

# RULES AND REGULATIONS

## Title 25—ENVIRONMENTAL PROTECTION

### ENVIRONMENTAL QUALITY BOARD

[ 25 PA. CODE CH. 109 ]

#### Safe Drinking Water; (Groundwater Rule; Long-Term 2 Enhanced Surface Water Treatment Rule; and Stage 2 Disinfectants and Disinfection Byproducts Rule)

##### Order

The Environmental Quality Board (Board) by this Order amends 25 Pa. Code Chapter 109 (relating to Safe Drinking Water). The amendments incorporate the provisions of the Federal Stage 2 Disinfectants and Disinfection Byproduct Rule (Stage 2 DBPR), the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) and the Groundwater Rule (GWR) to retain primary enforcement authority (primacy). These revisions were initially proposed in three separate packages that have been merged for clarity and consistency.

The Stage 2 DBPR supplements the Stage 1 DBPR by requiring water systems to meet disinfection byproducts (DBPs) maximum contaminant levels (MCLs) at each monitoring site in the distribution system. These amendments will reduce the potential risks of cancer and reproductive and developmental health effects associated with DBPs by reducing peak levels of DBPs in public drinking water systems.

The LT2ESWTR will further protect public health against *Cryptosporidium* and other microbial pathogens in drinking water. These amendments will supplement existing microbial treatment regulations and target public water systems (PWSs) with higher potential risk from *Cryptosporidium*.

The GWR will provide for increased protection against microbial pathogens in public water systems that use groundwater sources by establishing a risk-targeted approach to identify groundwater sources that are susceptible to fecal contamination using *E. coli* as the indicator organism for source water monitoring. These amendments will build upon the existing Total Coliform Rule by establishing corrective actions, monitoring and source treatment provisions as part of the risk-based strategy.

This order was adopted by the Board at its meeting of September 15, 2009.

##### A. Effective Date

These amendments will go into effect upon publication in the *Pennsylvania Bulletin* as final-form rulemaking.

##### B. Contact Persons

For further information, contact Lisa Daniels, Chief, Division of Operations Monitoring and Training, P. O. Box 8467, Rachel Carson State Office Building, Harrisburg, PA 17105-8467, (717) 772-4018, or Marylou Barton, Assistant Counsel, Bureau of Regulatory Counsel, P. O. Box 8464, Rachel Carson State Office Building, Harrisburg, PA 17105-8464, (717) 787-7060. Persons with a disability may use the Pennsylvania AT&T Relay Service by calling (800) 654-5984 (TDD users) or (800) 654-5988 (voice users). This final-form rulemaking is available electroni-

cally through the Department of Environmental Protection's (Department) web site (<http://www.dep.state.pa.us>).

##### C. Statutory Authority

The final-form rulemaking is being made under the authority of section 4 of the Pennsylvania Safe Drinking Water Act (35 P. S. § 721.4), which grants the Board the authority to adopt rules and regulations governing the provision of drinking water to the public, and sections 1917-A and 1920-A of The Administrative Code of 1929 (71 P. S. §§ 510-17 and 510-20).

##### D. Background and Purpose

###### Stage 2 DBPR

Since the discovery of total trihalomethanes (TTHM) in drinking water in 1974, other DBPs have been identified and studied for their health effects. Many of these studies have shown DBPs to be carcinogenic and/or to cause reproductive or developmental effects in laboratory animals. Studies have also shown that high levels of the disinfectants themselves may cause health problems over long periods of time, including damage to both the blood and the kidneys. While many of these studies have been conducted at high doses, the weight of the evidence indicates that DBPs present a potential public health problem that must be addressed. In 1992, the U.S. Environmental Protection Agency (EPA) initiated a rulemaking process to address public health concerns associated with disinfectants, DBPs, and microbial pathogens. The EPA's most significant concern in developing regulations for disinfectants and DBPs was the need to ensure that adequate treatment is maintained for controlling risks from microbial pathogens. One of the major goals addressed in the rulemaking process was to develop an approach that would reduce the level of exposure from disinfectants and DBPs without undermining the control of microbial pathogens. The intention was to ensure that drinking water is microbiologically safe at the limits set for disinfectants and DBPs and that these chemicals do not pose an unacceptable health risk at these limits.

The Stage 1 DBPR regulated treatment practices at public water systems to eliminate or minimize disinfectant levels and DBPs that may cause harmful health effects. The Stage 1 DBPR established maximum residual disinfectant levels (MRDLs) for chlorine and chlorine dioxide. MCLs were also established for TTHM, five haloacetic acids (HAA5), bromate and chlorite. The Stage 1 DBPR also regulated pre-filtration treatment techniques for public water systems that use conventional filtration to reduce source water Total Organic Carbon (TOC), which may serve as a precursor to DBPs.

The EPA promulgated the Federal Stage 2 DBPR on January 4, 2006; minor corrective amendments were published on June 29, 2009. The Stage 2 DBPR augments the Stage 1 DBPR by targeting the highest risk systems for changes beyond those required for Stage 1 DBPR. The Stage 2 DBPR focuses on monitoring for, and reducing concentrations of, TTHM and HAA5. These two groups of DBPs act as indicators for the various byproducts of chemical disinfection. A reduction in TTHM and HAA5 generally indicates an overall reduction of DBPs.

The Stage 2 DBPR will reduce DBP peaks and provide for more consistent, equitable protection from DBPs across the entire distribution system. The Stage 2 DBPR requires PWSs to identify the higher risk monitoring locations through the Initial Distribution System Evalua-

tion (IDSE) and then lower DBP peaks in distribution systems by making operational or treatment changes as needed to meet the MCLs at all sampling locations. The Stage 2 DBPR changes how MCL compliance is determined. Instead of calculating a system level running annual average based on results from all samples collected in the distribution system, MCL compliance will be determined for each sample site as a locational running annual average (LRAA).

The Stage 2 DBPR also defines an operational evaluation level (OEL). The OEL is an LRAA threshold meant to help systems identify if they are in danger of exceeding the MCL in the following monitoring quarter. The process alerts the system to the potential of an MCL violation if DBP concentrations remain at their current level and encourages the system to consider whether operational changes are necessary to reduce DBP levels.

The OEL is the sum of the two previous quarters' TTHM or HAA5 results plus twice the current quarter's TTHM or HAA5 result, divided by four. An OEL exceedance occurs if the OEL for TTHM exceeds 0.080 mg/L or the OEL for HAA5 exceeds 0.060 mg/L at any monitoring location. If an OEL exceedance occurs, the system must conduct an operational evaluation and submit a written report of the evaluation to the Department no later than 90 days after the system is notified of the analytical result that caused the OEL exceedance.

#### LT2ESWTR

The EPA promulgated the Federal LT2ESWTR on January 5, 2006. The LT2ESWTR applies to PWSs supplied by surface water or groundwater under the direct influence of surface water (GUDI) sources. Surface water and GUDI sources have been shown to contain *Cryptosporidium* and other pathogens which pose a public health risk. In humans, *Cryptosporidium* may cause a severe gastrointestinal infection, termed *Cryptosporidiosis*, which can last several weeks. *Cryptosporidiosis* poses serious health and mortality risks for sensitive subpopulations including children, the elderly, pregnant women, organ transplant recipients and persons with weakened immune systems.

*Cryptosporidium* is common in the environment and is targeted by the LT2ESWTR because it is has been identified as the cause of a number of waterborne disease outbreaks in the United States. The EPA has concluded that existing treatment requirements do not provide adequate public health protection in filtered PWSs with the highest source water *Cryptosporidium* levels. Unlike other microbial contaminants, *Cryptosporidium* is resistant to inactivation using standard disinfection practices such as chlorination. The LT2ESWTR increases public health protection from *Cryptosporidium* by establishing a method to identify and adequately treat surface and GUDI sources with elevated levels of *Cryptosporidium*.

PWSs must monitor their source water (the influent water entering the treatment plant) to determine an average *Cryptosporidium* level. Larger systems must monitor for *Cryptosporidium*, *E. coli*, and turbidity at least once per month for 24 consecutive months. Small systems may initially monitor for *E. coli* as an indicator organism and are required to monitor for *Cryptosporidium* only if their *E. coli* levels exceed specified "trigger" values.

Applicable PWSs will be classified in one of four treatment categories (or "bins") based on the results of the source water *Cryptosporidium* monitoring. The higher the *Cryptosporidium* concentration of the source water,

the higher the bin classification. This bin classification determines the degree of additional *Cryptosporidium* treatment, if any, the filtered PWS must provide above and beyond existing treatment requirements. The EPA suspects that the majority of filtered PWSs will be classified in Bin 1, which carries no additional treatment requirements. PWSs classified in Bins 2, 3 or 4 must achieve additional 1.0-log to 2.5-logs of treatment for *Cryptosporidium* using at least one of 16 microbial toolbox options. The microbial toolbox provides feasible treatment options specifically targeted at *Cryptosporidium* and establishes design and operational standards for each option. The toolbox options include standards for *Cryptosporidium* inactivation and removal processes.

The EPA believes that implementation of the LT2ESWTR will significantly reduce levels of infectious *Cryptosporidium* in finished drinking water. In addition, the treatment technique requirements of this final-form rulemaking will increase protection against other microbial contaminants by improving overall filter plant treatment.

#### GWR

The EPA promulgated the Federal GWR on November 8, 2006. This final-form rulemaking will incorporate necessary Federal requirements to: (1) establish a risk-targeted approach to identify groundwater systems that are susceptible to fecal contamination; (2) define adequate treatment technique requirements for the inactivation and/or removal of viruses; (3) create guidelines including corrective action alternatives for systems to respond in a timely and appropriate manner to significant deficiencies identified by the Department during inspections; and (4) include additional requirements for notifying the public.

Groundwater has been traditionally regarded to be safer than surface water due to the natural filtering that occurs as groundwater travels through aquifer media. New evidence suggests that groundwater may be susceptible to viral contamination despite this natural filtering, particularly in karst aquifers where contaminants are more readily transported through conduits and fissures dissolved in the limestone. Groundwater supplies can become contaminated with fecal pathogens when surface water infiltrates karst aquifers or when high densities of livestock farming operations or onlot sewage treatment systems overwhelm the natural protective barriers of nonkarst aquifers.

The viral pathogens that may be found in groundwater sources with fecal contamination include enteric viruses such as Echovirus, Coxsackie viruses, Hepatitis A and E, Rotavirus, and Noroviruses. Vulnerable groundwater sources have also been found to contain enteric bacterial pathogens such as *E. coli*, *Salmonella spp.*, *Shigella spp.*, and *Vibrio cholera*. The Centers for Disease Control reports that between 1991 and 2000, groundwater source contamination and inadequate treatment accounted for 51% of all waterborne disease outbreaks in the United States.

Groundwater systems in Pennsylvania were not previously regulated with respect to source water viral contamination. Community groundwater systems were only required to provide continuous disinfection and maintain a detectable disinfectant residual throughout the distribution system. Systems, particularly smaller systems, can potentially satisfy this requirement with entry point disinfectant residuals that are too low to inactivate viruses effectively. Thus, community systems meeting the

previous disinfection requirement may not be providing the public with adequate protection from viral contamination. Noncommunity groundwater systems are not required to provide disinfection; persons consuming water from these systems are not afforded protection other than that provided by the characteristics of the source aquifer. The GWR amendments will improve public health protection by ensuring that appropriate corrective actions are taken in response to fecal contamination of source water or the identification of significant deficiencies.

The final-form rulemaking was submitted to the Small Water Systems Technical Assistance Center Advisory Board (TAC) for review and discussion on May 21, 2009. Comments were received from the TAC on June 24, 2009.

*E. Summary of Changes to the Proposed Rulemaking*

The proposed regulations were published in the *Pennsylvania Bulletin* separately, as three individual rule-making packages as follows:

- GWR was published at 38 Pa.B. 6483 (November 29, 2008) with a 30-day comment period.
- LT2ESWTR was published at 38 Pa.B. 7035 (December 20, 2008) with a 30-day comment period.
- Stage 2 DBPR was published at 38 Pa.B. 7055 (December 20, 2008) with a 30-day comment period.

As a result of the notices of proposed rulemaking, the Board received a number of comments from a total of 7 commentators, including the EPA and the Independent Regulatory Review Commission (IRRC). A Comment and Response document has been proposed to address the comments and it is available from the Department. Following is a list of changes that were made to the proposed rulemaking.

§ 109.1. *Definitions.*

*BAT*—This definition was amended in response to an EPA comment regarding consistency with the Federal BAT requirements found throughout 40 CFR Part 141.

*Conventional filtration*—This definition was amended to correct typographical errors in the proposed rule-making as it was published.

*Wholesale systems*—The word “consecutive” in the definition of wholesale systems was replaced with “public water” to be consistent with the intent of the Federal definition and with the definition of consecutive water system in our regulations.

*GAC10* and *GAC20*—These definitions were added in response to an EPA comment regarding consistency with Federal definitions found in 40 CFR 141.2.

§ 109.202(c)(1)(vi)(D)

This clause was deleted and the text was moved to § 109.202(c)(2).

§ 109.301(8)(vi)

This subparagraph was edited in response to an EPA comment to correct the cross references to sections of the Federal regulations that have been vacated.

§ 109.301(12)(i)(B)(I)(-c-)

This item was edited in response to an EPA comment to correct the cross reference to disinfection byproduct precursors required monitoring.

§ 109.301(12)(ii)(A)(I)

This subclause was amended to clarify the requirement that any system part of a combined distribution system

shall comply at the same time as the system with the earliest compliance date in the combined distribution system.

§ 109.301(12)(ii)(A)(II)

This subclause was amended for consistency. The phrase “consecutive systems” was replaced with “consecutive water systems” to be consistent with the definition in § 109.1.

§ 109.301(12)(ii)(A)(III)

This subclause was added in response to an EPA comment to clarify that the proposed regulation does not clearly specify that Stage 1 MCL requirements are applicable only until the effective dates of the Stage 2 DBP Rule.

§ 109.301(12)(ii)(B)(I)

This subclause was amended in response to an EPA comment to clarify that water systems monitor in accordance with their Stage 2 DBP Rule monitoring plan.

§ 109.301(12)(ii)(B)(II)

This subclause was amended to clarify the cross reference to the Stage 2 DBP Rule monitoring plan.

§ 109.301(12)(ii)(B)(III)

The subclause was revised in response to an EPA comment to be consistent with a correction to the Federal monitoring requirements found in 40 CFR 141.621(a)(2) as it was published in the June 29, 2009 *Federal Register*.

§ 109.301(12)(ii)(D)(IV)

This subclause was amended and moved to § 109.301(12)(ii)(C)(VII) in response to an EPA comment.

§ 109.301(12)(ii)(E)(III) and (IV)

These subclauses were revised to clarify the compliance calculations.

§ 109.304(c)

This subsection was amended in response to an EPA comment to address a missing cross-reference for the LT2ESWTR.

§ 109.408(a)

This subsection was amended for clarity and consistency. A treatment technique violation under the LT2ESWTR requires a Tier 1 public notice because Tier 1 notice is required for any breakdown in treatment necessary to remove acute microbial pathogens. Systems required to install additional treatment to remove *Cryptosporidium* under LT2ESWTR are doing so in response to monitoring that has shown elevated levels of *Cryptosporidium* in the source water. The Department requires Tier 1 PN for those violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure. *Cryptosporidium* is an acute pathogen. Therefore, to protect public health adequately and to be consistent with existing regulations, the Department is requiring a Tier 1 PN for this treatment technique violation.

Additionally, for consistency in chapter organization, paragraphs 7 and 8 were renumbered as paragraphs 10 and 11.

§ 109.505(a)(2)(i)(A) and (B)

These clauses were deleted and the text has been added to subsection § 109.505(b).

## § 109.505(b)

This subsection was amended to clarify that noncommunity water systems (NCWS) which have not obtained a construction permit under § 109.503 or an operations permit under § 109.504 and are providing 4-log treatment of viruses under Subchapter M shall obtain a noncommunity water system 4-log treatment of groundwater permit.

## § 109.605

This section was amended to add a missing cross reference and for chapter organization. Paragraph (3) was amended to add the missing cross reference for the LT2ESWTR and the existing subsections were renumbered.

