection already afforded to people being served by systems serving 10,000 or more persons.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

Executive Order 13045: ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be economically significant as defined under Executive Order 12866, and; (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

While this final rule is not subject to the Executive Order because it is not economically significant as defined in Executive Order 12866, we nonetheless have reason to believe that the environmental health or safety risk addressed by this action may have a disproportionate effect on children. As a matter of EPA policy, we therefore have assessed the environmental health effects of *Cryptosporidium* on children. The results of this assessment are contained in the LT1ESWTR economic analysis (USEPA, 2001a). A copy of the analysis and supporting documents are found in the public docket for today's final rule (W–99–10, Final Long Term 1 Enhanced Surface Water Treatment Rule. The docket is available for public review at EPA's Drinking Water Docket: 401 M Street, SW., Rm. EB57, Washington, DC 20460.

The risk of illness and death due to cryptosporidiosis depends on several factors, including age, nutrition, exposure, genetic variability, disease and immune status of the individual. Mortality resulting from diarrhea shows the greatest risk of mortality occurring among the very young and elderly (Gerba *et al.,* 1996). For *Cryptosporidium,* young children are a vulnerable population subject to infectious diarrhea (CDC 1994). Cryptosporidiosis is prevalent worldwide, and its occurrence is higher in children than in adults (Fayer and Ungar, 1986).

Cryptosporidiosis appears to be more prevalent in populations, such as infants, that may not have established immunity against the disease and may be in greater contact with environmentally contaminated surfaces (DuPont, *et al.,* 1995). An infected child may spread the disease to other children or family members. Evidence of such secondary transmission of cryptosporidiosis from children to household and other close contacts has been found in a number of outbreak investigations (Casemore, 1990; Cordell *et al.,* 1997; Frost *et al.,* 1997). Chapelle et al., (1999) found that prior exposure to *Cryptosporidium* through the ingestion of a low oocyst dose provides protection from infection and illness. However, it is not known whether this immunity is life-long or temporary. Data

also indicate that either mothers confer short term immunity to their children or that babies have reduced exposure to *Cryptosporidium,* resulting in a decreased incidence of infection during the first year of life. For example, in a survey of over 30,000 stool sample analyses from different patients in the United Kingdom, the one to five year age group suffered a much higher infection rate than individuals less than one year of age. For children under one year of age, those older than six months of age showed a higher rate of infection than individuals aged fewer than six months (Casemore, 1990).

EPA has not been able to quantify the health effects for children as a result of Cryptosporidium-contaminated drinking water. However, the result of the LT1ESWTR will be a reduction in the risk of illness for the entire population, including children. Because available evidence indicates that children may be more vulnerable to Cryptosporidiosis than the rest of the population, the LT1ESWTR would, therefore, result in greater risk reduction for children than for the general population.

H. Consultations With the Science Advisory Board, National Drinking Water Advisory Council, and the Secretary of Health and Human Services

In accordance with section 1412 (d) and (e) of the SDWA, the Agency consulted with the National Drinking Water Advisory Council (NDWAC), the Secretary of Health and Human Services, and the EPA Science Advisory Board (SAB) on the proposed LT1ESWTR. None of the three consultations resulted in substantive comments on the LT1ESWTR.

On March 13 and 14, 2000 in Washington, DC, the Agency met with SAB during meetings open to the public where several of the Agency's drinking water rules were discussed. A copy of the SAB's comments are found in the docket (USEPA, 2000l). Comments on the LT1ESWTR were generally supportive.

On May 10, 2000 in San Francisco, California, the Agency met with NDWAC. A copy of the materials presented to the NDWAC, as well as the charge presented to the council are found in the docket (USEPA, 2000f, NDWAC, 2000).

EPA invited the Secretary of Health and Human Services to the April 14th, 2000 informational meeting regarding the proposed Long Term 1 Enhanced Surface Water Treatment Rule and consulted with the Centers for Disease Control (CDC) during a June 20, 2000 conference call with the Centers' Working Group on Waterborne Cryptosporidiosis. The meeting notes for that call are found in the docket (CDC, 2000). CDC's role as an Agency of the Department of Health and Human Services is to provide a system of health surveillance to monitor and prevent the outbreak of diseases. With the assistance of States and other partners, CDC guards against international disease transmission, maintains national health statistics, and provides for immunization services and supports research into disease and injury prevention.

I. Executive Order 13132: Executive Orders on Federalism

Executive Order 13132, entitled ''Federalism'' (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' is defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

This final rule does not have federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. Today's final rule does not have a substantial direct effect on local and State governments because it is not expected to impose substantial direct compliance costs. The rule imposes annualized compliance costs on State and local governments of approximately $30.6 million. $6.4 million of these costs are attributable to States, while $24.2 million is attributable to local governments serving fewer than 10,000 persons. As described in Section V1.A of the preamble for today's final rule, this rule will not have a significant economic impact on a substantial number of small entities, including small governments. Furthermore, the rule does not have a substantial direct effect on the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government as specified in Executive Order 13132 because the rule does not change the current roles and relationships of the Federal government, State governments and local governments in implementing drinking water programs. Thus Executive Order 13132 does not apply to this rule. Although the Executive Order does not apply to this rule, EPA did consult with State and local officials in developing this rule. In addition to our outreach efforts described earlier, on May 30, 2000, the Agency held a meeting in Washington, DC with ten representatives of elected State and local officials to discuss how new Federal drinking water regulations (LT1ESWTR, FBRR, Ground Water Rule, Radon Rule, Radionuclides Rule, and Arsenic Rule) may affect State, county, and local governments. Throughout the consultation, stakeholders asked EPA for clarification of basic concepts and rule elements. EPA addressed these issues throughout the consultation and provided background and clarification to promote better understanding of the issues. For example, stakeholders asked EPA to describe what *Cryptosporidium* is and how individuals are diagnosed with cryptosporidiosis. A detailed summary of this consultation meeting and the concerns raised is found in the docket (USEPA, 2000g). No significant concerns were raised regarding the LT1ESWTR.

J. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

On November 6, 2000, the President issued Executive Order 13175 (65 FR 67249) entitled, ''Consultation and Coordination with Indian Tribal Governments.'' Executive Order 13175 took effect on January 6, 2001, and revoked Executive Order 13084 (also entitled Consultation and Coordination with Indian Tribal Governments.'') as of that date. However, EPA developed and proposed this final rule when Executive Order 13084 was in effect, and before the effective date of the consultation requirements of Executive Order 13175. Therefore, the consultation requirements of Executive Order 13084 apply to this rule.

Under Executive Order 13084, EPA could not issue a regulation that was not required by statute, that significantly or uniquely affected the communities of Indian Tribal governments, and that imposed substantial direct compliance costs on those communities, unless the Federal government provided the funds necessary to pay the direct compliance costs incurred by the Tribal governments, or EPA consulted with those governments.

Executive Order 13084 required EPA to provide to the Office of Management and Budget, in a separately identified

section of the preamble to the rule, a description of the extent of EPA's prior consultation with representatives of affected Tribal governments, a summary of the nature of their concerns, and a statement supporting the need to issue the regulation. In addition, Executive Order 13084 required EPA to develop an effective process permitting elected officials and other representatives of Indian Tribal governments ''to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities.''

EPA has concluded that this rule will not significantly or uniquely affect communities of Indian Tribal governments, and will not impose substantial direct compliance costs on such communities. This rule will affect approximately 70 of the 700 total Tribal drinking water systems. Of these 70 systems, half are estimated to incur annualized compliance costs of less than $70 per year (0.003 percent of average annual revenue) and approximately 20 systems are estimated to incur annualized compliance costs of less than $850 per year (0.03 percent of average annual revenue). The remaining systems would incur an estimated annualized compliance costs of less than $13,000, or 0.6 percent of average annual revenue.

Nonetheless, EPA provided representatives of Tribal governments with several opportunities to become knowledgeable of the proposed rule and to provide meaningful and timely input in its development. EPA began outreach efforts to develop the LT1ESWTR in the summer of 1998 as discussed in detail above in the UMRA and Federalism sections. To inform and involve the representatives of Tribal governments specifically, EPA presented the LT1ESWTR at three venues: The 16th Annual Consumer Conference of the National Indian Health Board, the annual conference of the National Tribal Environmental Council, and the EPA/Inter Tribal Council of Arizona, Inc. Tribal consultation meeting. Summaries of the meetings have been included in the public docket for this rulemaking. EPA's consultation, the nature of the Tribal concerns, and the position supporting the need for this rule are discussed in Section VI.C., which addresses compliance with UMRA.

Over 900 Tribal representatives from across the country attended the National Indian Health Board's Consumer Conference and over 100 Tribes were represented at the annual conference of the National Tribal Environmental Council. At the first two conferences, an EPA representative conducted two workshops on EPA's drinking water program and upcoming regulations, including the LT1ESWTR. At the EPA/Inter Tribal Council of Arizona meeting, representatives from 15 Tribes participated. The presentation materials and meeting summary were sent to over 500 Tribes and Tribal organizations. Additionally, EPA contacted and invited each of the 12 Native American Drinking Water State Revolving Fund Advisors to attend the meetings described above.

During the comment period for today's final rule, the Agency held a public meeting in Washington, DC on April 14, 2000 which was announced in the **Federal Register**. Additionally, the proposed rule was either presented or discussed in nearly 50 meetings across the country. Finally, EPA mailed approximately 200 copies of the proposed rule to stakeholders, including Tribal representatives, requesting comment. EPA received 67 comments, one of which was from a Tribe. The Tribe indicated that they operated one surface water treatment plant and asked several clarifying questions with respect to optional monitoring and turbidity monitoring.

K. Likely Effect of Compliance With the LT1ESWTR on the Technical, Financial, and Managerial Capacity of Public Water Systems

Section 1420(d)(3) of the SDWA as amended requires that, in promulgating a NPDWR, the Administrator shall include an analysis of the likely effect of compliance with the regulation on the technical, financial, and managerial capacity of public water systems. This analysis can be found in the LT1ESWTR economic analysis (USEPA, 2001a). Overall water system capacity is defined in EPA guidance (USEPA, 1998j) as the ability to plan for, achieve, and maintain compliance with applicable drinking water standards. Capacity has three components: Technical, managerial, and financial. Technical capacity is the physical and operational ability of a water system to meet SDWA requirements. Technical capacity refers to the physical infrastructure of the water system, including the adequacy of source water and the adequacy of treatment, storage, and distribution infrastructure. It also refers to the ability of system personnel to adequately operate and maintain the system and to otherwise implement requisite technical knowledge. Managerial capacity is the ability of a water system to conduct its affairs to achieve and maintain compliance with SDWA requirements. Managerial capacity refers to the system's institutional and administrative capabilities. Financial capacity is a water system's ability to acquire and manage sufficient financial resources to allow the system to achieve and maintain compliance with SDWA requirements. Technical, managerial, and financial capacity can be assessed through key issues and questions, including:

Technical Capacity	
Source water adequacy	Does the system have a reliable source of drinking water? Is the source of generally good quality and adequately protected?
Infrastructure adequacy	Can the system provide water that meets SDWA standards? What is the condition of its infrastructure, including well(s) or source water intakes, treatment, storage, and distribution? What is the infrastructure's life expectancy? Does the system have a capital improvement plan?
Technical knowledge and implementation.	Is the system's operator certified? Does the operator have sufficient technical knowledge of applicable standards? Can the operator effectively implement this technical knowledge? Does the operator understand the system's technical and operational characteristics? Does the system have an effective operation and maintenance program?
Managerial Capacity	
Ownership accountability	Are the system owner(s) clearly identified? Can they be held accountable for the system?
Staffing and organization	Are the system operator(s) and manager(s) clearly identified? Is the system properly organized and staffed? Do personnel understand the management aspects of regulatory requirements and system operations? Do they have adequate expertise to manage water system operations? Do personnel have the necessary licenses and certifications?

Effective external linkages	Does the system interact well with customers, regulators, and other entities? Is the system aware of available external resources, such as technical and financial assistance?
Financial Capacity	
Revenue sufficiency	Do revenues cover costs? Are water rates and charges adequate to cover the cost of water?
Credit worthiness	Is the system financially healthy? Does it have access to capital through public or private sources?
Fiscal management and controls	Are adequate books and records maintained? Are appropriate budgeting, accounting, and financial planning methods used? Does the system manage its revenues effectively?

Systems not making significant modifications to the treatment process to meet LT1ESWTR requirements are not expected to require significantly increased technical, financial, or managerial capacity. As noted previously, less than 1 percent of affected systems are expected to incur annual costs exceeding 1 percent of their annual revenue as described in Section VI.A. Accordingly, most systems are not expected to require significantly increased technical, financial, or managerial capacity. EPA does recognize that a very small number of facilities may realize some technical, managerial, or financial capacity concerns as a result of the rule. EPA works closely with organizations such as the National Rural Water Association and the American Water Works Association to develop technical and managerial tools, materials, and assistance to aid small systems. Additionally, the Safe Drinking Water Act, as amended in 1996, established the Drinking Water State Revolving Fund (DWSRF) to make funds available to drinking water systems to finance infrastructure improvements. The program emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water.

L. Plain Language

Executive Order 12866 requires each agency to write its rules in plain language. Readable regulations help the public find requirements quickly and understand them easily. They increase compliance, strengthen enforcement, and decrease mistakes, frustration, phone calls, appeals, and distrust of government. Of the several techniques typically utilized for writing readably, using a question and answer format, and using the word 'you' for whoever must comply, do the most to improve the look and sound of a regulation. Today's preamble and final rule use both of these principles and was developed using a plain language format, except in the case of modifications or additions to existing subparts of parts 141 and 142, where such a format would not fit into existing rule language. The Agency requested comment on this approach and several commenter's indicated that the proposal was clear and easy to understand.

M. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.,* as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective February 13, 2002.

N. Executive Order 13211: Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use

This rule is not a ''significant energy action'' as defined in Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use'' 66 FR 28355, (May 22, 2001), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. The requirements in this rule would have a negligible impact upon the energy demands of some public water supply systems. Therefore, there is not a significant adverse effect on energy supply, distribution, or use.

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List of Subjects

40 CFR Parts 9

Reporting and recordkeeping requirements.

40 CFR Part 141

Environmental protection, Chemicals, Indians-lands, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

40 CFR Part 142

Environmental protection, Administrative practice and procedure, Chemicals, Indians-lands, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated: December 20, 2001.

Christine Todd Whitman,

Administrator.

For the reasons set forth in the preamble, title 40 chapter I of the Code of Federal Regulations is amended as follows:

PART 9—[AMENDED]

1. The authority citation for part 9 continues to read as follows:

Authority: 7 U.S.C. 135 *et seq.*, 136–136y; 15 U.S.C. 2001, 2003, 2005, 2006, 2601–2671; 21 U.S.C. 331j, 346a, 348; 31 U.S.C. 9701; 33 U.S.C. 1251 *et seq.*, 1311, 1313d, 1314, 1318, 1321, 1326, 1330, 1342, 1344, 1345 (d) and (e), 1361; Executive Order 11735, 38 FR 21243, 3 CFR, 1971–1975 Comp. p. 973; 42 U.S.C. 241, 242b, 243, 246, 300f, 300g, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–1, 300j–2, 300j–3, 300j–4, 300j–9, 1857 *et seq.*, 6901–6992k, 7401–7671q, 7542, 9601–9657, 11023, 11048.

2. In § 9.1 the table is amended by adding under the indicated heading:

a. By adding entries 141.530–141.536, 141.540–141.544, 141.550–141.553, 141.560–141.564 and 141.570–141.571 in numerical order.

b. By removing the entry 142.14(a)–(d)(7) and adding in its place a new entry § 142.14(b)–(d)(7).

c. By adding a new entry for 142.14(a) in numerical order.

d. By adding new entries for 142.16(g) and 142.16(j) in numerical order.

The additions read as follows:

§ 9.1 OMB approvals under the Paperwork Reduction Act.

* * * * *

40 CFR citation	OMB control No.
* * * * *	
National Primary Drinking Water Regulations	
* * * * *	
141.530–141.536	2040–0229
141.540–141.544	2040–0229
141.550–141.553	2040–0229
141.560–141.564	2040–0229
141.570–141.571	2040–0229
142.14(a)	2040–0229 2040–0090
142.14(b)–(d)(7)	2040–0090
* * * * *	
142.16(g)	2040–0229
142.16(j)	2040–0229

* * * * *

PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

3. The authority citation for part 141 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

4. Section 141.2 is amended by revising the definitions of ''Comprehensive performance evaluation'' (CPE), ''Ground water under the direct influence of surface water'' and ''Disinfection profile'' to read as follows:

§ 141.2 Definitions.

* * * * *

Comprehensive performance evaluation (CPE) is a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. For purpose of compliance with subparts P and T of this part, the comprehensive performance evaluation must consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

* * * * *

Disinfection profile is a summary of *Giardia lamblia* inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in § 141.172 (Disinfection profiling and benchmarking) in subpart P and §§ 141.530–141.536 (Disinfection profile) in subpart T of this part.

* * * * *

Ground water under the direct influence of surface water (GWUDI) means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium,* or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the State. The State determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well construction characteristics and geology with field evaluation.

* * * * *

5. Section 141.70 is amended by adding paragraph (e) to read as follows:

§ 141.70 General requirements.

* * * * *

(e) *Additional requirements for systems serving fewer than 10,000 people.* In addition to complying with requirements in this subpart, systems serving fewer than 10,000 people must also comply with the requirements in subpart T of this part.

6. Section 141.73 is amended by adding paragraph (a)(4) and revising paragraph (d) to read as follows:

§ 141.73 Filtration.

* * * * *

(a) * * *

(4) Beginning January 14, 2005, systems serving fewer than 10,000 people must meet the turbidity requirements in §§ 141.550 through 141.553.