Paragraph (5) was amended to clarify that a public water system developing a new groundwater source which has tested positive for *E. coli* during new source sampling shall provide 4-log treatment of viruses.

## § 109.701(a)(8)(ii)

This subparagraph was revised to clarify that the reporting requirements for systems monitoring for either chlorine or chloramines under § 109.301(13) include both the number of samples and the arithmetic average of all distribution samples taken in the last month.

## § 109.701(a)(9)

This paragraph was amended to correct a typographical error and in response to an EPA comment. The bracket showing that the text in this paragraph will be deleted was erroneously dropped at printing. This misprint caused EPA's comment that the proposed regulation is not clear as to specifically whether the RAA or LRAA are to be reported and that the proposed regulation does not differentiate how the RAA and LRAA reporting process will change after the Stage 2 effective date.

Under 40 CFR 141.629(a)(3), states have the option to perform calculations and determine compliance for water systems and whether the system is eligible for reduced monitoring. The Department has chosen to calculate LRAA values and determine compliance for water systems in this Commonwealth. Systems are only required to report the results of analyses conducted under § 109.701(a)(1), not the RAA and LRAA calculations. Therefore, paragraph 9 was deleted.

## § 109.701(a)(10)

This paragraph was amended in response to an EPA comment to clarify the reporting requirements for disinfection byproduct precursors. Public water systems are required to only report analytical results because the Department calculates compliance. Therefore, this paragraph was deleted to be consistent with the reporting requirements for other regulated contaminants.

## § 109.701(d)(1) and (2)

These paragraphs were revised to be consistent with Federal recordkeeping requirements under 40 CFR Part 141 and 142.

## § 109.701(g)(2)(ii)(A)

This clause was amended in response to an EPA comment to clarify and correct a cross reference. The sentence was revised to read "The monitoring plan must contain the elements in subclauses (I)—(III) and be completed no later than the date systems conduct their initial monitoring under § 109.301(12)(ii)(A)."

## § 109.701(g)(2)(ii)(A)(IV)

This subclause was deleted. Under 40 CFR 142.16(m), EPA gives States the option to modify, on a case-by-case basis, the TTHM and HAA5 monitoring requirements for a wholesale and consecutive system that are connected. Water quality may vary greatly between PWSs because of changing water chemistry. Although treatment and operational practices of the wholesaler will affect the water quality in the consecutive system, the consecutive system is responsible for maintaining the quality of the water supplied to their consumers. The Department believes that the monitoring requirements specified in § 109.301(12)(ii) are necessary to ensure acceptable water quality. It is not protective of public health to allow any reduction in monitoring requirements beyond those already covered in § 109.301(12)(ii)(C). Therefore, the Department will not modify the monitoring requirements of a wholesale and consecutive system on a case-by-case basis.

## § 109.701(g)(2)(ii)(B)

This clause was revised in response to an EPA comment to clarify whether the monitoring described are locations under the Stage 1 DBPR or Stage 2 DBPR.

## § 109.701(g)(2)(ii)(D)

This clause was amended to clarify that all systems must submit their modified monitoring plan to the Department. This is consistent with § 109.701(g)(2)(ii)(C) which requires all systems to submit their initial monitoring plan to the Department.

## § 109.701(g)(2)(iii)(A)

This clause was amended to clarify that PWSs on a quarterly monitoring frequency have to calculate an OEL for each sampling location. The OEL is an LRAA threshold, calculated quarterly, that is meant to help systems identify if they are in danger of exceeding the MCL.

## § 109.701(g)(2)(iii)(C)(II)

The subclause was edited in response to an EPA comment to correct a cross reference for the schedule to submit the OEL report after an OEL exceedance.

## § 109.705(b)(1)

The Federal Groundwater Rule allows state regulatory agencies to reduce the minimum frequency with which they conduct sanitary surveys at community water systems (CWS) from 3 years to 5 years *if* the State determines the CWS has "outstanding performance". This Federal option was included in the proposed GWR. However, upon further discussion with staff it has been decided that the 3-year minimum frequency for conducting a sanitary survey should not be extended. A 3-year frequency ensures protection of public health and allows greater opportunity for the Department to offer compliance assistance to a CWS. Accordingly, all references to "outstanding performance" and associated incentives have been removed from this final-form rulemaking. This will not place an additional burden on a CWS or Department resources because this is the current minimum frequency for conducting sanitary surveys.

## § 109.705(b)(2)

Text has been deleted which referenced the alternative schedule for states to conduct sanitary surveys at a CWS which has been deleted from the final Annex A under § 109.705(b)(1).

§ 109.801

This section was amended to address missing cross references for the Lead and Copper Rule, LT2ESWTR and GWR.

§ 109.810(b)

This subsection was amended because the proposed rulemaking was based on the Chapter 109 language in existence at the time of publication. However, § 109.810(b) was revised as part of the General Update revisions, which were published as final-form rulemaking at 39 Pa.B. 2661 (May 23, 2009). Therefore, these revisions show the proposed changes based on the currently existing language.

§ 109.901(b) and (c)

These subsections were amended to be consistent with Federal regulations found in 40 CFR 141.4 regarding the exceptions to obtaining a variance. Variances and exemptions are not permitted for the MCL for total coliforms, nor for the treatment techniques for PWSs using surface water, GUDI or groundwater sources.

§ 109.903(b) and (c)

These subsections were amended to be consistent with Federal regulations found in 40 CFR 141.4 regarding the exceptions to obtaining an exemption. Variances and exemptions are not permitted for the MCL for total coliforms, nor for the treatment techniques for PWSs using surface water, GUDI or groundwater sources.

§ 109.1003

This section was amended for clarity and to be consistent with chapter organization. The cross reference for LT2ESWTR source water monitoring requirements has been added to subsection (f). Subsection (b) was amended for clarity. The proposed subsection (f) was renumbered as subsection (g).

§ 109.1201(b)

This subsection was amended for clarity and consistency with the requirements of the Stage 2 DBPR. Paragraph (1) was amended for consistency. Paragraph (2) was deleted as unnecessary because subsection (a) already defines the water systems affected by this subchapter.

§ 109.1202(c)

This subsection was amended in response to a public comment to clarify when systems may begin the second round of source water monitoring. The intent is that there is at least a 6-year window between the 2 rounds of source water monitoring. Systems that used grandfathered data or that completed the first round of monitoring early may wish to begin the second round of monitoring before the deadline specified in Federal regulations. Therefore, text has been added to clarify when the second round of monitoring may be started.

§ 109.1202(h)—(p)

Subsection (h) was deleted and moved to § 109.1205. The grandfathering provisions of the LT2ESWTR are incorporated by reference. To clarify that all of the grandfathering provisions are incorporated by reference, this text was moved to a separate section of Subchapter L.

The remaining subsections were renumbered and cross references were updated to maintain chapter organization.

§ 109.1203(e)

Paragraphs (1)—(4) were amended to clarify that water systems must provide the additional level of treatment specified at all times.

§ 109.1203(n) and (o)

These subsections were amended to clarify that both filtered and unfiltered surface water or GUDI systems must provide the additional treatment required if the bin classification increases as a result of the second round of source water monitoring.

§ 109.1204(b)

This subsection was amended to be consistent with the Federal requirements for a watershed control program found in 40 CFR 141.715(b)(1). A watershed control program may not be used as a toolbox option for unfiltered water systems.

§ 109.1205

This section was amended for clarity and chapter organization. The grandfathering provisions of the LT2ESWTR are incorporated by reference. To clarify that all of the grandfathering provisions are incorporated by reference, this text was moved to a separate section of Subchapter L.

§ 109.1206(e)

This subsection was amended to clarify the reporting requirements for *Cryptosporidium* and *E. coli*.

§ 109.1206(f)—(l)

This subsection was deleted because the grandfathering provisions are incorporated by reference in § 109.1205. The remaining subsections were renumbered for chapter organization.

§ 109.1206(h)

This subsection was amended to clarify the reporting requirements for systems with Bin 1 sources. Systems with Bin 1 sources that are using alternative treatment technologies for LT2ESWTR have the same toolbox component reporting requirements as systems using Bin 2 or higher sources.

§ 109.1302(a)(2)

This paragraph was amended to clarify the minimum disinfectant residual that must be maintained to demonstrate 4-log inactivation of viruses. The residual of 0.4 mg/L has been changed to 0.40 mg/L because the decimal place is significant when calculating log-inactivation by free chlorine. The calculation used to determine this minimum residual was performed assuming that the design standards set forth in Part II of the Department's *Public Water Supply Manual* (DEP ID# 383-2125-108) are met. The results of the calculation indicate that, in a system satisfying the design requirements, 4-log treatment of viruses is achieved with a minimum residual of 0.40 mg/L. For example, under the proposed regulation, a minimum residual of 0.36 mg/L free chlorine would round to 0.4 mg/L and meet the regulatory requirement but would not provide 4-log inactivation of viruses. This edit to the final regulation corrects that oversight.

This paragraph was also amended in response to a public comment to clarify that the Department will not specify an alternative free chlorine minimum residual, but rather approve an alternative residual. A PWS may propose an alternative residual that provides at least

4-log treatment of viruses. This alternative residual may be either above or below the default residual of 0.40 mg/L.

§ 109.1302(a)(4)

This paragraph has been revised to clarify that 4-log treatment of viruses must be achieved before the first customer, not at the entry point of the distribution system. This provision allows a community water system to utilize the length of transmission line from the entry point to the first customer for log inactivation credit if it is not able to achieve 4-log treatment at the entry point.

§ 109.1302(a)(4)(i)—(iii)

January dates have been changed to April dates, which allows PWSs an additional 3 months to comply with the requirement to provide 4-log treatment of viruses. The additional months will also give the Department greater time to review submissions of 4-log demonstrations under § 109.1302(a)(3), which may be necessary in circumstances where the system needs to make physical modifications.

§ 109.1302(a)(6)

This paragraph was amended to clarify that a community water system must provide 4-log treatment for a new source when the source is put into service, not when the entry point is put into service. This change was made to capture new sources that are developed to serve existing entry points.

§ 109.1302(b)(1)

This paragraph was amended to clarify that a noncommunity water system may utilize the length of transmission line from the entry point to the first customer for log inactivation credit if it is not able to provide 4-log treatment at the entry point.

§ 109.1302(c)(1)(iii)

This subparagraph was amended to clarify that PWSs providing 4-log treatment of viruses must provide adequate treatment prior to the first customer; PWSs are not permitted to provide treatment at the first customer. Under existing regulations, Point-of-Use treatment devices are prohibited.

Additionally, this subparagraph was amended to clarify when PWSs that have Department-approved 4-log treatment must begin compliance monitoring.

§ 109.1302(c)(4)

This paragraph was amended for clarity and consistency with Federal regulations found in 40 CFR 141.404(a). PWSs must correct any significant deficiency within 120 days or an alternate deadline established by the Department.

§ 109.1303(a)

This subsection was amended to clarify that a PWS must comply with triggered monitoring requirements unless it has successfully demonstrated to the Department that they are capable of providing 4-log treatment of viruses and the Department has approved the submittal. Once the Department approves a system's 4-log treatment submission, compliance monitoring shall commence and triggered monitoring requirements no longer apply.

§ 109.1303(b)

This subsection was amended to clarify the 24-hour time limit for collecting source water samples.

§ 109.1303(c)

This subsection was amended to clarify that a PWS must have a representative sampling plan approved by the Department prior to the notification to begin triggered source water monitoring to reduce the number of source water samples required to be collected.

§ 109.1303(c)(1) and (2)

These paragraphs set forth the conditions under which the Department would permit representative sampling allowing a reduced number of source water samples that must be collected in response to a total coliform-positive result. Paragraph (1) states that systems may reduce the number of source samples to be collected if multiple sources draw from the same hydrogeologic setting. Paragraph (2) states the PWS may sample sources which are representative of Total Coliform Rule monitoring locations in situations where these sources feed separate distribution systems with no interconnection, if a monitoring plan is approved by the Department prior to notification of a total coliform-positive sample collected under § 109.1303(a).

§ 109.1303(f)

This subsection was amended in response to a public comment to be consistent with the Federal GWR regulations found in 40 CFR 141.402(a)(5) to allow a PWS to forgo collecting triggered source water samples if the routine total coliform positive sample has been invalidated within the 24-hour time limit under § 109.1303(a). Although the Department has included this provision, it is highly unlikely that a public water system will have a routine total coliform-positive sample invalidated within the 24-hour timeline established under the Federal Groundwater Rule.

§ 109.1304(a)

This subsection has been amended in response to a TAC comment. The phrase "... a groundwater system is using a fecally-contaminated groundwater source ..." has been changed to "... a groundwater system using a groundwater source with fecal contamination ..."

§ 109.1304(a)(1)(i)—(vii)

These subparagraphs were amended to enhance the readability of paragraph (1).

§ 109.1304(a)(1)(iv)

This subparagraph was amended to clarify that triggered source water samples may be used to satisfy the requirements of assessment source water monitoring when approved by the Department.

§ 109.1304(a)(3)

This paragraph was deleted. This was a typographical error in the proposed rulemaking. Provisions relating to invalidation of an *E. coli*-positive sample are covered in § 109.1304(b).

§ 109.1305(a)

This subsection was amended to clarify that the Department will approve, rather than specify, the minimum disinfectant residual necessary to achieve 4-log treatment of viruses.

§ 109.1305(a)(2)(i)

This subparagraph was amended to clarify that grab sampling may be allowed at a location other than the entry point, if approved by the Department.

§ 109.1305(b)

This subsection was amended to remove references to membrane technology. Currently, there are no available integrity testing protocols sensitive enough to locate defects in the membrane that could allow the passage of viruses. Therefore, no log removal credit can be awarded. If integrity testing protocols become available in the future, membrane technology may be used and shall follow requirements established in the current § 109.1305(b).

§ 109.1306(a)

This subsection was amended to clarify that a PWS currently holding a valid operation permit shall submit forms provided by the Department to demonstrate 4-log treatment of viruses.

§ 109.1306(b)

This subsection was created to explain further the responsibilities of a noncommunity water system not operating under a construction and operating permit that is demonstrating and providing 4-log treatment of viruses under subchapter M. A “noncommunity water system 4-log treatment of groundwater permit” has been created for these systems. This is part of a new, abbreviated permitting process specifically designed for noncommunity water systems that choose to, or are required to, provide 4-log treatment of viruses under the GWR.

§ 109.1307(a)(1)(i)

This subparagraph was amended to clarify a compliance monitoring location may either be at the entry point or another Department-approved location.

§ 109.1307(a)(1)(i)(A)—(C)

These clauses were amended to be consistent with Safe Drinking Water-General Update revisions published as final-form rulemaking at 39 Pa.B. 2661 (May 23, 2009).

F. *Benefits, Costs and Compliance*

*Benefits*

The Stage 2 DBPR will reduce DBP peaks and provide for more consistent, equitable protection from DBPs across the entire distribution system. The Stage 2 DBPR will affect approximately 2,045 community water systems and 600 nontransient noncommunity water systems serving 10.5 million Pennsylvanians. These 10.5 million people will benefit from a reduction in health risks associated with disinfection practices, such as bladder cancer and kidney damage. The EPA has estimated that the nation may realize a total annual benefit of up to \$3.5 billion as a result of avoiding up to 581 cases of bladder cancer per year. In Pennsylvania, this translates into a total annual benefit of up to \$144 million in avoiding up to 24 cases of bladder cancer per year.

The LT2ESWTR rule will further protect public health against *Cryptosporidium* and other microbial pathogens in 355 PWSs that supply water to approximately 8.4 million Commonwealth citizens. Additional *Cryptosporidium* treatment is expected to result in a reduced rate of *Cryptosporidium*-related illnesses and death. The EPA estimates that after full implementation of the LT2ESWTR, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually. Furthermore, the EPA estimates the annual benefit of LT2ESWTR implementation ranges from \$177 million to \$2.8 billion, depending on the rate of *Cryptosporidium* occurrence. In Pennsylvania, this trans-

lates into a total annual benefit of \$4.48 million to \$70.84 million depending on the rate of *Cryptosporidium* occurrence.

The GWR establishes monitoring requirements to ensure adequate treatment is provided at groundwater systems and defines a risk-targeted approach to identify groundwater sources that are vulnerable to fecal contamination. Implementation of the Rule will create public health benefits for approximately 7 million Pennsylvanians resulting from the reduction in endemic acute viral illness and death. Although most illnesses caused by viruses are mild, some viruses may produce severe health effects in children, the elderly and those with compromised immune systems. The EPA has estimated that the nation may avoid 41,868 illnesses associated with viruses. In Pennsylvania, this translates to 2,553 illnesses avoided. The EPA estimated the National annual benefits from the GWR implementation to be \$16 million for community water systems, \$900,000 for nontransient noncommunity systems and \$2.7 million for transient noncommunity systems. In Pennsylvania, this translates to annual benefits of \$632,657, \$54,548 and \$193,321 respectively, totaling \$880,527.

*Compliance Costs*

All public water systems in this Commonwealth are affected by at least one of these rules. The costs associated with these three rules will vary because the requirements for each are different and the number of PWSs affected by each rule is different. The annual costs associated with each rule are as follows:

Rule	No. of Systems Affected	Total Annual Costs
Stage 2 DBPR	2,650	\$3,390,000
LT2ESWTR	355	\$3,364,900
GWR	9,100	\$2,929,940
	Total	\$9,684,840

For the Stage 2 DBPR, the estimated \$3.39 million includes nontreatment costs of rule implementation such as: the Initial Distribution System Evaluation, Stage 2 DBPR monitoring plans, routine monitoring, reporting, recordkeeping and operational evaluations. PWSs required to install treatment to comply with MCLs will accrue the additional costs of treatment installation as well as operation and maintenance costs.

For the LT2ESWTR, PWSs will incur monitoring costs for turbidity, *E. coli*, and *Cryptosporidium* to assess source water *Cryptosporidium* levels. Estimates of laboratory fees, shipping costs, labor hours for sample collection, and hours for reporting results were used to predict source water monitoring costs. PWSs are required to conduct two rounds of source water monitoring unless the PWS installs additional treatment to achieve the maximum level of treatment required for *Cryptosporidium* as a result of the rule. Some PWSs will be required to install additional treatment based on the results of the source water monitoring.

For the GWR, costs will vary considerably due to the current treatment capacity of a system, groundwater source quality and sensitivity of the groundwater source to fecal contamination. The EPA estimates corrective actions systems must take in response to any significant deficiencies identified by the Department or in response to the presence of *E. coli* in raw source water may be the

mostcostly expenses a system may incur. Corrective actions include: installing or upgrading treatment to achieve at least 4-log inactivation and/or removal of viruses; providing an alternate source of water; or eliminating a source of fecal contamination. Systems providing sufficient treatment must conduct compliance monitoring to ensure treatment effectiveness. Additional costs may be

borne if a system needs to install equipment to continuously monitor a disinfectant residual.

For the Commonwealth, there are costs associated with regulatory oversight and costs to state-owned public water systems. The details for the Commonwealth costs are as follows:

<i>Rule</i>	<i>Oversight Costs</i>	<i>No. of PWSs Affected</i>	<i>State-owned PWS Costs*</i>	<i>Total Annual Costs</i>
Stage 2 DBPR	\$585,000	32	\$41,000	\$626,000
LT2ESTWR	\$35,420	17	\$161,461	\$196,881
GWR	\$719,469	223	\$70,441	\$789,910
Total	\$1,339,889	—	\$272,902	\$1,612,791

\* The cost estimates for state-owned PWSs are part of (not in addition to) the total cost estimates for the regulated community.

#### *Compliance Assistance Plan*

Pennsylvania's PENNVEST Program offers financial assistance to public water systems that qualify. Eligibility is based upon factors such as public health impact, compliance necessity, and project/operational affordability. Assistance is in the form of a low-interest loan and in hardship cases additional grant funds may be awarded.

The Safe Drinking Water Program has established a network of regional and central office training staff that is responsive to identifiable training needs. The target audience in need of training may be program staff, the regulated community, or both.

In addition to this network of training staff, the Bureau of Water Standards and Facility Regulation have staff dedicated to providing both training and outreach support services to public water system operators. The Department's Internet site also contains the *Drinking Water & Wastewater Treatment System Operator Information Center* Internet site, which provides a bulletin board of timely, useful information for treatment plant operators.

#### *Paperwork Requirements*

The Stage 2 DBPR will require that water systems conduct the IDSE and submit the report to the Department. Most of this initial implementation will be completed prior to the Department receiving primacy. It is anticipated that little additional paperwork will be necessary for the routine monitoring and reporting upon adoption of this final-form rulemaking.

The LT2ESWTR amendments will create additional reporting, recordkeeping and paperwork requirements. It is anticipated that our current data reporting forms can be modified to facilitate an additional monitoring and reporting and that no additional data or paperwork will be necessary.

The GWR will not change existing requirements, but it will add new requirements for groundwater systems. Community water systems will need to complete and submit a form that demonstrates how 4-log treatment will be provided at each entry point and describes how compliance monitoring will be conducted. Systems conducting compliance monitoring because 4-log treatment of viruses is provided will need to use existing Department forms to submit disinfection data on a monthly basis.

It is anticipated that this additional monitoring and reporting will be easily facilitated by the addition of one or two new data reporting forms and that little additional paperwork will be necessary.

#### *G. Pollution Prevention*

Not applicable.

#### *H. Sunset Review*

The regulations will be reviewed in accordance with the sunset review schedule published by the Department to determine whether the regulation effectively fulfills the goals for which it was intended.

#### *I. Regulatory Review*

Under section 5(a) of the Regulatory Review Act (71 P. S. § 745.5(a)), on November 19, 2008, the Department submitted a copy of the notice of proposed rulemaking for the GWR, published at 38 Pa.B. 6483 (November 29, 2008) and on November 24, 2008, the Department submitted a copy of the notice of proposed rulemaking for the LT2ESWTR and Stage 2 DBP rules, published at 38 Pa.B. 7035 (December 20, 2008) and 38 Pa.B. 7055 (December 20, 2008), respectively, to the Independent Regulatory Review Commission (IRRC) and to the House and Senate Environmental Resources and Energy Committees (Committees).

Under section 5(c) of the Regulatory Review Act (71 P. S. § 745.5(a)), IRRC and the Committees were provided with copies of the comments received during the public comment period, as well as other documents when requested. In preparing these final-form regulations, the Department has considered all comments from IRRC, the Committees and the public.

Under section 5.1(j.2) of the Regulatory Review Act (71 P. S. § 745(j.2)), on November 4, 2009, these final-form regulations were deemed approved by the Committees. Under section 5.1(e) of the Regulatory Review Act (71 P. S. § 745.5a(e)), IRRC met on November 5, 2009, and approved the final-form regulations.

#### *J. Findings of the Board*

The Board finds that:

(1) Public notice of proposed rulemaking was given under sections 201 and 202 of the act of July 31, 1968 (P. L. 769, No. 240) (45 P. S. §§ 1201 and 1202) and regulations promulgated thereunder at 1 Pa. Code §§ 7.1



and 7.2 (relating to notice of proposed rulemaking required; and adoption of regulations).

(2) A public comment period was provided as required by law, and all comments were considered.

(3) These regulations do not enlarge the purpose of the proposals published as follows:

- GWR at 38 Pa.B. 6483 (November 29, 2008).
- LT2ESWTR at 38 Pa.B. 7035 (December 20, 2008).
- Stage 2 DBPR at 38 Pa.B. 7055 (December 20, 2008).

(4) These regulations are necessary and appropriate for administration and enforcement of the authorizing acts identified in section C of this order.

K. Order of the Board

The Board, acting under the authorizing statutes, orders that:

(a) The regulations of the Department of Environmental Protection, 25 Pa. Code Chapter 109, are amended by amending §§ 109.1, 109.5, 109.202, 109.204, 109.301, 109.304, 109.407—109.410, 109.503, 109.505, 109.507, 109.602, 109.605, 109.611, 109.701, 109.705, 109.801, 109.810, 109.901, 109.903, 109.906—109.908, 109.1002, 109.1003, 109.1008; and by adding §§ 109.417, 109.418, 109.1201—109.1206 and 109.1301—109.1307 and Appendices A—C to Subchapter L to read as set forth in Annex A, with ellipses referring to the existing text of the regulations.

(b) The Chairperson of the Board shall submit this order and Annex A to the Office of General Counsel and the Office of Attorney General for review and approval as to legality and form, as required by law.

(c) The Chairperson of the Board shall submit this order and Annex A to IRRC and the Committees as required by the Regulatory Review Act.

(d) The Chairperson of the Board shall certify this order and Annex A and deposit them with the Legislative Reference Bureau, as required by law.

(e) This order shall take effect immediately.

JOHN HANGER,  
Chairperson

(Editor's Note: For the text of the order of the Independent Regulatory Review Commission relating to this document, see 39 Pa.B. 6705 (November 21, 2009).)

Fiscal Note: Fiscal Note 7-439 remains valid for the final adoption of the subject regulation.

Annex A

TITLE 25. ENVIRONMENTAL PROTECTION

PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE II. WATER RESOURCES

CHAPTER 109. SAFE DRINKING WATER

Subchapter A. GENERAL PROVISIONS

§ 109.1. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

\* \* \* \* \*

*BAT—Best Available Technology*—The best technology, treatment techniques or other means which the Administrator finds are available for achieving compliance with maximum contaminant levels. This chapter incorporates by reference the BAT specified in 40 CFR Parts 141 and 142 (relating to National primary drinking water regulations; and National primary drinking water regulations implementation).

*Bag filter*—A pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media. It is typically constructed of a nonrigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to outside.

*Bank filtration*—A water treatment process that uses a well to recover surface water that has naturally infiltrated into groundwater through a riverbed or bank. Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other well.

*Bin*—A category based on the level of *Cryptosporidium* present in source water. Four potential bins exist, 1—4. The higher the bin, the higher the concentration of source water *Cryptosporidium*.

\* \* \* \* \*

*Cartridge filter*—A pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media. It is typically constructed as rigid or semirigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.

\* \* \* \* \*

*Combined distribution system*—The interconnected distribution system consisting of the distribution systems of wholesale systems and of the public water systems that obtain finished water from another public water system.

\* \* \* \* \*

*Conventional filtration*—The series of processes for the purpose of substantial particulate removal consisting of coagulation, flocculation, clarification, and granular media filtration. The clarification step must be a solid/liquid separation process where accumulated solids are removed during this separate component of the treatment system.

\* \* \* \* \*

*DBP*—Disinfection byproduct.

\* \* \* \* \*

*Dual sample set*—A set of two samples collected at the same time and same location, with one sample analyzed for TTHM and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an IDSE and determining compliance with the TTHM and HAA5 MCLs under Subchapter G (relating to system management responsibilities).

\* \* \* \* \*

*Finished water*—Water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as necessary to maintain water quality in the distribution system (for example, booster disinfection or addition of corrosion control chemicals).

\* \* \* \* \*

*Flowing stream*—A course of running water flowing in a definite channel.

\* \* \* \* \*

*GAC10*—A granular activated carbon filter bed with an empty bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days, except that the reactivation frequency for *GAC10* used as a BAT shall be 120 days.

*GAC20*—A granular activated carbon filter bed with an empty bed contact time of 20 minutes based on average daily flow and a carbon reactivation frequency of every 240 days.

\* \* \* \* \*

*Groundwater*—Water that is located within the saturated zone below the water table and is available to supply wells and springs.

\* \* \* \* \*

*IDSE*—Initial Distribution System Evaluation.

\* \* \* \* \*

*LRAA*—*Locational running annual average*—The average, computed quarterly, of quarterly arithmetic averages of all analytical results for samples taken at a particular monitoring location during the most recent 4 calendar quarters.

\* \* \* \* \*

*Lake/reservoir*—A natural or man made basin or hollow on the earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.

\* \* \* \* \*

*Log inactivation*—A measure of the amount of viable microorganisms that are rendered nonviable during disinfection processes and is defined as:

$$\text{Log inactivation} = \log\left(\frac{N_o}{N_D}\right)$$

Where,

$N_o$  = Initial concentration of viable microorganisms

$N_D$  = Concentration of viable microorganisms after disinfection

Log = Logarithm to base 10

Log inactivation is related to percent inactivation, defined as:

$$\text{Percent inactivation} = \left(1 - \frac{N_D}{N_o}\right) * 100$$

Common log-inactivation values and corresponding percent inactivation values include:

<i>Log Inactivation</i>	<i>Percent Inactivation</i>
0.5-log	68.4%
1.0-log	90.0%
1.5-log	96.8%
2.0-log	99.0%
2.5-log	99.7%
3.0-log	99.9%

*Log Inactivation*

4.0-log

*Percent Inactivation*

99.99%

*Log removal*—A measure of the physical removal of a targeted contaminant or disease-causing microorganism (or its surrogate) during water treatment processes and is defined as:

$$\text{Log removal} = \log\left(\frac{N_o}{N_R}\right)$$

Where,

$N_o$  = Initial concentration of targeted contaminant or disease-causing microorganism (or its surrogate)

$N_R$  = Concentration of targeted contaminant or disease-causing microorganism (or its surrogate) after removal

Log = Logarithm to base 10

Log removal is related to percent removal, defined as:

$$\text{Percent removal} = \left(1 - \frac{N_R}{N_o}\right) * 100$$

Common log removal values and corresponding percent removal values include:

<i>Log Removal</i>	<i>Percent Removal</i>
0.5-log	68.4%
1.0-log	90.0%
1.5-log	96.8%
2.0-log	99.0%
2.5-log	99.7%
3.0-log	99.9%
4.0-log	99.99%

*Log treatment*—A measure of the removal or inactivation, or Department-approved combination of removal and inactivation, of a targeted contaminant or disease-causing microorganism (or its surrogate) during water treatment processes and is defined as:

Log treatment = Log removal + Log inactivation

Or,

$$\text{Log treatment} = \log\left(\frac{N_o}{N_T}\right)$$

Where,

$N_o$  = Initial concentration of a targeted contaminant or disease-causing microorganism (or its surrogate)

$N_T$  = Concentration of a targeted contaminant or disease-causing microorganism (or its surrogate) after treatment

Log = Logarithm to base 10

Log treatment is related to percent treatment, defined as:

$$\text{Percent treatment} = \left( 1 - \frac{N_T}{N_0} \right) * 100$$

Common log treatment values and corresponding percent treatment values include:

Log Treatment	Percent Treatment
0.5-log	68.4%
1.0-log	90.0%
1.5-log	96.8%
2.0-log	99.0%
2.5-log	99.7%
3.0-log	99.9%
4.0-log	99.99%

\* \* \* \* \*

*Membrane filtration—*

(i) A pressure or vacuum driven separation process in which particulate matter larger than 1 micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test.

(ii) The term includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration and reverse osmosis.

\* \* \* \* \*

*Microorganism—*Any of a number of unicellular, multicellular or colonial bacteria, fungi, protozoa, archaea or viruses whose individuals are too small to be seen by the human eye without magnification.

\* \* \* \* \*

*Plant intake—*The works or structures at the head of a conduit through which water is diverted from a source (for example, a river or lake) into the treatment plant.

\* \* \* \* \*

*Presedimentation—*A preliminary treatment process used to remove gravel, sand and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.

\* \* \* \* \*

*RAA—Running annual average—*The average, computed quarterly, of quarterly arithmetic averages of all analytical results for samples taken during the most recent 4 calendar quarters.

\* \* \* \* \*

*Significant deficiency—*A defect in design, operation or maintenance, or a failure or malfunction of the sources, treatment, storage or distribution system that the Department determines to be causing, or has the potential for causing the introduction of contamination into the water delivered to consumers.

\* \* \* \* \*

*2-stage lime softening—*A process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.

\* \* \* \* \*

*Wholesale system—*A public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more public water systems.

**§ 109.5. Organization of chapter.**

(a) This subchapter and Subchapter H (relating to laboratory certification) apply to all public water systems.

(b) Subchapters B—G and I apply to public water systems, except bottled water and vended water systems, retail water facilities and bulk water hauling systems, unless provisions in those Subchapters are specifically referenced in Subchapter J (relating to bottled water and vended water systems, retail water facilities and bulk water hauling systems).

(c) Subchapter J applies exclusively to bottled water and vended water systems, retail water facilities and bulk water hauling systems.

(d) Subchapter K (relating to lead and copper) applies to community and nontransient noncommunity water systems.