* * * * *

(d) *Other filtration technologies.* A public water system may use a filtration technology not listed in paragraphs (a) through (c) of this section if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of § 141.72(b), consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of paragraph (b) of this section apply. Beginning January 1, 2002, systems serving at least 10,000 people must meet the requirements for other filtration technologies in § 141.173(b). Beginning January 14, 2005, systems serving fewer than 10,000 people must meet the turbidity requirements for other filtration technologies in § 141.550 through 141.553.

7. Section 141.153 is amended by revising the first sentence of paragraph (d)(4)(v)(C) to read as follows:

§ 141.153 Content of the reports.

* * * * *

(d) * * *

(4) * * *

(v) * * *

(C) When it is reported pursuant to § 141.73 or § 141.173 or § 141.551: the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in § 141.73 or § 141.173, or § 141.551 for the filtration technology being used.

* * *

* * * * *

8. The heading to Subpart P is revised to read as follows:

Subpart P—Enhanced Filtration and Disinfection—Systems Serving 10,000 or More People

* * * * *

9. Section 141.170 is amended by adding paragraph (d) to read as follows:

§ 141.170 General requirements.

* * * * *

(d) Subpart H systems that did not conduct optional monitoring under § 141.172 because they served fewer than 10,000 persons when such monitoring was required, but serve more than 10,000 persons prior to January 14, 2005 must comply with §§ 141.170, 141.171, 141.173, 141.174, and 141.175. These systems must also consult with the State to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in § 141.172(c)(1)(i) through (iv) must consult with the State prior to making such change.

10. Section 141.202 is amended in Table 1 by revising entry 6 to read as follows:

§ 141.202 Tier 1 Public Notice—Form, manner, and frequency of notice.

* * * * *

(a) * * *

TABLE 1 TO SEC. 141.202.—VIOLATION CATEGORIES AND OTHER SITUATIONS REQUIRING A TIER 1 PUBLIC NOTICE

*	*	*	*	*	*	*
(6) Violation of the Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR) or Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in Appendix A), where the primacy agency determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation;						
*	*	*	*	*	*	*

* * * * *

11. Section 141.203 is amended by revising paragraph (b)(3)(ii) to read as follows:

§ 141.203 Tier 2 Public Notice—Form, manner, and frequency of notice.

* * * * *

(b) * * *

(3) * * *

(ii) Violation of the SWTR, IESWTR or LT1ESWTR treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

* * * * *

12. Appendix A to subpart Q is amended:

a. Under I.A. by revising entry 5.

b. Under I.A. by revising entry 7.

c. Adding a new entry 9.

d. Under I.G. by revising entry 10.

e. Revising endnote 6.

The additions and revisions read as follows:

APPENDIX A TO SUBPART Q OF PART 141.—NPDWR VIOLATIONS AND OTHER SITUATIONS REQUIRING PUBLIC NOTICE [1]

Contaminant	MCL/MRDL/TT violations [2]		Monitoring & testing procedure violations	
	Tier of public notice required	Citation	Tier of public notice required	Citation
I. Violations of National Primary Drinking Water Regulations (NPDWR): [3]				
* * *	*	* *	*	*
A. Microbiological Contaminants				
* * *	*	* *	*	*
5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level).	[6] 2,1	141.71(a)(2),141.71(c)(2)(i), 141.73(a)(2), 141.73 (b)(2), 141.73 (c)(2), 141.73(d), 141.173(a)(2), 141.173(b), 141.551(b).	3	141.74(a)(1), 141.74(b)(2), 141.74(c)(1), 141.174, 141.560(a)–(c), 141.561.
* * *	*	* *	*	*
7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. turbidity level (TT).	[7] 2	141.170–141.173, 141.500–141.553.	3	141.172, 141.174, 141.530–141.544, 141.560–141.564.
* * *	*	* *	*	*
9. Long Term 1 Enhanced Surface Water Treatment Rule violations.	2	141.500–141.553	3	141.530–141.544, 141.560–141.564.
* * *	*	* *	*	*
G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs).[9]				
* * *	*	* *	*	*
10. Bench marking and disinfection profiling.	N/A	N/A	3	141.172 141.530–141.544.
* * *	*	* *	*	*

Appendix A–Endnotes:

[1] Violations and other situations not listed in this table (e.g., reporting violations and failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the primacy agency. Primacy agencies may, at their option, also require a more stringent public notice tier (e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3) for specific violations and situations listed in this Appendix, as authorized under § 141.202(a) and § 141.203(a).

[2] MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique

[3] The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, monitoring, and testing procedure requirements.

* * * * * * *

[6] Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR), or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) are required to consult with the primacy agency within 24 hours after learning of the violation. Based on this consultation, the primacy agency may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the primacy agency in the 24-hour period, the violation is automatically elevated to Tier 1.

[7] Most of the requirements of the Interim Enhanced Surface Water Treatment Rule (63 FR 69477) (§§ 141.170—141.171, 141.173—141.174) become effective January 1, 2002 for the Subpart H systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons. However, § 141.172 has some requirements that become effective as early as April 16, 1999. The Surface Water Treatment Rule remains in effect for systems serving at least 10,000 persons even after 2002; the Interim Enhanced Surface Water Treatment Rule adds additional requirements and does not in many cases supercede the SWTR.

* * * * * * *

[9] Subpart H community and non-transient non-community systems serving ≥10,000 must comply with new DBP MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non-transient non-community systems must meet the MCLs and MRDLs beginning January 1, 2004. Subpart H transient non-community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL begining January 1, 2002. Subpart H transient non-community systems serving fewer than 10,000 persons and using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.

Appendix B—[Amended]

13. Appendix B to subpart Q is amended by:

a. Revising entry A.2c.
b. Revising heading B.
c. Revising entries B.3., B.4, B.5, B.6., and B.7.
d. Revising endnotes 4, 6 and 10.
e. Revising endnote 8.