(e) Subchapter L (relating to the long-term 2 enhanced surface water treatment rule) applies to all public water systems using surface water or GUDI sources.

(f) Subchapter M (relating to additional requirements for groundwater sources) applies to all public water systems that use groundwater, excluding those systems that combine all of their groundwater with surface water or with groundwater under the direct influence of surface water prior to treatment under § 109.202(c)(1) (relating to State MCLs, MRDLs and treatment technique requirements).

**Subchapter B. MCLs, MRDLs OR TREATMENT TECHNIQUE REQUIREMENTS**

**§ 109.202. State MCLs, MRDLs and treatment technique requirements.**

\* \* \* \* \*

(c) *Treatment technique requirements for pathogenic bacteria, viruses and protozoan cysts.* A public water system shall provide adequate treatment to reliably protect users from the adverse health effects of microbiological contaminants, including pathogenic bacteria, viruses and protozoan cysts. The number and type of treatment barriers and the efficacy of treatment provided shall be commensurate with the type, degree and likelihood of contamination in the source water.

(1) A public water supplier shall provide, as a minimum, continuous filtration and disinfection for surface water and GUDI sources. The treatment technique must provide at least 99.9% removal and inactivation of *Giardia lamblia* cysts, and at least 99.99% removal and inactivation of enteric viruses. Beginning January 1, 2002, public water suppliers serving 10,000 or more people shall provide at least 99% removal of *Cryptosporidium* oocysts. Beginning January 1, 2005, public water suppliers serving fewer than 10,000 people shall provide at least 99% removal of *Cryptosporidium* oocysts. The Department, depending on source water quality conditions, may require additional treatment as necessary to meet the requirements of this chapter and to protect the public health.

\* \* \* \* \*

(ii) The combined total effect of disinfection processes utilized in a filtration plant shall achieve at least a 90% inactivation of *Giardia* cysts and a 99.9% inactivation of viruses, as determined by CTs and measurement methods established by the EPA. The residual disinfectant concentration in the water delivered to the distribution system prior to the first customer may not be less than .2 mg/L for more than 4 hours, as demonstrated by measurement taken under § 109.301(1). Failure to maintain this level that extends beyond 4 hours constitutes a breakdown in treatment. A system that experiences a breakdown in treatment shall, under § 109.701(a)(3) (relating to reporting and recordkeeping), notify the Department within 1 hour after the water system learns of the violation or the situation, and shall provide public notice in accordance with § 109.408 (relating to Tier 1 public notice categories, timing and delivery of notice).

\* \* \* \* \*

(vi) For a source including springs, infiltration galleries, cribs or wells permitted for use by the Department prior to May 16, 1992, and determined by the Department to be a GUDI source, the public water supplier shall:

(A) Maintain a minimum residual disinfectant concentration in the water delivered to the distribution system prior to the first customer in accordance with subsection (c)(1)(iii)(A).

(B) Provide continuous filtration and disinfection in accordance with this paragraph within 48 months after the Department determines the source of supply is a GUDI source.

(C) Submit to the Department for approval a feasibility study within 1 year after the Department determines the source of supply is a GUDI source. The feasibility study shall specify the means by which the supplier shall, within the deadline established in clause (B), meet the requirements of this paragraph and shall otherwise comply with paragraph (1)(iv)(A).

(2) In addition to meeting the requirements of paragraph (1), a public water supplier using surface water or GUDI sources shall also comply with the requirements of, and on the schedules in, Subchapter L (relating to long-term 2 enhanced surface water treatment rule).

(3) A community public water system shall provide continuous disinfection and comply with Subchapter M (relating to additional requirements for groundwater sources) for groundwater sources.

\* \* \* \* \*

**§ 109.204. Disinfection profiling and benchmarking.**

(a) The disinfection profiling and benchmarking requirements, established by the EPA under the National Primary Drinking Water Regulations in 40 CFR 141.172, 141.530—141.536, 141.540—141.544, 141.570(c) and (d) and 141.708—141.709 are incorporated by reference except as otherwise established by this chapter.

(b) Public water suppliers that did not conduct TTHM and HAA5 monitoring under this section because they served fewer than 10,000 persons when the monitoring was required, but serve 10,000 or more persons before January 1, 2005, shall comply with this section. These suppliers shall also establish a disinfection benchmark and consult with the Department for approval. A supplier that decides to make a significant change to its disinfection practice, as described in this section, shall consult with the Department before making such a change.

(c) The public water supplier shall conduct disinfection profiling in accordance with the procedures and methods in the most current edition of the *Disinfection Profiling and Benchmarking Guidance Manual* published by the EPA. The results of the disinfection profiling and the benchmark, including raw data and analysis, shall be retained indefinitely on the water system premises or at a convenient location near the premises. Public water suppliers serving 10,000 or more persons and required to conduct disinfection profiling shall submit the disinfection profiling data and the benchmark data to the Department by June 1, 2001, in a format acceptable to the Department. Public water suppliers serving 500 to 9,999 persons shall submit the disinfection profiling data and the benchmark to the Department by October 1, 2004. Public water suppliers serving less than 500 persons shall submit the disinfection profiling data and the benchmark to the Department by April 1, 2005, in a format acceptable to the Department.

**Subchapter C. MONITORING REQUIREMENTS**

**§ 109.301. General monitoring requirements.**

Public water suppliers shall monitor for compliance with MCLs, MRDLs and treatment technique requirements in accordance with the requirements established by the EPA under the National Primary Drinking Water Regulations, 40 CFR Part 141 (relating to national primary drinking water regulations), except as otherwise established by this chapter unless increased monitoring is required by the Department under § 109.302 (relating to special monitoring requirements). Alternative monitoring requirements may be established by the Department and may be implemented in lieu of monitoring requirements for a particular National Primary Drinking Water Regulation if the alternative monitoring requirements are in conformance with the Federal act and regulations. The monitoring requirements shall be applied as follows:

\* \* \* \* \*

(8) *Monitoring requirements for public water systems that obtain finished water from another public water system.*

\* \* \* \* \*

(vi) Community water systems and nontransient noncommunity water systems that obtain finished water from another permitted public water system shall comply with the monitoring requirements for disinfection byproducts and disinfectant residuals in paragraphs (12)(i)—(v) and (13).

(vii) A community water system which is a consecutive water system shall comply with the monitoring requirements for lead and copper as specified in § 109.1101(c) (relating to lead and copper).

(viii) A public water supplier that obtains finished water from another permitted public water system using groundwater shall comply with Subchapter M (relating to additional requirements for groundwater sources).

\* \* \* \* \*

(12) *Monitoring requirements for disinfection byproducts and disinfection byproduct precursors.* Community water systems and nontransient noncommunity water systems that use a chemical disinfectant or oxidant shall monitor for disinfection byproducts and disinfection byproduct precursors in accordance with this paragraph. Community water systems and nontransient noncommunity water systems that obtain finished water from another public water system that uses a chemical disin-

fectant or oxidant to treat the finished water shall monitor for TTHM and HAA5 in accordance with this paragraph. Systems that use either surface water or GUDI sources and that serve at least 10,000 persons shall begin monitoring by January 1, 2002. Systems that use either surface water or GUDI sources and that serve fewer than 10,000 persons, or systems that use groundwater sources, shall begin monitoring by January 1, 2004. Systems monitoring for disinfection byproducts and disinfection byproduct precursors shall take all samples during normal operating conditions. Systems monitoring for disinfection byproducts and disinfection byproduct precursors shall use only data collected under this chapter to qualify for reduced monitoring. Compliance with the MCLs and monitoring requirements for TTHM, HAA5, chlorite (where applicable) and bromate (where applicable) shall be determined in accordance with 40 CFR 141.132 and 141.133 (relating to monitoring requirements; and compliance requirements) which are incorporated herein by reference.

(i) *TTHM and HAA5 Stage 1 DBP Rule.*

\* \* \* \* \*

(B) *Reduced monitoring.* Systems shall monitor for TTHM and HAA5 for at least 1 year prior to qualifying for reduced monitoring. Systems serving at least 500 persons and that use either surface water or GUDI sources shall monitor source water TOC monthly for at least 1 year prior to qualifying for reduced monitoring. The Department retains the right to require a system that meets the requirements of this clause to resume routine monitoring.

(I) For systems serving at least 500 persons that use either surface water or GUDI sources and that have a source water TOC running annual average that is no greater than 4.0 mg/L, a TTHM running annual average that is no greater than 0.040 mg/L and an HAA5 running annual average that is no greater than 0.030 mg/L, the required monitoring is reduced according to items (-a-) and (-b-). Systems serving at least 10,000 persons shall resume routine monitoring as prescribed in clause (A) if the TTHM running annual average exceeds 0.060 mg/L or the HAA5 running annual average exceeds 0.045 mg/L. Systems serving from 500 to 9,999 persons shall resume routine monitoring as prescribed in clause (A) if the annual TTHM average exceeds 0.060 mg/L or the annual HAA5 average exceeds 0.045 mg/L. Systems serving at least 500 persons that must resume routine monitoring shall resume routine monitoring in the quarter immediately following the quarter in which the system exceeded the specified TTHM or HAA5 criteria.

\* \* \* \* \*

(-c-) Beginning April 1, 2008, systems not monitoring under the provisions of subparagraph (v) shall take monthly TOC samples every 30 days at a location prior to any treatment, to qualify for reduced monitoring for TTHM and HAA5 under this subparagraph. In addition to meeting other criteria for reduced monitoring in this section, the source water TOC running annual average must be less than or equal to 4.0 mg/L (based on the most recent 4 quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under this

section, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.

(II) For systems that use only groundwater sources not included under subclause (I), the required monitoring is reduced according to the following:

\* \* \* \* \*

(-b-) For systems serving fewer than 10,000 persons that have an annual TTHM average that is no greater than 0.040 mg/L and an annual HAA5 average that is no greater than 0.030 mg/L for 2 consecutive years or an annual TTHM average that is no greater than 0.020 mg/L and an annual HAA5 average that is no greater than 0.015 mg/L for 1 year, the required monitoring is reduced to one sample per 3-year cycle per treatment plant. The sample shall be taken at a location that represents a maximum residence time during the month of warmest water temperature. The 3-year cycle shall begin on January 1 following the quarter in which the system qualifies for reduced monitoring. If the TTHM annual average exceeds 0.060 mg/L, or the HAA5 annual average exceeds 0.045 mg/L the system shall resume routine monitoring as prescribed in clause (A), except that systems that exceed either a TTHM or HAA5 MCL shall increase monitoring to at least one sample per quarter per treatment plant beginning in the quarter immediately following the quarter in which the system exceeds the TTHM or HAA5 MCL.

(ii) *TTHM and HAA5 Stage 2 DBP Rule.*

(A) *Applicability and schedule.*

(I) Community water systems and nontransient noncommunity water systems using a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light shall monitor for compliance with the MCLs based on the LRAA for TTHM and HAA5. Any system that is part of a combined distribution system shall comply at the same time as the system with the earliest compliance date in the combined distribution system. Systems shall comply with this subparagraph as follows:

(-a-) Systems serving 100,000 or more people begin April 1, 2012.

(-b-) Systems serving from 50,000 to 99,999 people begin October 1, 2012.

(-c-) Systems serving from 10,000 to 49,999 people begin October 1, 2013.

(-d-) Systems serving less than 10,000 people:

(-1-) Begin October 1, 2013, if no *Cryptosporidium* monitoring is required under §§ 109.1201—109.1204.

(-2-) Begin October 1, 2014, if *Cryptosporidium* monitoring is required under §§ 109.1201—109.1204.

(II) For the purpose of the schedule under this subparagraph, the Department may determine that the combined distribution system does not include certain consecutive water systems based on factors such as receiving water from a wholesale system only on an emergency basis or receiving only a small percentage and

small volume of water from a wholesale system. The Department may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive water system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive water system.

(III) All systems monitoring under this paragraph shall comply with subparagraph (i) until the dates specified in this subparagraph.

(B) *Routine monitoring.*

(I) A system that submitted an IDSE report shall begin monitoring at the locations and months recommended in the IDSE report unless the Department notifies the system that other locations or additional locations are required. A system that submitted a 40/30 certification, or qualified for a very small system waiver or a nontransient noncommunity water system serving less than 10,000, shall monitor at the locations and dates identified in its Stage 2 DBP rule monitoring plan following the schedule in § 109.701(g)(2)(ii) (relating to reporting and recordkeeping).

(II) A system required to conduct quarterly monitoring shall begin monitoring in the first full calendar quarter that includes the compliance date specified in clause (A). A system required to conduct monitoring at frequencies less than quarterly shall begin monitoring in the calendar month recommended in the IDSE report in accordance with 40 CFR 141.601 and 141.602 (relating to standard monitoring; and system specific studies) as incorporated by reference or the calendar month identified in the Stage 2 DBP rule monitoring plan no later than 12 months after the applicable compliance date under clause (A).

(III) Monitoring shall be conducted at no fewer than the number of locations identified in the table under subclauses (IV) and (V). All systems shall monitor during the month of highest DBP concentrations. Systems on quarterly monitoring shall sample every 90 days at each monitoring location. Sampling at each monitoring location shall be conducted as follows:

(-a-) Systems using surface water or GUDI sources serving a population greater than 3,300 and systems using groundwater sources serving a population of 500 or greater shall take dual sample sets at each monitoring location.

(-b-) Systems using surface water or GUDI sources serving a population of 3,300 or less and systems using groundwater sources serving a population less than 500 shall take individual TTHM and HAA5 samples at the locations with the highest TTHM and HAA5 concentrations, respectively.

(-c-) Systems serving a population less than 500 may take a dual sample set at one location per monitoring period if the highest TTHM and HAA5 concentrations occur at the same location and during the same month.

(IV) Community water systems and nontransient noncommunity water systems using surface water or GUDI sources shall monitor as follows:

<i>Population size</i>	<i>Monitoring frequencies</i>	<i>Distribution system monitoring location total per monitoring period</i>
< 500	Annually	2
500—3,300	Quarterly	2
3,301—9,999	Quarterly	2
10,000—49,999	Quarterly	4
50,000—249,999	Quarterly	8
250,000—999,999	Quarterly	12
1,000,000—4,999,999	Quarterly	16
≥ 5,000,000	Quarterly	20

(V) Community water systems and nontransient noncommunity water systems using groundwater sources shall monitor as follows:

<i>Population size</i>	<i>Monitoring frequencies</i>	<i>Distribution system monitoring location total per monitoring period</i>
< 500	Annually	2
500—9,999	Annually	2
10,000—99,999	Quarterly	4
100,000—499,999	Quarterly	6
≥ 500,000	Quarterly	8

(VI) An undisinfected system that begins using a disinfectant other than UV light after the dates under 40 CFR 141.600 (relating to general requirements) as incorporated by reference for complying with the IDSE requirements, shall consult with the Department to identify compliance monitoring locations. The system shall develop a monitoring plan under § 109.701(g)(2)(ii) that includes those monitoring locations.

(VII) Systems shall use analytical techniques adopted by the EPA under the Federal act for TTHM and HAA5 analyses. Laboratories that have received accreditation by the Department shall conduct analyses.

(C) *Reduced monitoring.*

(I) Systems may reduce monitoring to the level specified in the table under subclauses (II) and (III) if, after at least 4 consecutive quarters, the LRAA is equal to or less than 0.040 mg/L for TTHM and equal to or less than 0.030 mg/L for HAA5 at all monitoring locations. Only data collected under subparagraph (i) and this subparagraph may be used to qualify for reduced monitoring. Systems with surface water or GUDI sources shall also take monthly TOC samples every 30 days at a location prior to any treatment, to qualify for reduced monitoring for TTHM and HAA5 under this clause. In addition to meeting other criteria for reduced monitoring in this clause, the source water TOC running annual average (based on the most recent 4 quarters of monitoring) must be equal to or less than 4.0 mg/L on continuing basis at each treatment plant to reduce monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under this clause, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.

(II) Community water systems and nontransient noncommunity water systems using surface water or GUDI sources may reduce monitoring as follows:

<i>Population size</i>	<i>Monitoring frequencies</i>	<i>Distribution system monitoring location total per monitoring period</i>
< 500	Monitoring may not be reduced	
500—3,300	Annually	1 TTHM and 1 HAA5 sample: 1 at the location and during the quarter with the highest TTHM single measurement, 1 at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
3,301—9,999	Annually	2 dual sample sets: 1 at the location and during the quarter with the highest TTHM single measurement, 1 at the location and during the quarter with the highest HAA5 single measurement.
10,000—49,999	Quarterly	2 dual sample sets at the locations with the highest TTHM and the highest HAA5 LRAAs.
50,000—249,999	Quarterly	4 dual sample sets at the locations with two highest TTHM and two highest HAA5 LRAAs.
250,000—999,999	Quarterly	6 dual sample sets at the locations with the three highest TTHM and the three highest HAA5 LRAAs.
1,000,000—4,999,999	Quarterly	8 dual sample sets at the location with the 4 highest TTHM and 4 highest HAA5 LRAAs.
≥ 5,000,000	Quarterly	10 dual sample sets at the locations with the five highest TTHM and five highest HAA5 LRAAs.

(III) Community water systems and nontransient noncommunity water systems using groundwater sources may reduce monitoring as follows:

<i>Population size</i>	<i>Monitoring frequencies</i>	<i>Distribution system monitoring location total per monitoring period</i>
< 500	Every third year	1 TTHM and 1 HAA5 sample: 1 at the location and during the quarter with the highest TTHM single measurement; 1 at the location and during quarter with highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
500—9,999	Annually	1 TTHM and 1 HAA5 sample: 1 at the location and during the quarter with highest TTHM single measurement; 1 at the location during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
10,000—99,999	Annually	2 dual sample sets: 1 at the location and during the quarter with the highest TTHM single measurement; 1 at the location and during the quarter with the highest HAA5 single measurement.
100,000—499,999	Quarterly	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
≥ 500,000	Quarterly	4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs.

(IV) Systems on reduced quarterly monitoring may remain on reduced monitoring as long as the TTHM LRAA is equal to or less than 0.040 mg/L and the HAA5 LRAA is equal to or less than 0.030 mg/L at each monitoring location. Systems on reduced annual or less frequent monitoring may remain on reduced monitoring as long as each TTHM sample result is equal to or less than 0.060 mg/L and each HAA5 sample result is equal to

or less than 0.045 mg/L. In addition, the source water TOC running annual average (based on the most recent 4 quarters of monitoring) from samples collected every 90 days at a location prior to any treatment must be equal to or less than 4.0 mg/L at each treatment plant treating surface water or GUDI sources.

(V) If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM

or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment, is greater than 4.0 mg/L at any treatment plant treating surface water or GUDI sources, the system shall resume routine monitoring under clause (B) or begin increased monitoring if clause (D)(I) applies.

(VI) The Department retains the right to require a system that meets the requirements of this clause to resume routine monitoring.

(VII) A system may remain on reduced monitoring after the dates identified in clause (A) for compliance with this subparagraph only if the criteria specified in items (-a-)—(-c-) are met. If any condition is not met, the system shall resume routine monitoring as specified in clause (B) by the dates specified in clause (A).

(-a-) The system qualified for a 40/30 certification under 40 CFR 141.603 (relating to 40/30 certification) as incorporated by reference or has received a very small system waiver under 40 CFR 141.604 (relating to very small system waivers) as incorporated by reference.

(-b-) The system meets the reduced monitoring criteria in this clause.

(-c-) The system has not changed or added monitoring locations from those used for compliance monitoring in subparagraph (i).

(D) *Increased monitoring.*

(I) Systems that are required to monitor at a particular location annually or less frequently than annually under clause (B) or (C) shall increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if any single TTHM sample result is greater than 0.080 mg/L or any single HAA5 sample result is greater than 0.060 mg/L at any location.

(II) A system may return to routine monitoring once it has conducted increased monitoring for at least 4 consecutive quarters and the LRAA for every monitoring location is equal to or less than 0.060 mg/L for TTHM and is equal to or less than 0.045 mg/L for HAA5.

(III) Systems on increased monitoring under subparagraph (i) shall remain on increased monitoring until they qualify for a return to routine monitoring under subclause (II). Systems shall conduct increased monitoring under subclause (I) at the monitoring locations in the monitoring plan developed under § 109.701(g)(2)(ii) beginning at the date identified in clause (A) for compliance with this subparagraph and remain on increased monitoring until they qualify for a return to routine monitoring under subclause (II).

(E) *General monitoring and compliance requirements.*

(I) A system required to monitor quarterly shall calculate LRAAs for TTHM and HAA5 using monitoring results collected under this subparagraph and determine that each LRAA does not exceed the MCL. A system that fails to complete four consecutive quarters of monitoring, shall calculate compliance with the MCL based on the average of the available data from the most recent 4 quarters. A system that takes more than one sample per quarter at a monitoring location shall average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

(II) A system required to monitor yearly or less frequently shall determine that each sample result is less than the MCL. If any single sample result exceeds the

MCL, the system shall comply with the requirements of clause (D). If no sample result exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

(III) A system required to conduct quarterly monitoring, shall make compliance calculations at the end of the 4th calendar quarter that follows the compliance date (or earlier if the LRAA calculated based on fewer than 4 quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters) and at the end of each subsequent calendar quarter. A system required to conduct monitoring at a frequency that is less than quarterly shall make compliance calculations beginning with the first compliance sample taken after the compliance date.

(IV) A system is in violation of the MCL when the LRAA at any location exceeds the MCL for TTHM or HAA5, calculated as specified in subclause (I), or the LRAA calculated based on fewer than 4 quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters. A system is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if it fails to monitor.

(iii) *Chlorite.* Community water systems and non-transient noncommunity water systems that use chlorine dioxide for disinfection or oxidation shall monitor for chlorite.

\* \* \* \* \*

(iv) *Bromate.* Community water systems and non-transient noncommunity water systems that use ozone for disinfection or oxidation shall monitor for bromate.

\* \* \* \* \*

(B) *Reduced monitoring.*

(I) Until March 31, 2009, systems that have an average source water bromide concentration that is less than 0.05 mg/L based upon representative monthly bromide measurements for 1 year, the required monitoring is reduced from monthly to quarterly. Systems on reduced monitoring shall continue to take monthly samples for source water bromide. If the running annual average source water bromide concentration, computed quarterly, equals or exceeds 0.05 mg/L based upon representative monthly measurements, the system shall revert to routine monitoring as prescribed by clause (A).

(II) Beginning April 1, 2009, a system required to analyze for bromate may reduce monitoring from monthly to quarterly, if the system's running annual average bromate concentration computed quarterly is less than or equal to 0.0025 mg/L based on monthly measurements as prescribed in clause (A) for the most recent 4 quarters. Systems qualifying for reduced bromate monitoring under subclause (I) may remain on reduced monitoring as long as the running annual average of quarterly bromate samples is less than or equal to 0.0025 mg/L. If the running annual average bromate concentration is greater than 0.0025 mg/L, the system shall resume routine monitoring as prescribed under clause (A).

(v) *DBP precursors.* Community water systems and nontransient noncommunity water systems that use either surface water or GUDI sources and that use conventional filtration shall monitor for disinfection byproduct precursors.

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§ 109.304. Analytical requirements.

(a) Sampling and analysis shall be performed in accordance with analytical techniques adopted by the EPA under the Federal act or methods approved by the Department.

(b) An alternate analytical technique may be employed with the written approval of the Department and the concurrence of the Administrator. An alternate technique will be accepted only if it is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with MCLs or MRDLs or treatment technique requirements. The use of the alternate analytical technique may not decrease the frequency of monitoring required by this subchapter.

(c) For the purpose of determining compliance with the monitoring and analytical requirements established under this subchapter and Subchapters K, L and M (relating to lead and copper; long-term 2 enhanced surface water treatment rule; and additional requirements for groundwater sources), the Department will consider only samples analyzed by a laboratory accredited by the Department, except that measurements for turbidity, fluoridation operation, residual disinfectant concentration, temperature, pH, alkalinity, orthophosphates, silica, calcium, conductivity, daily chlorite, and magnesium hardness may be performed by a person meeting one of the following requirements:

(1) A person meeting the requirements of § 109.704 (relating to operator certification).

(2) A person using a standard operating procedure as provided under authority of the Water and Wastewater Systems Operators' Certification Act (63 P.S. §§ 1001—1015.1).

(3) An environmental laboratory meeting the requirements of Chapter 252 (relating to environmental laboratory accreditation).

(d) A system shall have *Cryptosporidium* samples analyzed by a laboratory that is approved under the EPA's Laboratory Quality Assurance Evaluation Program for Analysis of *Cryptosporidium* in Water or a laboratory that has been accredited for *Cryptosporidium* analysis by an equivalent Department laboratory accreditation program.

**Subchapter D. PUBLIC NOTIFICATION**

§ 109.407. General public notification requirements.

(a) *Violation categories and other situations requiring a public notice.* A public water supplier shall give public notice for the following circumstances:

(1) Failure to comply with an applicable State primary MCL or MRDL in Subchapter B (relating to MCLs, MRDLs or treatment technique requirements).

(2) Failure to comply with a prescribed treatment technique requirement in Subchapter B, G, K, L or M.

(3) Failure to perform water quality monitoring, as required by Subchapter C (relating to monitoring requirements) or Subchapter K.

(4) Operation under a variance or an exemption under Subchapter I (relating to variances and exemptions issued by the Department).

(5) Failure to comply with the requirements of any schedule that has been set under a variance or exemption.

(6) Occurrence of a waterborne disease outbreak, as defined in § 109.1 (relating to definitions), or other emergency situation as defined in § 109.701(a)(3)(iii) (relating to reporting and recordkeeping) that adversely affects the quality or quantity of finished water and has a significant potential to have serious adverse effects on human health as a result of short-term exposure.

(7) Availability of unregulated contaminant monitoring data.

(8) Exceedance of the nitrate MCL by noncommunity water systems, when permitted by the Department in writing to exceed the MCL in accordance with 40 CFR 141.11(d) (relating to MCLs for inorganic contaminants).

(9) Other violations or situations determined by the Department to require a public notice under this subchapter.

\* \* \* \* \*

§ 109.408. Tier 1 public notice—categories, timing and delivery of notice.

(a) *General violation categories and other situations requiring a Tier 1 public notice.* A public water supplier shall provide Tier 1 public notice for the following circumstances:

(1) Violation of the MCL for total coliforms when fecal coliforms or *E. coli* are present in the water distribution system, as specified in § 109.202(a)(2) (relating to MCLs, MRDLs or treatment technique requirements), or when the water supplier fails to test for fecal coliforms or *E. coli* when any check sample tests positive for coliforms, as specified in § 109.301(3) (relating to general monitoring requirements).

(2) Violation of the MCL for nitrate, nitrite or total nitrate and nitrite, as defined in § 109.202(a)(2), or when the water supplier fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in § 109.301(7)(ii)(C)(V).

(3) Exceedance of the nitrate MCL by noncommunity water systems, when permitted by the Department in writing to exceed the MCL in accordance with 40 CFR 141.11(d) (relating to maximum contaminant levels for inorganic chemicals).

(4) Violation of the MRDL for chlorine dioxide, as defined in § 109.202(f)(2), when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water supplier does not take the required samples in the distribution system, as specified in § 109.301.

(5) Violation of the turbidity MCL of 5 NTU based on an average for 2 consecutive days by a public water system using an unfiltered surface water source, as specified in § 109.202(a)(2).

(6) Violation of a treatment technique requirement for pathogenic bacteria, viruses and protozoan cysts as defined in § 109.202(c), resulting from a single exceedance of the maximum allowable turbidity limit.

(7) Violation of a treatment technique requirement for *Cryptosporidium* as defined in § 109.1203 (relating to bin classification and treatment technique requirements), resulting from a failure to provide the level of treatment appropriate for the systems bin classification.

(8) Detection of *E. coli* in source water samples as specified in §§ 109.1303 and 109.1304 (relating to trig-

gered monitoring requirements for groundwater sources; and assessment source water monitoring).

(9) A breakdown in treatment for groundwater sources as specified in § 109.1307(a)(1)(ii) (relating to system management responsibilities).

(10) Occurrence of a waterborne disease outbreak, as defined in § 109.1 (relating to definitions), or other emergency situation as defined in § 109.701(a)(3)(iii) (relating to reporting and recordkeeping) that adversely affects the quality or quantity of the finished water and has a significant potential to have serious adverse effects on human health as a result of short-term exposure.

(11) Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Department on a case-by-case basis.

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**§ 109.409. Tier 2 public notice—categories, timing and delivery of notice.**

(a) *General violation categories and other situations requiring a Tier 2 public notice.* A public water supplier shall provide Tier 2 public notice for the following circumstances:

(1) All violations of the primary MCL, MRDL treatment technique requirements and failure to take corrective action in Subchapters B, G, K, L or M, except when a Tier 1 notice is required under § 109.408 (relating to Tier 1 public notice—categories, timing and delivery of notice) or when the Department determines that a Tier 1 notice is required. The tier assignment for fluoride is not incorporated by reference. Under § 109.202(d) (relating to MCLs, MRDLs or treatment technique requirements), a public water system shall comply with the primary MCL for fluoride of 2 mg/L. As such, a public water supplier shall provide Tier 2 public notice for violation of the primary MCL for fluoride.

(2) Violations of the monitoring requirements in Subchapter C, K or M (relating to monitoring requirements; lead and copper; and additional requirements for groundwater sources), when the Department determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation.

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**§ 109.410. Tier 3 public notice—categories, timing and delivery of notice.**

(a) *General violation categories and other situations requiring a Tier 3 public notice.* A public water supplier shall provide Tier 3 public notice for the following circumstances:

(1) Monitoring violations under Subchapter C, K, L or M, except when a Tier 1 notice is required under § 109.408 (relating to Tier 1 public notice—categories, timing and delivery of notice) or when the Department determines that a Tier 2 notice is required.

(2) Reporting and record maintenance violations under § 109.701(h) (relating to reporting and recordkeeping).

(3) Operation under a variance or an exemption granted under Subchapter I (relating to variances and exemptions issued by the Department).

(4) Availability of unregulated contaminant monitoring results, as required under 40 CFR 141.40 (relating to monitoring requirements for unregulated contaminants).

\* \* \* \* \*

**§ 109.417. Special notice for significant deficiencies by noncommunity water systems.**

(a) In addition to the applicable public notification requirements of this subchapter, a noncommunity water system that receives notice from the Department under § 109.1302(c)(2) (relating to groundwater systems with significant deficiencies or source water *E. coli* contamination) of a significant deficiency shall inform the public served by the water system in a manner approved by the Department of any significant deficiency that has not been corrected within 12 months of being notified by the Department, or earlier if directed by the Department. The system shall continue to inform the public annually until the significant deficiency is corrected. The information must include:

(1) The nature of the significant deficiency and the date the significant deficiency was identified by the Department.

(2) The Department-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed.

(3) For systems with a large proportion of non-English speaking consumers specified in § 109.411(c)(2) (relating to content of a public notice), information in the appropriate languages regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.

(b) If directed by the Department, a noncommunity water system with significant deficiencies that have been corrected in accordance with § 109.1302(c)(1) shall inform its customers of the significant deficiencies, how the deficiencies were corrected, and the dates of correction.

**§ 109.418. Special notice for failure to conduct source water *Cryptosporidium* monitoring or failure to determine bin classification.**

(a) *Special notice for repeated failure to conduct monitoring of the source water for Cryptosporidium and for failure to determine bin classification or Cryptosporidium level.* The owner or operator of a community or noncommunity water system that is required to monitor source water under § 109.1202 (relating to monitoring requirements) shall notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in § 109.1202(c). The notice shall be repeated as specified in § 109.409(b)(3) (relating to Tier 2 public notice—form, manner and frequency of notice).

(b) *Delivery of the special notice for failure to determine bin classification or Cryptosporidium level.* The owner or operator of a community or noncommunity water system that is required to determine a bin classification under § 109.1203 (relating to bin classification and treatment technique requirements), or to determine *Cryptosporidium* level under § 109.1203(i) and (j), shall notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed to report the determination as specified in § 109.1206(h) (relating to reporting and recordkeeping requirements) or § 109.1203(i) and (j), initial round and second round, respectively. The notice shall be repeated as specified in § 109.409(b)(3). The

notice is not required if the system is complying with a Department-approved schedule to address the violation.