The revisions read as follows:

APPENDIX B TO SUBPART Q OF PART 141.—STANDARD HEALTH EFFECTS LANGUAGE FOR PUBLIC NOTIFICATION

Contaminant	MCLG [1], mg/L	MCL [2] mg/L	Standard health effects language for public notification
National Primary Drinking Water Regulations (NPDWR):			
A. Microbiological Contaminants			
* * * * * * *			
2c. Turbidity (IESWTR TT and LT1ESWTR TT) [8].	None	TT	Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches.
* * * * * * *			
B. Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) and the Filter Backwash Recycling Rule (FBRR) violations:			
* * * * * * *			
3. Giardia lamblia (SWTR/IESWTR/LT1ESWTR)	Zero	TT [10]	Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.
4. Viruses (SWTR/IESWTR/LT1ESWTR)			
5. Heterotrophic plate count (HPC) bacteria [9] (SWTR/IESWTR/LT1ESWTR)			
6. Legionella (SWTR/IESWTR/LT1ESWTR)			
7. Cryptosporidium (IESWTR/FBRR/LT1ESWTR)			
* * * * * * *			

[1] MCLG—Maximum contaminant level goal.
[2] MCL—Maximum contaminant level.
[4] There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, and the 1989 Surface Water Treatment Rule, the 1998 Interim Enhanced Surface Water Treatment Rule and the 2001 Long Term 1 Enhanced Surface Water Treatment Rule. The MCL for the montly turbidity average is 1 NTU; the MCL for the 2-day average is 5 NTU for systems that are required to filter but have not yet installed filtration (40 CFR 141.13).
[6] There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, and the 1989 Surface Water Treatment Rule, the 1998 Interim Enhanced Surface Water Treatment Rule and the 2001 Long Term 1 Enhanced Surface Water Treatment Rule. Systems subject to the Surface Water Treatment Rule (both filtered and unfiltered) may not exceed 5 NTU. In addition, in filtered systems, 95 percent of samples each month must not exceed 0.5 NTU in systems using conventional or direct filtration and must not exceed 1 NTU in systems using slow sand or diatomaceous earth filtration or other filtration technologies approved by the primacy agency.
[8] There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, the 1989 Surface Water Treatment Rule (SWTR), the 1998 Interim Enhanced Surface Water Treatment Rule (IESWTR) and the 2001 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR). For systems subject to the IESWTR (systems serving at least 10,000 people, using surface water or ground water under the direct influence of surface water), that use conventional filtration or direct filtration, after January 1, 2002, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. Systems subject to the IESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the primacy agency. For systems subject to the LT1ESWTR (systems serving fewer than 10,000 people, using surface water or ground water under the direct influence of surface water) that use conventional filtration or direct filtration, after January 14, 2005 the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent must not exceed 1 NTU at any time. Systems subject to the LT1ESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the primacy agency.
[9] The bacteria detected by heterotrophic plate count (HPC) are not necessarily harmful. HPC is simply an alternative method of determining disinfectant residual levels. The number of such bacteria is an indicator of whether there is enough disinfectant in the distribution system.
[10] SWTR, IESWTR, and LT1ESWTR treatment technique violations that involve turbidity exceedances may use the health effects language for turbidity instead.

14. Part 141 is amended by adding a new subpart T to read as follows:

Subpart T—Enhanced Filtration and Disinfection—Systems Serving Fewer Than 10,000 People

Subpart T—Enhanced Filtration and Disinfection—Systems Serving Fewer Than 10,000 People

General Requirements

§ 141.500 General requirements.

The requirements of this subpart constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: *Giardia lamblia,* viruses, heterotrophic plate count bacteria, *Legionella, Cryptosporidium* and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

(a) At least 99 percent (2 log) removal of Cryptosporidium between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the watershed control plan for unfiltered systems; and

(b) Compliance with the profiling and benchmark requirements in §§ 141.530 through 141.544.

§ 141.501 Who is subject to the requirements of subpart T?

You are subject to these requirements if your system:

(a) Is a public water system;

(b) Uses surface water or GWUDI as a source; and

(c) Serves fewer than 10,000 persons.

§ 141.502 When must my system comply with these requirements?

You must comply with these requirements in this subpart beginning January 14, 2005 except where otherwise noted.

§ 141.503 What does subpart T require?

There are seven requirements of this subpart, and you must comply with all requirements that are applicable to your system. These requirements are:

(a) You must cover any finished water reservoir that you began to construct on or after March 15, 2002 as described in §§ 141.510 and 141.511;

(b) If your system is an unfiltered system, you must comply with the updated watershed control requirements described in §§ 141.520–141.522;

(c) If your system is a community or non-transient non-community water systems you must develop a disinfection profile as described in §§ 141.530–141.536;

(d) If your system is considering making a significant change to its disinfection practices, you must develop a disinfection benchmark and consult with the State for approval of the change as described in §§ 141.540–141.544;

(e) If your system is a filtered system, you must comply with the combined filter effluent requirements as described in §§ 141.550–141.553;

(f) If your system is a filtered system that uses conventional or direct filtration, you must comply with the individual filter turbidity requirements as described in §§ 141.560–141.564; and

(g) You must comply with the applicable reporting and recordkeeping requirements as described in §§ 141.570 and 141.571.

Finished Water Reservoirs

§ 141.510 Is my system subject to the new finished water reservoir requirements?

All subpart H systems which serve fewer than 10,000 are subject to this requirement.

§ 141.511 What is required of new finished water reservoirs?

If your system begins construction of a finished water reservoir on or after March 15, 2002 the reservoir must be covered. Finished water reservoirs for which your system began construction prior to March 15, 2002 are not subject to this requirement.

Additional Watershed Control Requirements for Unfiltered Systems

§ 141.520 Is my system subject to the updated watershed control requirements?

If you are a subpart H system serving fewer than 10,000 persons which does

not provide filtration, you must continue to comply with all of the filtration avoidance criteria in § 141.71, as well as the additional watershed control requirements in § 141.521.

§ 141.521 What updated watershed control requirements must my unfiltered system implement to continue to avoid filtration?

Your system must take any additional steps necessary to minimize the potential for contamination by *Cryptosporidium* oocysts in the source water. Your system's watershed control program must, for *Cryptosporidium*:

(a) Identify watershed characteristics and activities which may have an adverse effect on source water quality; and

(b) Monitor the occurrence of activities which may have an adverse effect on source water quality.

§ 141.522 How does the State determine whether my system's watershed control requirements are adequate?

During an onsite inspection conducted under the provisions of § 141.71(b)(3), the State must determine whether your watershed control program is adequate to limit potential contamination by *Cryptosporidium* oocysts. The adequacy of the program must be based on the comprehensiveness of the watershed review; the effectiveness of your program to monitor and control detrimental activities occurring in the watershed; and the extent to which your system has maximized land ownership and/or controlled land use within the watershed.

Disinfection Profile

§ 141.530 What is a Disinfection Profile and who must develop one?

A disinfection profile is a graphical representation of your system's level of *Giardia lamblia* or virus inactivation measured during the course of a year. If you are a subpart H community or non-transient non-community water systems which serves fewer than 10,000 persons, your system must develop a disinfection profile unless your State determines that your system's profile is unnecessary. Your State may approve the use of a more representative data set for disinfection profiling than the data set required under §§ 141.532–141.536.

§ 141.531 What criteria must a State use to determine that a profile is unnecessary?

States may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in your distribution system.

§ 141.532 How does my system develop a Disinfection Profile and when must it begin?

A disinfection profile consists of three steps:

(a) First, your system must collect data for several parameters from the plant as discussed in § 141.533 over the course of 12 months. If your system serves between 500 and 9,999 persons you must begin to collect data no later than July 1, 2003. If your system serves fewer than 500 persons you must begin to collect data no later than January 1, 2004.

(b) Second, your system must use this data to calculate weekly log inactivation as discussed in §§ 141.534 and 141.535; and

(c) Third, your system must use these weekly log inactivations to develop a disinfection profile as specified in § 141.536.

§ 141.533 What data must my system collect to calculate a Disinfection Profile?

Your system must monitor the following parameters to determine the total log inactivation using the analytical methods in § 141.74 (a), once per week on the same calendar day, over 12 consecutive months:

(a) The temperature of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;

(b) If your system uses chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;

(c) The disinfectant contact time(s) (''T'') during peak hourly flow; and

(d) The residual disinfectant concentration(s) (''C'') of the water before or at the first customer and prior to each additional point of disinfection during peak hourly flow.

§ 141.534 How does my system use this data to calculate an inactivation ratio?

Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of *Giardia lamblia*:

If your system * * *	Your system must determine * * *
(a) Uses only one point of disinfectant application.	(1) One inactivation ratio ($CTcalc/CT_{99.9}$) before or at the first customer during peak hourly flow or (2) Successive $CTcalc/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, your system must calculate the total inactivation ratio by determining ($CTcalc/CT_{99.9}$) for each sequence and then adding the ($CTcalc/CT_{99.9}$) values together to determine ($3CTcalc/CT_{99.9}$).
(b) Uses more than one point of disinfectant application before the first customer.	The ($CTcalc/CT_{99.9}$) value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow using the procedure specified in paragraph (a)(2) of this section.

§ 141.535 What if my system uses chloramines, ozone, or chlorine dioxide for primary disinfection?

If your system uses chloramines, ozone, or chlorine dioxide for primary disinfection, you must also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the State.

§ 141.536 My system has developed an inactivation ratio; what must we do now?

Each log inactivation serves as a data point in your disinfection profile. Your system will have obtained 52 measurements (one for every week of the year). This will allow your system and the State the opportunity to evaluate how microbial inactivation varied over the course of the year by looking at all 52 measurements (your Disinfection Profile). Your system must retain the Disinfection Profile data in graphic form, such as a spreadsheet, which must be available for review by the State as part of a sanitary survey. Your system must use this data to calculate a benchmark if you are considering changes to disinfection practices.

Disinfection Benchmark

§ 141.540 Who has to develop a Disinfection Benchmark?

If you are a subpart H system required to develop a disinfection profile under

§§ 141.530 through 141.536, your system must develop a Disinfection Benchmark if you decide to make a significant change to your disinfection practice. Your system must consult with the State for approval before you can implement a significant disinfection practice change.

§ 141.541 What are significant changes to disinfection practice?

Significant changes to disinfection practice include:

(a) Changes to the point of disinfection;

(b) Changes to the disinfectant(s) used in the treatment plant;

(c) Changes to the disinfection process; or

(d) Any other modification identified by the State.

§ 141.542 What must my system do if we are considering a significant change to disinfection practices?

If your system is considering a significant change to its disinfection practice, your system must calculate a disinfection benchmark(s) as described in §§ 141.543 and 141.544 and provide the benchmark(s) to your State. Your system may only make a significant disinfection practice change after consulting with the State for approval. Your system must submit the following information to the State as part of the consultation and approval process:

(a) A description of the proposed change;

(b) The disinfection profile for *Giardia lamblia* (and, if necessary, viruses) and disinfection benchmark;

(c) An analysis of how the proposed change will affect the current levels of disinfection; and

(d) Any additional information requested by the State.

§ 141.543 How is the Disinfection Benchmark calculated?

If your system is making a significant change to its disinfection practice, it must calculate a disinfection benchmark using the procedure specified in the following table.

To calculate a disinfection benchmark your system must perform the following steps
Step 1: Using the data your system collected to develop the Disinfection Profile, determine the average *Giardia lamblia* inactivation for each calendar month by dividing the sum of all *Giardia lamblia* inactivations for that month by the number of values calculated for that month.
Step 2: Determine the lowest monthly average value out of the twelve values. This value becomes the disinfection benchmark.

§ 141.544 What if my system uses chloramines, ozone, or chlorine dioxide for primary disinfection?

If your system uses chloramines, ozone or chlorine dioxide for primary disinfection your system must calculate the disinfection benchmark from the data your system collected for viruses to develop the disinfection profile in addition to the *Giardia lamblia* disinfection benchmark calculated under § 141.543. This viral benchmark must be calculated in the same manner used to calculate the *Giardia lamblia* disinfection benchmark in § 141.543.

Combined Filter Effluent Requirements

§ 141.550 Is my system required to meet subpart T combined filter effluent turbidity limits?

All subpart H systems which serve populations fewer than 10,000, are required to filter, and utilize filtration other than slow sand filtration or diatomaceous earth filtration must meet the combined filter effluent turbidity requirements of §§ 141.551–141.553 . If your system uses slow sand or diatomaceous earth filtration you are not required to meet the combined filter effluent turbidity limits of subpart T, but you must continue to meet the combined filter effluent turbidity limits in § 141.73.