(c) *Form and manner of the special notice.*

(1) The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in § 109.409(c). The public notice shall be presented as required in § 109.411(c) (relating to content of a public notice).

(2) The notice must contain the following language, including the language necessary to fill in the blanks.

(i) The special notice for repeated failure to conduct monitoring must contain the following language:

“We are required to monitor the source of your drinking water for *Cryptosporidium*. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We ‘did not monitor or test’ or ‘did not complete all monitoring or testing’ on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate *Cryptosporidium* removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).”

(ii) The special notice for failure to determine bin classification or *Cryptosporidium* level must contain the following language:

“We are required to monitor the source of your drinking water for *Cryptosporidium* to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove *Cryptosporidium* from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).”

(3) Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.

**Subchapter E. PERMIT REQUIREMENTS**

**§ 109.503. Public water system construction permits.**

(a) *Permit application requirements.* An application for a public water system construction permit shall be submitted in writing on forms provided by the Department and shall be accompanied by plans, specifications, engineer’s report, water quality analyses and other data, information or documentation reasonably necessary to enable the Department to determine compliance with the act and this chapter. The Department will make available to the applicant the Public Water Supply Manual, available from the Bureau of Water Standards and Facility Regulation, Post Office Box 8774, Harrisburg, Pennsylvania 17105 which contains acceptable design standards

and technical guidance. Water quality analyses shall be conducted by a laboratory accredited under this chapter.

(1) *General requirements.* An application must include:

\* \* \* \* \*

(iii) *Information describing new sources.* The Department may accept approval of an out-of-State source by the agency having jurisdiction over drinking water in that state if the supplier submits adequate proof of the approval and the agency’s standards are at least as stringent as this chapter. Information describing sources must include:

\* \* \* \* \*

(B) An evaluation of the quality of the raw water from each new source. This clause does not apply when the new source is finished water obtained from an existing permitted community water system unless the Department provides written notice that an evaluation is required. The evaluation must include analysis of the following:

(I) VOCs for which MCLs have been established by the EPA under the National Primary Drinking Water Regulations in 40 CFR 141.61(a) (relating to maximum contaminant levels for organic contaminants). Vinyl chloride monitoring is required only if one or more of the two-carbon organic compounds specified under § 109.301(5)(i) (relating to general monitoring requirements) are detected. Samples for VOCs shall be collected in accordance with § 109.303(d) (relating to sampling requirements).

(II) Except for asbestos, IOCs for which MCLs have been established by the EPA under the National Primary Drinking Water Regulations in 40 CFR 141.62 (relating to maximum contaminant levels for inorganic contaminants). The new source shall be monitored for asbestos if the Department has reason to believe the source water is vulnerable to asbestos contamination.

(III) Lead.

(IV) Copper.

(V) Total coliform concentration and, if total coliform-positive, analyze for the presence of *E. coli*.

(VI) SOCs.

(-a-) Except for SOCs that have been granted a State-wide waiver, SOCs for which MCLs have been established by the EPA under the National Primary Drinking Water Regulations in 40 CFR 141.61(c).

(-b-) Dioxin where there is a source of dioxin contamination within 1,000 feet of a groundwater source or within 1 mile upstream of a surface water source.

(-c-) Polychlorinated biphenyls (PCBs) where there is a source of PCB contamination within 1,000 feet of a groundwater source or within 1 mile upstream of a surface water source.

(VII) Gross Alpha ( $\alpha$ ), radium-226, radium-228, uranium and Gross Beta ( $\beta$ ).

(VIII) Aluminum, chloride, color, foaming agents, iron, manganese, pH, silver, sulfate, total dissolved solids and zinc for which MCLs have been established by the EPA under the National Secondary Drinking Water Regulations in 40 CFR 143.3 (relating to secondary MCLs).

(IX) Alkalinity.

(X) Hardness.

(XI) Temperature.

(XII) For surface water or GUDI sources, *E. coli* or *Cryptosporidium*, or both, as specified in § 109.1202 (relating to monitoring requirements).

(XIII) Other contaminants that the Department determines necessary to evaluate the potability of the source.

\* \* \* \* \*

**§ 109.505. Requirements for noncommunity water systems.**

(a) A noncommunity water system shall obtain a construction permit under § 109.503 (relating to public water system construction permits) and an operation permit under § 109.504 (relating to public water system operation permits), unless the noncommunity water system satisfies paragraph (1) or (2). The Department retains the right to require a noncommunity water system that meets the requirements of paragraph (1) or (2) to obtain a construction and an operation permit, if, in the judgment of the Department, the noncommunity water system cannot be adequately regulated through standardized specifications and conditions. A noncommunity water system which is released from the obligation to obtain a construction and an operation permit shall comply with the other requirements of this chapter, including design, construction and operation requirements described in Subchapters F and G (relating to design and construction standards; and system management responsibilities).

\* \* \* \* \*

(2) A noncommunity water system not covered under paragraph (1) is not required to obtain a construction and an operation permit if it satisfies the following specifications and conditions:

(i) The sources of supply for the system are groundwater sources requiring treatment no greater than disinfection to provide water of a quality that meets the primary MCLs established under Subchapter B (relating to MCLs, MRDLs or treatment technique requirements).

(ii) The water supplier files a brief description of the system, including raw source quality data, on forms acceptable to the Department. Amendments to the system description shall be filed when a substantial modification is made to the system. Descriptions of new systems or modifications shall be submitted and approved by the Department prior to construction.

(3) A noncommunity water system which satisfies the requirements of paragraphs (1) and (2) shall provide the Department with the following information describing new sources, including an evaluation of the quality of the raw water from each new source. Water quality analyses shall be conducted by a laboratory certified under this chapter. This paragraph does not apply when the new source is finished water obtained from an existing permitted community water system or an existing permitted or approved noncommunity water system unless the Department provides written notice that one or more of the provisions of this paragraph apply.

(i) For transient noncommunity water systems, the evaluation must include analysis of the following:

\* \* \* \* \*

(B) Total coliform concentration and, if total coliform-positive, analyze for the presence of *E. coli*.

\* \* \* \* \*

(b) A noncommunity water system providing 4-log treatment of a groundwater source under § 109.1302(b) (relating to treatment technique requirements) that has

not obtained a construction permit under § 109.503 (relating to public water system construction permits) and an operations permit under § 109.504 (relating to public water system operation permits) shall obtain a noncommunity water system 4-log treatment of groundwater permit under § 109.1306 (relating to information describing 4-log treatment and compliance monitoring) and comply with subsection (a)(2)(ii).

**§ 109.507. Permits for Innovative Technology.**

The Department may consider proposals for innovative water treatment processes, methods or equipment and may issue an innovative technology construction or operation permit if the applicant demonstrates to the Department's satisfaction that the proposal will provide drinking water that complies with Subchapters B, L and M (relating to MCLs, MRDLs or treatment technique requirements; long-term 2 enhanced surface water treatment rule; and additional requirements for groundwater sources). Applications for innovative technology construction permits must satisfy the requirements of § 109.503 (relating to public water system construction permits). The Department may condition innovative technology operation permits on duration, additional monitoring, reporting or other requirements as it deems necessary to protect the public health. The Department may revoke an innovative technology construction or operation permit if it finds the public water system is not complying with drinking water standards or the terms or conditions of the permit or if there is a significant change in the source water quality which could affect the reliability and operability of the treatment facility. Authorization for construction, operation or modifications obtained under an innovative technology permit will not extend beyond the expiration date of the permit.

**Subchapter F. DESIGN AND CONSTRUCTION STANDARDS**

**§ 109.602. Acceptable design.**

(a) A public water system shall be designed to provide an adequate and reliable quantity and quality of water to the public. The design must ensure that the system will, upon completion, be capable of providing water that complies with the primary and secondary MCLs, MRDLs and treatment techniques established in Subchapters B, L and M (relating to MCLs, MRDLs or treatment technique requirements; long-term 2 enhanced surface water treatment rule; and additional requirements for groundwater sources) except as further provided in this section.

\* \* \* \* \*

**§ 109.605. Minimum treatment design standards.**

The level of treatment required for raw water depends upon the characteristics of the raw water, the nature of the public water system and the likelihood of contamination. The following minimum treatment design standards apply to new facilities and major changes to existing facilities:

\* \* \* \* \*

(3) For surface water and GUDI sources permitted after December 26, 2009, that are determined to be bin 2 or higher, the minimum treatment design for filtration and disinfection must also meet the requirements of §§ 109.1203 and 109.1204 (relating to bin classification and treatment technique requirements; and requirements for microbial toolbox components).

(4) For community water systems using groundwater, the minimum treatment design standard for disinfection technologies utilized at the entry point is a total of 99.99% treatment of viruses.

(5) For noncommunity water systems using groundwater with an *E. coli*-positive groundwater source sample collected under § 109.505(a)(3) (relating to requirements for noncommunity water systems), the minimum treatment design standard for disinfection technologies utilized at the entry point is a total of 99.99% treatment of viruses.

§ 109.611. Disinfection.

Disinfection facilities shall be designed to provide the dosage rate and contact time prior to the first customer sufficient to provide a quality of water that complies with the microbiological MCL and the appropriate MRDL, specified in § 109.202 (relating to State MCLs, MRDLs and treatment technique requirements) and the treatment technique requirements in § 109.1302 (relating to treatment technique requirements).

Subchapter G. SYSTEM MANAGEMENT RESPONSIBILITIES

§ 109.701. Reporting and recordkeeping.

(a) Reporting requirements for public water systems. Public water systems shall comply with the following requirements:

\* \* \* \* \*

(8) Reporting requirements for disinfectant residuals. In addition to the reporting requirements specified in paragraph (1), public water systems shall report MRDL monitoring data as follows:

(i) Systems monitoring for chlorine dioxide under § 109.301(13) shall report the number of days chlorine dioxide was used at each entry point during the last month.

(ii) Systems monitoring for either chlorine or chloramines under § 109.301(13) shall report the following:

(A) The number of samples taken during the month.

(B) The arithmetic average of all distribution samples taken in the last month.

(9) Noncompliance report. Except where a different reporting period is specified in this chapter, the water supplier shall report to the Department within 48 hours the failure to comply with any National Primary Drinking Water Regulation, including the failure to comply with any monitoring requirement set forth in this chapter.

\* \* \* \* \*

(d) Record maintenance. The public water supplier shall retain on the premises of the public water system or at a convenient location near the premises the following:

(1) Records of bacteriological and turbidity analyses which shall be kept for at least 5 years, and records of chemical analyses which shall be kept for at least 12 years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, if the following information is included:

\* \* \* \* \*

(2) Records of performance monitoring required under § 109.301, except for turbidity, which shall be kept for at least 3 years. Records of turbidity performance monitoring required under § 109.301 shall be kept for at least 5 years. At a minimum, these records must contain the reporting requirements under subsection (a).

\* \* \* \* \*

(g) Monitoring plans for disinfectants, DBPs and DBP precursors.

(1) Stage 1 DBP Rule. Systems required to monitor for disinfection byproducts under § 109.301(12)(i), disinfection byproduct precursors under § 109.301(12)(v) or disinfectant residuals under § 109.301(13) shall develop and implement a monitoring plan. The system shall maintain the plan and make it available for inspection by the Department and the general public no later than 30 days following the applicable compliance dates. Systems that use either surface water or GUDI sources shall submit a copy of the monitoring plan to the Department no later than 30 days prior to the date of the first report required under this subchapter. The Department may also require the plan to be submitted by any other system, regardless of size or source water type. After review, the Department may require changes in any of the plan components.

(i) The plan must include the following components:

(A) Specific locations and schedules for collecting samples for any parameters included in § 109.301(12) or (13).

(B) How the system will calculate compliance with the MCLs, MRDLs and treatment techniques.

(C) If approved for monitoring as a consecutive system, or if providing water to a consecutive system, the sampling plan shall reflect the entire distribution system.

(D) Systems may consider multiple wells drawing water from a single aquifer as one treatment plant for determining the minimum number of TTHM and HAA5 samples required under § 109.301(12)(i).

(ii) The system shall notify the Department of subsequent revisions to a monitoring plan as they occur. Revisions to a monitoring plan shall be submitted in written form to the Department within 30 days of notifying the Department of the revisions.

(iii) Copies of Stage 1 DBP Rule monitoring plans developed under this paragraph shall be kept for the same period of time as the Stage 1 DBP Rule records of analyses are required to be kept under subsection (d)(1).

(2) Stage 2 DBP Rule. Systems required to monitor for disinfection byproducts under § 109.301(12)(ii) shall comply with the following:

(i) IDSE requirements. The IDSE requirements established by the EPA under the National Primary Drinking Water Regulations in 40 CFR 141.600—141.605 (relating to initial distribution system evaluations) are incorporated by reference except as otherwise established by this chapter.

(ii) Stage 2 DPB Rule monitoring plan.

(A) A public water system shall develop and implement a monitoring plan to be kept on file for Department and public review. The monitoring plan must contain the elements in subclauses (I)—(III) and be completed no later than the date systems conduct their initial monitoring under § 109.301(12)(ii)(A).

(I) Monitoring locations,

(II) Monitoring dates,

(III) Compliance calculation procedures

(B) Public water systems not required to submit an IDSE report under either 40 CFR 141.601 or 141.602 (relating to standard monitoring; and system specific studies) as incorporated by reference, and do not have sufficient § 109.301(12)(i) monitoring locations to identify

the required number of Stage 2 DBP rule compliance monitoring locations, shall identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of Stage 2 DBP rule compliance monitoring locations have been identified. The system shall also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. Systems that have more Stage 1 DBP rule monitoring locations than required for Stage 2 DBP rule compliance monitoring shall identify which locations will be used for Stage 2 DBP rule compliance monitoring by alternating selection of Stage 1 DBP rule monitoring locations representing high TTHM levels and high HAA5 levels until the required number of Stage 2 DBP rule compliance monitoring locations have been identified.

(C) A public water system shall submit a copy of its monitoring plan to the Department prior to the date for initial monitoring specified in § 109.301(12)(ii), unless the system submits to the Department an IDSE report containing all the information required by clause (A).

(D) A public water system may revise its monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Department-approved reasons, after consultation with the Department regarding the need for changes and the appropriateness of changes. A system that changes monitoring locations, shall replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Department may also require modifications in the system's monitoring plan. Systems shall submit a copy of the modified monitoring plan to the Department prior to the date the system is required to comply with the revised monitoring plan.

(iii) *Operational evaluation levels.*

(A) The operational evaluation level for TTHM and HAA5 is the sum of the two previous quarterly results plus twice the current quarter's result, divided by four. Public water systems that are monitoring quarterly shall calculate the TTHM and HAA5 operation evaluation levels for each monitoring location at the end of each calendar quarter.

(B) If the TTHM operational evaluation level exceeds 0.080 mg/L, or the HAA5 operational evaluation level exceeds 0.060 mg/L at any monitoring location, the system shall conduct an operational evaluation to identify the cause of the exceedance and submit a written report of the evaluation to the Department no later than 90 days after being notified of the analytical result that causes the system to exceed the operational evaluation level. The written report must be made available to the public upon request.

(C) The operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedances.

(I) A system may request and the Department may allow a system to limit the scope of evaluation if the system is able to identify the cause of the operational evaluation level exceedance.

(II) The request to limit the scope of the evaluation does not extend the schedule in clause (B) for submitting the written report. The Department must approve this limited scope of evaluation in writing and systems shall keep that approval with the completed report.

(iv) *Reporting and recordkeeping requirements.*

(A) For each monitoring location, public water systems shall report to the Department within 10 days of the end of any quarter in which monitoring is required any TTHM operational evaluation level that exceeded 0.080 mg/L and any HAA5 operational evaluation level that exceeded 0.060 mg/L during the quarter and the location, date, and the TTHM and HAA5 calculated operation evaluation level.

(B) Copies of Stage 2 DBP Rule monitoring plans developed under this subparagraph shall be kept for the same period of time as the Stage 2 DBP Rule records of analyses are required to be kept under subsection (d)(1).

\* \* \* \* \*

(1) *Additional reporting and recordkeeping requirements for systems using surface water or GUDI sources.* In addition to the reporting and recordkeeping requirements of this subchapter, systems using surface water or GUDI sources shall also comply with the reporting and recordkeeping requirements of § 109.1206 (relating to reporting and recordkeeping requirements).

(m) *Additional reporting and recordkeeping requirements for systems using groundwater sources.* In addition to the reporting and recordkeeping requirements of this subchapter, systems using groundwater sources shall also comply with the reporting and recordkeeping requirements of § 109.1307 (relating to system management responsibilities).

**§ 109.705. Sanitary surveys.**

\* \* \* \* \*

(b) A community water system which does not collect five or more routine coliform samples per month shall do one of the following:

(1) Undergo a sanitary survey conducted by the Department by June 29, 1994, and thereafter undergo a subsequent sanitary survey conducted by the Department at a minimum frequency of every 3 years.

(2) Increase the number of routine coliform samples collected to at least five samples per month if the Department does not conduct a sanitary survey by June 29, 1994, or within 3 years following the initial or a subsequent sanitary survey. This increased sampling frequency shall be in place of the monitoring frequency requirements for coliforms in § 109.301(3)(i) (relating to general monitoring requirements) and remain in effect through the month in which the next sanitary survey is conducted by the Department.

(c) A noncommunity water system which does not collect five or more routine coliform samples per month shall do one of the following:

(1) Undergo an initial sanitary survey conducted by the Department by June 29, 1999, and thereafter undergo a subsequent sanitary survey at a minimum of every 5 years after the initial sanitary survey.

(2) Increase the number of routine coliform samples collected to at least five samples per month if the Department does not conduct a sanitary survey by June 29, 1999, or within 5 years following the initial or a subsequent sanitary survey. This increased sampling fre-

quency shall be in place of the monitoring frequency requirements for coliforms in § 109.301(3)(i) and shall remain in effect through the month in which the next sanitary survey is conducted by the Department.

(d) The following apply to significant deficiencies identified at public water systems supplied by a surface water source and public water systems supplied by a groundwater source under the direct influence of surface water:

(1) For sanitary surveys performed by the Department, a system shall respond in writing to significant deficiencies identified in sanitary survey reports no later than 45 days after receipt of the report, indicating how and on what schedule the system will address significant deficiencies noted in the survey.

(2) A system shall correct significant deficiencies identified in sanitary survey reports according to the schedule approved by the Department, or if there is no approved schedule, according to the schedule reported under paragraph (1) if the deficiencies are within the control of the system.

(e) Significant deficiencies identified by the Department at public water systems using groundwater shall comply with § 109.1302(c) (relating to groundwater systems with significant deficiencies or source water *E. coli* contamination).

**Subchapter H. LABORATORY CERTIFICATION**

**§ 109.801. Certification requirement.**

A laboratory shall be accredited under Chapter 252 (relating to laboratory accreditation) to perform analyses acceptable to the Department for the purposes of ascertaining drinking water quality and demonstrating compliance with monitoring requirements established in Subchapters C, K, L and M.

**§ 109.810. Reporting and notification requirements.**

\* \* \* \* \*

(b) A laboratory accredited under Chapter 252 shall whenever the results of test measurements or analyses performed by the laboratory under this chapter indicate an MCL, MRDL or a treatment technique performance requirement under § 109.202 (relating to State MCLs, MRDLs and treatment technique requirements) is exceeded, or an action level under § 109.1102(a) (relating to lead and copper) is exceeded, or a sample result requires the collection of check or confirmation samples under § 109.301 (relating to general monitoring requirements), or a sample collected under Subchapter M (relating to additional requirements for groundwater sources) is *E. coli*-positive:

\* \* \* \* \*

**Subchapter I. VARIANCES AND EXEMPTIONS ISSUED BY THE DEPARTMENT**

**§ 109.901. Requirements for a variance.**

(a) The Department may grant one or more variances to a public water system from a requirement respecting a MCL upon finding that:

(1) The public water system has installed and is using the best treatment technology, treatment methods or other means that the Department in concurrence with the Administrator finds are generally available to reduce the level of the contaminant, and has determined that alternative sources of water are not reasonably available.

(2) The water supplier has demonstrated to the Department that, because of characteristics of the raw water

sources which are reasonably available to the system, the system cannot meet the requirements respecting the MCLs.

(3) The granting of a variance will not result in an unreasonable risk to the health of persons served by the system.

(b) The MCL for total coliforms established under § 109.202(a) (relating to State MCLs, MRDLs and treatment technique requirements) is not eligible for a variance.

(c) The Department may grant one or more variances to a public water system from a treatment technique requirement upon a finding that the public water supplier applying for the variance has demonstrated that, because of the nature of the raw water source of the system the treatment technique is not necessary to protect the health of the persons served by the system. The treatment technique requirements established under § 109.202(c), the treatment technique requirements established under § 109.1102(b) (relating to action levels and treatment technique requirements), the treatment technique requirements established under §§ 109.1203 and 109.1302 (relating to bin classification and treatment technique requirements; and treatment technique requirements) are not eligible for a variance.

**§ 109.903. Requirements for an exemption.**

(a) The Department may exempt a public water system from an MCL or treatment technique requirement upon finding that:

(1) Due to compelling factors, the public water system is unable to comply with the contaminant level or treatment technique requirement, or to implement measures to develop an alternative source of water supply.

(2) The public water system was in operation on the effective date of the contaminant level or treatment technique requirement or, for a system that was not in operation by that date, only if no reasonable alternative source of drinking water is available to the new system.

(3) The granting of the exemption will not result in an unreasonable risk to health.

(4) Management or restructuring changes or both as provided in 40 CFR 142.20(b)(1)(i) (relating to State-issued variances and exemptions) cannot reasonably be made that will result in compliance with the applicable MCL or treatment technique requirement or, if compliance cannot be achieved, improve the quality of the drinking water.

(b) The MCL for total coliforms established under § 109.202(a) (relating to State MCLs, MRDLs and treatment technique requirements) is not eligible for an exemption.

(c) The treatment technique requirements established under § 109.202(c), the treatment technique requirements established under §§ 109.1102(b), 109.1203 and 109.1302 (relating to action levels and treatment technique requirements; bin classification and treatment technique requirements; and treatment technique requirements) are not eligible for an exemption.

**§ 109.906. Consideration of a request for a variance or exemption.**

The Department will consider comments received during the comment period and testimony in the record of a public hearing held with respect to the request for a variance or exemption before making a determination. The Department will consider the availability of alterna-

tive water sources, risks to the public health from granting the relief requested and other relevant factors including the following considerations:

(1) In its consideration of whether the public water system satisfies the requirements for a variance from a maximum contaminant level under § 109.901(a) (relating to requirements for a variance), the Department will consider whether the public water system has installed and is effectively operating the best treatment technology, treatment methods, or other means that the Department finds in concurrence with the Administrator are generally available to reduce the level of the contaminant for which the variance is requested, and whether the system has evaluated that alternative sources of water are not reasonably available.

(2) In its consideration of whether a public water system satisfies the requirements for a variance from a treatment technique requirement under § 109.901(b), the Department will consider the following factors:

(i) The quality of the water source and pertinent sources of pollution.

(ii) The source protection measures employed by the public water system.

(3) In its consideration of whether a public water system satisfies the requirements for an exemption under § 109.903 (relating to requirements for an exemption), the Department will consider factors such as:

(i) The need for construction, installation, or modification of treatment equipment or systems.

(ii) The time needed to put into operation a new treatment facility to replace an existing system which is not in compliance.

(iii) The availability of an alternative source of water, including the feasibility of partnerships with neighboring public water systems, as identified by the public water system or by the Department.

**§ 109.907. Disposition of a request for a variance or exemption.**

\* \* \* \* \*

(c) If the Department makes a determination to grant a variance or exemption request, it will document its findings as required under 40 CFR 142.20(a)(1) (relating to State-issued variances and exemptions under section 1415(a) and section 1416 of the act) for granting a variance, and under 40 CFR 142.20(b)(1) for granting an exemption.

**§ 109.908. Compliance schedules.**

\* \* \* \* \*

(e) In accordance with 40 CFR 142.20(b)(2) (relating to State-issued variances and exemptions under section 1415(a) and section 1416 of the act), the Department may renew an exemption for a public water system that serves fewer than 3,300 persons and which needs financial assistance for the necessary improvements under the initial compliance schedule, provided the Department establishes that the system is taking all practicable steps to meet the requirements of this subchapter and the established compliance schedule to achieve full compliance with the applicable MCL or treatment technique requirement. The Department must document its findings in granting an extension under this subsection.

**Subchapter J. BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS**

**§ 109.1002. MCLs, MRDLs or treatment techniques.**

(a) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall supply drinking water that complies with the MCLs, MRDLs and treatment technique requirements under §§ 109.202 and 109.203 (relating to State MCLs, MRDLs and treatment technique requirements; and unregulated contaminants). Bottled water systems, vended water systems, retail water facilities and bulk water hauling systems shall provide continuous disinfection for groundwater sources. Water for bottling labeled as mineral water, under § 109.1007 (relating to labeling requirements for bottled water systems, vended water systems and retail water facilities) shall comply with the MCLs except that mineral water may exceed the MCL for total dissolved solids.

(b) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall supply drinking water that contains no more than 0.005 mg/L of lead and no more than 1.0 mg/L copper.

(c) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with the treatment technique requirements under Subchapter L (relating to bin classification and treatment technique rule).

(d) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with Subchapter M (relating to additional requirements for groundwater sources). For the purpose of determining compliance with Subchapter M, bottled water and vended systems, retail water facilities and bulk water hauling systems using groundwater sources shall comply with standards pertaining to noncommunity groundwater systems.

**§ 109.1003. Monitoring requirements.**

(a) *General monitoring requirements.* Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall monitor for compliance with the MCLs and MRDLs in accordance with § 109.301 (relating to general monitoring requirements) and shall comply with § 109.302 (relating to special monitoring requirements). The monitoring requirements shall be applied as follows, except that systems which have installed treatment to comply with primary MCL shall conduct quarterly operational monitoring for the contaminant which the facility is designed to remove:

(1) Bottled water systems, retail water facilities and bulk water hauling systems, for each entry point shall:

\* \* \* \* \*

(viii) *TTHM and HAA5 Stage 1 DBP Rule.* Beginning January 1, 2004, monitor annually for TTHM and HAA5 if the system uses a chemical disinfectant or oxidant, or obtains finished water from another public water system that uses a chemical disinfectant or oxidant to treat the water. Bottled water systems are not required to monitor for TTHM and HAA5 if the system does not use a chlorine-based disinfectant or oxidant and does not obtain finished water from another public water system that uses a chlorine-based disinfectant or oxidant to treat the water.

(A) *Routine monitoring.* Systems shall take at least one sample per year per entry point during the month of



warmest water temperature. If the sample, or average of all samples, exceeds either a TTHM or HAA5 MCL, the system shall take at least one sample per quarter per entry point. The system shall return to the sampling frequency of one sample per year per entry point if, after at least 1 year of monitoring, the TTHM running annual average is no greater than 0.060 mg/L and the HAA5 running annual average is no greater than 0.045 mg/L.

(B) *Reduced monitoring.* Systems that use groundwater sources shall monitor for TTHM and HAA5 for at least 1 year prior to qualifying for reduced monitoring. The Department retains the right to require a system that meets the requirements of this clause to resume routine monitoring.

(I) Systems that use groundwater sources shall reduce monitoring to one sample per 3-year cycle per entry point if the annual TTHM average is no greater than 0.040 mg/L and the annual HAA5 average is no greater than 0.030 mg/L for 2 consecutive years or the annual TTHM average is no greater than 0.020 mg/L and the annual HAA5 average is no greater than 0.015 mg/L for 1 year. The sample shall be taken during the month of warmest water temperature. The 3-year cycle shall begin on January 1 following the quarter in which the system qualifies for reduced monitoring.

(II) Systems that use groundwater sources that qualify for reduced monitoring shall remain on reduced monitoring if the TTHM annual average is no greater than 0.060 mg/L and the HAA5 annual average is no greater than 0.045 mg/L. Systems that exceed these levels shall resume routine monitoring as prescribed in clause (A), except that systems that exceed either a TTHM or HAA5 MCL shall increase monitoring to at least one sample per quarter per entry point beginning in the quarter immediately following the quarter in which the system exceeds the TTHM or HAA5 MCL.

(ix) *TTHM and HAA5 Stage 2 DBP Rule.* Beginning October 1, 2013, monitor annually for TTHM and HAA5 if the system uses a chemical disinfectant or oxidant to treat the water, or obtains finished water from another public water system that uses a chemical disinfectant or oxidant to treat the water as follows:

(A) *Routine monitoring.* Systems shall take at least one dual sample set per year per entry point during the month of warmest water temperature.

(B) *Increased monitoring.* If any sample results exceed either a TTHM or HAA5 MCL, the system shall take at least one dual sample set per quarter per entry point. The system shall return to the sampling frequency of one dual sample set per year per entry point if, after at least 1 year of monitoring, each TTHM sample result is no greater than 0.060 mg/L and each HAA5 sample result is no greater than 0.045 mg/L.

(x) Beginning January 1, 2004, monitor daily for chlorite if the system uses chlorine dioxide for disinfection or oxidation. Systems shall take at least one daily sample at the entry point. If a daily sample exceeds the chlorite MCL, the system shall take three additional samples within 24 hours from the same lot, batch, machine, carrier vehicle or point of delivery. The chlorite MCL is based on the average of the required daily sample plus any additional samples.

(xi) Beginning January 1, 2004, monitor monthly for bromate if the system uses ozone for disinfection or oxidation.

(A) *Routine monitoring.* Systems shall take one sample per month for each entry point that uses ozone while the ozonation system is operating under normal conditions.

(B) *Reduced monitoring.*

(I) Until March 31, 2009, systems shall reduce monitoring for bromate from monthly to quarterly if the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly bromide measurements for 1 year. Systems on reduced monitoring shall continue monthly source water bromide monitoring. If the running annual average source water bromide concentration, computed quarterly, is equal to or exceeds 0.05 mg/L, the system shall revert to routine monitoring as prescribed by clause (A).

(II) Beginning April 1, 2009, a system required to analyze for bromate may reduce monitoring from monthly to quarterly, if each sample result is less than or equal to 0.0025 mg/L based on monthly measurements as prescribed in clause (A) for the most recent 12 months. Systems qualifying for reduced bromate monitoring under subclause (I) may remain on reduced monitoring as long as each sample result from the previous 12 months is less than or equal to 0.0025 mg/L. If any sample result exceeds 0.0025 mg/L, the system shall resume routine monitoring as prescribed under clause (A).

(2) Vended water systems shall monitor in accordance with paragraph (1) except that vended water systems qualifying for permit by rule under § 109.1005(b), for each entry point shall:

- (i) Monitor monthly for microbiological contaminants.
- (ii) Monitor annually for total dissolved solids, lead and cadmium.
- (iii) Conduct special monitoring as required by the Department.

(b) *Sampling requirements.*

(1) For bottled water and vended water systems, retail water facilities and bulk water hauling systems, samples taken to determine compliance with Subsection (a) shall be taken from each entry point.

\* \* \* \* \*

(f) *Additional monitoring requirements for surface water and GUDI sources.* Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with the monitoring requirements under Subchapter L (relating to long-term 2 enhanced surface water treatment rule).

(g) *Additional monitoring requirements for groundwater sources.* Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with the monitoring requirements under Subchapter M (relating to additional requirements for groundwater sources).

**§ 109.1008. System management responsibilities.**

(a) *Reporting and recordkeeping requirements for bottled water and vended water systems, retail water facilities and bulk water hauling systems.* Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with the reporting requirements in § 109.701(a) and (d) (relating to reporting and recordkeeping).

\* \* \* \* \*

(4) In addition to the requirements of this subsection, bottled water and vended water systems, retail water

facilities and bulk water hauling systems using surface water or GUDI sources shall also comply with the reporting and recordkeeping requirements of Subchapter L (relating to long-term 2 enhanced surface water treatment rule).

(5) In addition to the requirements of this Subsection, bottled water and vended water systems, retail water facilities and bulk water hauling systems using groundwater sources, including purchased groundwater, shall also comply with the reporting and recordkeeping requirements of Subchapter M (relating to additional requirements for groundwater sources).

\* \* \* \* \*

### Subchapter L. LONG-TERM 2 ENHANCED SURFACE WATER TREATMENT RULE

Sec.