§ 141.551 What strengthened combined filter effluent turbidity limits must my system meet?

Your system must meet two strengthened combined filter effluent turbidity limits.

(a) The first combined filter effluent turbidity limit is a ''95th percentile'' turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in § 141.74(a) and (c). Monthly reporting must be completed according to § 141.570. The following table describes the required limits for specific filtration technologies.

If your system consists of * * *	Your 95th percentile turbidity value is * * *
(1) Conventional Filtration or Direct Filtration	0.3 NTU.
(2) All other ''Alternative'' Filtration	A value determined by the State (no to exceed 1 NTU) based on the demonstration described in § 141.552.

(b) The second combined filter effluent turbidity limit is a ''maximum'' turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in § 141.74(a) and (c). Monthly reporting must be completed according to § 141.570. The following table describes the required limits for specific filtration technologies.

If your system consists of * * *	Your maximum turbidity value is * * *
(1) Conventional Filtration or Direct Filtration	1 NTU.
(2) All other ''Alternative''	A value determined by the State (not to exceed 5 NTU) based on the demonstration as described in § 141.552.

§ 141.552 My system consists of ''alternative filtration'' and is required to conduct a demonstration—what is required of my system and how does the State establish my turbidity limits?

(a) If your system consists of alternative filtration(filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in § 141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:

(1) 99 percent removal of *Cryptosporidium* oocysts;

(2) 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts; and

(3) 99.99 percent removal and/or inactivation of viruses.

(b) [Reserved]

§ 141.553 My system practices lime softening—is there any special provision regarding my combined filter effluent?

If your system practices lime softening, you may acidify representative combined filter effluent turbidity samples prior to analysis using a protocol approved by the State.

Individual Filter Turbidity Requirements

§ 141.560 Is my system subject to individual filter turbidity requirements?

If your system is a subpart H system serving fewer than 10,000 people and utilizing conventional filtration or direct filtration, you must conduct continuous monitoring of turbidity for each individual filter at your system. The following requirements apply to continuous turbidity monitoring:

(a) Monitoring must be conducted using an approved method in § 141.74(a);

(b) Calibration of turbidimeters must be conducted using procedures specified by the manufacturer;

(c) Results of turbidity monitoring must be recorded at least every 15 minutes;

(d) Monthly reporting must be completed according to § 141.570; and

(e) Records must be maintained according to § 141.571.

§ 141.561 What happens if my system's turbidity monitoring equipment fails?

If there is a failure in the continuous turbidity monitoring equipment, your system must conduct grab sampling every four hours in lieu of continuous monitoring until the turbidimeter is back on-line. Your system has 14 days to resume continuous monitoring before a violation is incurred.

§ 141.562 My system only has two or fewer filters—is there any special provision regarding individual filter turbidity monitoring?

Yes, if your system only consists of two or fewer filters, you may conduct continuous monitoring of combined filter effluent turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring must meet the same requirements set forth in § 141.560(a) through (d) and § 141.561.

§ 141.563 What follow-up action is my system required to take based on continuous turbidity monitoring?

Follow-up action is required according to the following tables:

If * * *	Your system must * * *
(a) The turbidity of an individual filter (or the turbidity of combined filter effluent (CFE) for systems with 2 filters that monitor CFE in lieu of individual filters) exceeds 1.0 NTU in two consecutive recordings 15 minutes apart.	Report to the State by the 10th of the following month and include the filter number(s), corresponding date(s), turbidity value(s) which exceeded 1.0 NTU, and the cause (if known) for the exceedance(s).

If a system was required to report to the State * * *	Your system must * * *
(b) For three months in a row and turbidity exceeded 1.0 NTU in two consecutive recordings 15 minutes apart at the same filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters).	Conduct a self-assessment of the filter(s) within 14 days of the day the filter exceeded 1.0 NTU in two consecutive measurements for the third straight month unless a CPE as specified in paragraph (c) of this section was required. Systems with 2 filters that monitor CFE in lieu of individual filters must conduct a self assessment on both filters. The self-assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report. If a self-assessment is required, the date that it was triggered and the date that it was completed.
(c) For two months in a row and turbidity exceeded 2.0 BTU in 2 consecutive recordings 15 minutes apart at the same filter (or CFE for systems with 2 filters that monitor CFE in lieu of individual filters).	Arrange to have a comprehensive performance evaluation (CPE) conducted by the State or a third party approved by the State not later than 60 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month. If a CPE has been completed by the State or a third party approved by the State within the 12 prior months or the system and State are jointly participating in an ongoing Comprehensive Technical Assistance (CTA) project at the system, a new CPE is not required. If conducted, a CPE must be completed and submitted to the State no later than 120 days following the day the filter exceeded 2.0 NTU in two consecutive measurements for the second straight month.

§ 141.564 My system practices lime softening—is there any special provision regarding my individual filter turbidity monitoring?

If your system utilizes lime softening, you may apply to the State for alternative turbidity exceedance levels for the levels specified in the table in § 141.563. You must be able to demonstrate to the State that higher turbidity levels are due to lime carryover only, and not due to degraded filter performance.

Reporting and Recordkeeping Requirements

§ 141.570 What does subpart T require that my system report to the State?

This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the

frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.

Corresponding requirement	Description of information to report	Frequency
(a) Combined Filter Effluent Requirements. (§§ 141.550–141.553)	(1) The total number of filtered water turbidity measurements taken during the month.	By the 10th of the following month.
	(2) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to your system's required 95th percentile limit.	By the 10th of the following month.
	(3) The date and value of any turbidity measurements taken during the month which exceed the maximum turbidity value for your filtration system.	By the 10th of the following month.
(b) Individual Turbidity Requirements. (§§ 141.560–141.564)	(1) That your system conducted individual filter turbidity monitoring during the month.	By the 10th of the following month.
	(2) The filter number(s), corresponding date(s), and the turbidity value(s) which exceeded 1.0 NTU during the month, but only if 2 consecutive measurements exceeded 1.0 NTU.	By the 10th of the following month.
	(3) If a self-assessment is required, the date that it was triggered and the date that it was completed.	By the 10th of the following month (or 14 days after the self-assessment was triggered only if the self-assessment was triggered during the last four days of the month)
	(4) If a CPE is required, that the CPE is required and the date that it was triggered.	By the 10th of the following month.
	(5) Copy of completed CPE report	Within 120 days after the CPE was triggered.
(c) Disinfection Profiling (§§ 141.530–141.536)	(1) Results of optional monitoring which show TTHM levels <0.064 mg/l and HAA5 levels <0.048 mg/l (Only if your system wishes to forgo profiling) or that your system has begun disinfection profiling.	(i) For systems serving 500–9,999 by July 1, 2003; (ii) For systems serving fewer than 500 by January 1, 2004.
(d) Disinfection Benchmarking (§§ 141.540–141.544)	(1) A description of the proposed change in disinfection, your system's disinfection profile for Giardia lamblia (and, if necessary, viruses) and disinfection benchmark, and an analysis of how the proposed change will affect the current levels of disinfection.	Anytime your system is considering a significant change to its disinfection practice.

§ 141.571 What records does subpart T require my system to keep?

Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under § 141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.

Corresponding requirement	Description of necessary records	Duration of time records must be kept
(a) Individual Filter Turbidity Requirements (§§ 141.560–141.564)	Results of individual filter monitoring	At least 3 years.
(b) Disinfection Profiling (§§ 141.530–141.536)	Results of Profile (including raw data and analysis)	Indefinitely.
(c) Disinfection Benchmarking (§§ 141.540–141.544)	Benchmark (including raw data and analysis)	Indefinitely.

PART 142—NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION

15. The authority citation for Part 142 continues to read as follows:

Authority: 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

16. Section 142.14 is amended by revising paragraphs (a)(3), (a)(4)(i), (a)(4)(ii) introductory text, and (a)(7) to read as follows:

§ 142.14 Records kept by States.

(a) * * *

(3) Records of turbidity measurements must be kept for not less than one year. The information retained must be set forth in a form which makes possible comparison with the limits specified in §§ 141.71, 141.73, 141.173 and 141.175, 141.550–141.553 and 141.560–141.564 of this chapter. Until June 29, 1993, for any public water system which is providing filtration treatment and until December 30, 1991, for any public water system not providing filtration treatment and not required by the State to provide filtration treatment, records kept must be set forth in a form which makes possible comparison with the limits contained in § 141.13 of this chapter.

(4)(i) Records of disinfectant residual measurements and other parameters necessary to document disinfection effectiveness in accordance with §§ 141.72 and 141.74 of this chapter and the reporting requirements of §§ 141.75, 141.175, and 141.570, of this chapter must be kept for not less than one year.

(ii) Records of decisions made on a system-by-system and case-by-case basis

under provisions of part 141, subpart H, subpart P, or subpart T of this chapter, must be made in writing and kept by the State.

* * * * *

(7) Any decisions made pursuant to the provisions of part 141, subpart P or subpart T of this chapter.

(i) Records of systems consulting with the State concerning a modification to disinfection practice under §§ 141.170(d), 141.172(c), and 141.542 of this chapter, including the status of the consultation.

(ii) Records of decisions that a system using alternative filtration technologies, as allowed under §§ 141.173(b) and § 141.552 of this chapter, can consistently achieve a 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts. The decisions must include State-set enforceable turbidity limits for each system. A copy of the decision must be kept until the decision is reversed or revised. The State must provide a copy of the decision to the system.

(iii) Records of systems required to do filter self-assessment, CPE, or CCP under the requirements of §§ 141.175 and 141.563 of this chapter.

* * * * *

17. Section 142.16 is amended by revising paragraph (g) introductory text and adding paragraph (j) to read as follows:

§ 142.16 Special primacy requirements.

* * * * *

(g) Requirements for States to adopt 40 CFR part 141, Subpart P Enhanced Filtration and Disinfection—Systems Serving 10,000 or More People. In addition to the general primacy requirements enumerated elsewhere in this part, including the requirement that State provisions are no less stringent than the Federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, Subpart P Enhanced Filtration and Disinfection—Systems Serving 10,000 or More People, must contain the information specified in this paragraph:

* * * * *

(j) Requirements for States to adopt 40 CFR part 141, Subpart T Enhanced Filtration and Disinfection—Systems Serving Fewer than 10,000 People. In addition to the general primacy requirements enumerated elsewhere in this part, including the requirement that State provisions are no less stringent than the Federal requirements, an application for approval of a State program revision that adopts 40 CFR part 141, Subpart T Enhanced Filtration and Disinfection—Systems Serving Fewer than 10,000 People, must contain the information specified in this paragraph:

(1) *Enforceable requirements.* States must have rules or other authority to require systems to participate in a Comprehensive Technical Assistance (CTA) activity, the performance improvement phase of the Composite Correction Program (CCP). The State must determine whether a CTA must be conducted based on results of a CPE which indicate the potential for improved performance, and a finding by the State that the system is able to receive and implement technical assistance provided through the CTA. A CPE is a thorough review and analysis of a system's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance. During the CTA phase, the system must identify and systematically address factors limiting performance. The CTA is a combination of utilizing CPE results as a basis for follow-up, implementing process control priority-setting techniques and maintaining long-term involvement to systematically train staff and administrators.

(2) *State practices or procedures.*

(i) Section 141.530–141.536—How the State will approve a more representative data set for optional TTHM and HAA5 monitoring and profiling.

(ii) Section 141.536 of this chapter—How the State will approve a method to calculate the logs of inactivation for viruses for a system that uses either chloramines, ozone, or chlorine dioxide for primary disinfection.

(iii) Section 141.542 of this chapter—How the State will consult with the system and approve significant changes to disinfection practices.

(iv) Section 141.552 of this chapter—For filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, how the State will determine that a public water system may use a filtration technology if the PWS demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of § 141.72(b) of this chapter, consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts. For a system that makes this demonstration, how the State will set turbidity performance requirements that the system must meet 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of *Cryptosporidium* oocysts.

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