- 109.1201. Scope.
- 109.1202. Monitoring requirements.
- 109.1203. Bin classification and treatment technique requirements.
- 109.1204. Requirements for microbial toolbox components.
- 109.1205. Grandfathering previously collected data.
- 109.1206. Reporting and recordkeeping requirements.

#### § 109.1201. Scope.

(a) *Scope.* This subchapter establishes or extends treatment technique requirements in lieu of maximum contaminant levels for *Cryptosporidium*. These requirements are in addition to requirements for filtration and disinfection.

(b) *Applicability.* This subchapter applies to public water systems supplied by a surface water source and public water systems supplied by a groundwater source under the direct influence of surface water systems that are part of a combined distribution system shall comply with the requirements of this subchapter based on the population of the largest system in the combined distribution system.

#### § 109.1202. Monitoring requirements.

(a) *Initial round of source water monitoring.* A system shall conduct the following monitoring on the schedule in subsection (c) unless it meets the monitoring exemption criteria in subsection (d):

(1) Filtered systems serving at least 10,000 people shall sample their source water for *Cryptosporidium*, *E. coli* and turbidity at least monthly for 24 months.

(2) Unfiltered systems serving at least 10,000 people shall sample their source water for *Cryptosporidium* at least monthly for 24 months.

(3) Filtered systems serving less than 10,000 people shall sample their source water for *E. coli* at least once every 2 weeks for 12 months. A filtered system serving less than 10,000 people may avoid *E. coli* monitoring if the system notifies the Department that it will monitor for *Cryptosporidium* as described in paragraph (4). The system shall notify the Department no later than 3 months prior to the date the system is otherwise required to start *E. coli* monitoring under subsection (c).

(4) Filtered systems serving less than 10,000 people shall sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months if they meet one of the following subparagraphs, based on monitoring conducted under paragraph (3):

(i) For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/100 mL.

(ii) For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/100 mL.

(iii) The system does not conduct *E. coli* monitoring as described in paragraph (3).

(iv) Systems using groundwater sources under the direct influence of surface water (GUDI) shall comply with this paragraph based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system shall comply based on the requirements that apply to systems using lake/reservoir sources.

(5) For filtered systems serving less than 10,000 people, the Department may approve monitoring for an indicator other than *E. coli* under paragraph (3). The Department also may approve an alternative to the *E. coli* concentration in paragraph (4)(i), (ii) or (iv) to trigger *Cryptosporidium* monitoring. This approval by the Department would be based on EPA-supported research indicating the validity of an alternative to *E. coli*. The Department will provide this approval to the system in writing and will include the basis for the Department's determination that the alternative indicator, trigger level, or both, will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in § 109.1203(c) (relating to bin classification and treatment technique requirements).

(6) Unfiltered systems serving less than 10,000 people shall sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.

(7) Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.

(b) *Second round of source water monitoring.* Systems shall conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in subsection (a), unless they meet the monitoring exemption criteria in subsection (d). Systems shall conduct this monitoring on the schedule in subsection (c).

(c) *Source water monitoring schedule.* Systems shall begin the monitoring required in subsections (a) and (b) as follows:

(1) At least 100,000 people:

(i) Begin the first round of source water monitoring no later than the month beginning October 1, 2006.

(ii) Begin the second round of source water monitoring at least 6 years after submitting the initial bin classification but no later than the month beginning April 1, 2015.

(2) From 50,000 to 99,999 people:

(i) Begin the first round of source water monitoring no later than the month beginning April 1, 2007.

(ii) Begin the second round of source water monitoring at least 6 years after submitting the initial bin classification but no later than the month beginning October 1, 2015.

(3) From 10,000 to 49,999 people:

(i) Begin the first round of source water monitoring no later than the month beginning April 1, 2008.

(ii) Begin the second round of source water monitoring at least 6 years after submitting the initial bin classification but no later than the month beginning October 1, 2016.

- (4) Less than 10,000 people and monitor for E coli:
  - (i) Begin the first round of source water monitoring no later than the month beginning October 1, 2008.
  - (ii) Begin the second round of source water monitoring at least 6 years after submitting the initial bin classification but no later than the month beginning October 1, 2017.
- (5) Less than 10,000 and monitor for *Cryptosporidium*:
  - (i) Begin the first round of source water monitoring no later than the month beginning April 1, 2010.
  - (ii) Begin the second round of source water monitoring at least 6 years after submitting the initial bin classification but no later than the month beginning April 1, 2019.
- (d) *Source water monitoring avoidance.*

(1) *5.5 log treatment.* A filtered system is not required to conduct source water monitoring under this subchapter if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in § 109.1203.

(2) *Notification.* If a system chooses to provide the level of treatment in paragraph (1), as applicable, rather than start source water monitoring, the system shall notify the Department in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under subsections (h)—(j). Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the Department in writing that it will provide this level of treatment. Systems shall install and operate technologies to provide this level of treatment by the applicable treatment compliance date in § 109.1203(k)—(o).

(e) *Plants operating only part of the year.* Public water systems supplied by a surface water source and public water systems supplied by a groundwater source under the direct influence of surface water that operate for only part of the year shall conduct source water monitoring in accordance with this subchapter, but with the following modifications:

- (1) Systems shall sample their source water only during the months that the plant operates unless the Department specifies another monitoring period based on plant operating practices.
- (2) Systems with plants that operate less than 6 months per year and that monitor for *Cryptosporidium* shall collect at least six *Cryptosporidium* samples per year during each of 2 years of monitoring. Samples must be evenly spaced throughout the period the plant operates or is anticipated to operate.

(f) *New sources.*

(1) A system that intends to use a new source of surface water or GUDI after the system is required to begin monitoring under subsection (c) shall monitor the new source on a schedule the Department approves. Any source that has not been monitored according to the requirements of this subchapter will be considered to be a new source. Source water monitoring for new sources must meet the requirements of this subchapter. The system shall also meet the bin classification and *Cryptosporidium* treatment requirements of § 109.1203 (a)—(j), as applicable, for the new source on a schedule approved by the Department. Sources that have not been monitored according to the requirements of this subchapter will be considered to be Bin 4 until monitoring is adequately completed. No later than the applicable *Cryptosporidium* compliance dates specified in

§ 109.1203(k), systems wishing to use sources that have not been monitored shall meet the Bin 4 treatment requirements of § 109.1203(a)—(j) unless otherwise indicated by the Department.

(2) The requirements of this subsection apply to public water systems supplied by a surface water source or groundwater source under the direct influence of surface water that begin operation after the monitoring start date applicable to the system's size under subsection (c).

(3) The system shall begin a second round of source water monitoring no later than 6 years following initial bin classification under § 109.1203 or determination of the *Cryptosporidium* level under § 109.1203(i) and (j), as applicable.

(g) *Monitoring violations.* Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory and reporting requirements of this subsection, §§ 109.304 and 109.1206(a)—(e) (relating to analytical requirements; and reporting and recordkeeping requirements) is a monitoring violation.

(h) *Source water sampling schedules.* Systems required to conduct source water monitoring under subsections (a)—(g) shall submit a sampling schedule that specifies the calendar dates when the system will collect each required sample.

(1) Systems shall submit sampling schedules no later than 3 months prior to the applicable date listed in subsection (c) for each round of required monitoring.

(2) A system must comply with the following:

(i) A system serving at least 10,000 people shall submit its sampling schedule for the initial round of source water monitoring under subsection (a) to the EPA electronically at <https://intranet.epa.gov/lt2/>.

(ii) If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that the EPA approves.

(3) A system serving less than 10,000 people shall submit its sampling schedules for the initial round of source water monitoring under subsection (a) to the Department.

(4) Systems shall submit sampling schedules for the second round of source water monitoring under subsection (b) to the Department.

(5) If the EPA or the Department does not respond to a system regarding its sampling schedule, the system shall sample at the reported schedule.

(i) *Source water sample collection period.* Systems shall collect samples within 2 days before or 2 days after the dates indicated in their sampling schedule (that is, within a 5 day period around the schedule date) unless one of the conditions of subsection (b)(1) or (2) applies.

(1) *Extreme sample collection conditions.* If an extreme condition or situation exists that may pose danger to the sample collector, or that cannot be avoided and causes the system to be unable to sample in the scheduled 5-day period, the system shall sample as close to the scheduled date as is feasible unless the Department approves an alternative sampling date. The system shall submit an explanation for the delayed sampling date to the Department concurrent with the shipment of the sample to the laboratory.

(2) *Replacement samples.* The requirements for replacement samples are as follows:

(i) If a system is unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements in § 109.304, or the failure of an approved laboratory to analyze the sample, then the system shall collect a replacement sample.

(ii) The system shall collect the replacement sample not later than 21 days after receiving information that an analytical result cannot be reported for the scheduled date unless the system demonstrates that collecting a replacement sample within this time frame is not feasible or the Department approves an alternative resampling date. The system shall submit an explanation for the delayed sampling date to the Department concurrent with the shipment of the sample to the laboratory.

(j) *Missed samples.* Systems that fail to meet the criteria of subsection (i) for any source water sample required under subsections (a)—(g) shall revise their sampling schedules to add dates for collecting all missed samples. Systems shall submit the revised schedule to the Department for approval prior to when the system begins collecting the missed samples.

(k) *Source water sampling locations.* Systems required to conduct source water monitoring under subsections (a)—(g) shall collect samples for each plant that treats a surface water or GUDI source. When multiple plants draw water from the same influent, such as the same pipe or intake, the Department may approve one set of monitoring results to be used to satisfy the requirements of subsections (a)—(g) for all plants.

(l) *Chemical treatment prior to sampling location.* Systems shall collect source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants.

(m) *Source water sample location for plants that recycle.* Systems that recycle filter backwash water shall collect source water samples prior to the point of filter backwash water addition.

(n) *Bank filtration.*

(1) Systems that receive *Cryptosporidium* treatment credit for bank filtration to meet existing treatment technique requirements of § 109.202(c) (relating to State MCLs, MRDLs and treatment technique requirements), as applicable, shall collect source water samples in the surface water prior to bank filtration.

(2) Systems that use bank filtration as pretreatment to a filtration plant shall collect source water samples from the well (that is, after bank filtration). Use of bank filtration during monitoring must be consistent with routine operational practice. Systems collecting samples after a bank filtration process may not receive treatment credit for the bank filtration under § 109.1204(f) (relating to requirements for microbial toolbox components).

(o) *Multiple sources.* Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and groundwater sources, shall collect samples as specified in paragraph (1) or (2). The use of multiple sources during monitoring must be consistent with routine operational practice. Sources not adequately evaluated during the monitoring period will be considered new sources and the requirements under subsection (f) will apply. Systems may begin monitoring a new source as soon as a sampling schedule and plan have been approved by the Department.

(1) If a sampling tap is available where the sources are combined prior to treatment, systems shall collect samples from the tap.

(2) If a sampling tap where the sources are combined prior to treatment is not available, systems shall collect samples at each source near the intake on the same day and shall follow either subparagraph (i) or (ii) for sample analysis.

(i) Systems may composite samples from each source into one sample prior to analysis. The volume of sample from each source must be weighted according to the proportion of the source in the total plant flow at the time the sample is collected.

(ii) Systems may analyze samples from each source separately and calculate a weighted average of the analysis results for each sampling date. The weighted average must be calculated by multiplying the analysis result for each source by the fraction the source contributed to total plant flow at the time the sample was collected and then summing these values.

(p) *Additional requirements.* A system shall submit a description of its sampling locations to the Department at the same time as the sampling schedule required under subsections (h)—(j). This description must address the position of the sampling location in relation to the system's water sources and treatment processes, including pretreatment, points of chemical treatment and filter backwash recycle. If the Department does not respond to a system regarding sampling locations, the system shall sample at the reported locations.

#### § 109.1203. Bin classification and treatment technique requirements.

(a) *Bin classification.* Following completion of the initial round of source water monitoring required under § 109.1202(a) (relating to monitoring requirements), filtered systems shall calculate an initial *Cryptosporidium* bin concentration for each plant for which monitoring was required. Calculation of the bin concentration must use the *Cryptosporidium* results reported under § 109.1202(a) and must follow the procedures in subsection (b)(1)—(5).

(b) *Procedures for calculating bin classifications.*

(1) For systems that collect a total of at least 48 samples, the bin concentration is equal to the arithmetic mean of all sample concentrations.

(2) For systems that collect a total of at least 24 samples, but not more than 47 samples, the bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected.

(3) For systems that serve less than 10,000 people and monitor for *Cryptosporidium* for only 1 year (that is, collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.

(4) For systems with plants operating only part of the year that monitor less than 12 months per year under § 109.1202(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

(5) If the monthly *Cryptosporidium* sampling frequency varies, systems shall first calculate a monthly average for each month of monitoring. Systems shall then use these monthly average concentrations, rather than individual sample concentrations, in the applicable calculation for bin classification in paragraphs (1)—(4).

(c) *Cryptosporidium bin concentration thresholds.* Systems required to monitor for *Cryptosporidium* under § 109.1202 shall use *Cryptosporidium* bin concentration calculated under subsections (a) and (b) to determine their initial bin classification as follows:

(1) With a *Cryptosporidium* bin concentration of less than 0.075 oocysts/L, the bin classification is Bin 1.

(2) With a *Cryptosporidium* bin concentration of 0.075 oocysts/L or higher, but less than 1.0 oocysts/L, the bin classification is Bin 2.

(3) With a *Cryptosporidium* bin concentration of 1.0 oocysts/L or higher but less than 3.0 oocysts/L, the bin classification is Bin 3.

(4) With a *Cryptosporidium* bin concentration of 3.0 oocysts/L or higher, the bin classification is Bin 4.

(5) If serving less than 10,000 people and not required to monitor for *Cryptosporidium* under § 109.1202(a)(4), the bin classification is Bin 1.

(d) *Cryptosporidium bin concentration recalculation requirements.* Following completion of the second round of source water monitoring required under § 109.1202(b), filtered systems shall recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 109.1202(b) and following the procedures in subsection (b). Systems shall then redetermine their bin classification using the bin concentrations subsection (c).

(e) *Filtered system additional Cryptosporidium treatment requirements.* Filtered systems shall provide the level of additional treatment for *Cryptosporidium* specified in this subsection based on their bin classification as determined under subsections (a)—(c) and according to the schedule in subsections (k)—(o). The treatments required under paragraphs (1)—(4) are in addition to existing treatment technique requirements contained in § 109.202(c) (relating to State MCLs, MRDLs and treatment technique requirements), which still apply. Systems using multiple sources shall establish their bin classification based on the highest bin source in use by the facility.

(1) *Bin 1.* If the system bin classification is Bin 1, the system shall provide additional *Cryptosporidium* treatment as follows:

(i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide no additional treatment.

(ii) Direct filtration treatment must provide no additional treatment.

(iii) Alternative filtration technologies must provide no additional treatment.

(2) *Bin 2.* If the system bin classification is Bin 2, the system shall provide additional *Cryptosporidium* treatment as follows:

(i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide 1-log additional treatment.

(ii) Direct filtration treatment must provide 1.5 log additional treatment.

(iii) Alternative filtration technologies must provide additional treatment as determined by the Department such that the total *Cryptosporidium* removal and inactivation is at least 4.0 log.

(3) *Bin 3.* If the system bin classification is Bin 3, the system shall provide additional *Cryptosporidium* treatment as follows:

(i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide 2-log additional treatment.

(ii) Direct filtration treatment must provide 2.5 log additional treatment.

(iii) Alternative filtration technologies must provide additional treatment as determined by the Department so that the total *Cryptosporidium* removal and inactivation is at least 5.0 log.

(4) *Bin 4.* If the system bin classification is Bin 4, the system shall provide additional *Cryptosporidium* treatment as follows:

(i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide 2.5-log additional treatment.

(ii) Direct filtration treatment must provide 3 log additional treatment.

(iii) Alternative filtration technologies must provide additional treatment as determined by the Department so that the total *Cryptosporidium* removal and inactivation is at least 5.5 log.

(f) *Treatment and management options for filtered systems, microbial toolbox.*

(1) Filtered systems shall use one or more of the treatment and management options listed in § 109.1204 (relating to requirements for microbial toolbox components), termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in subsection (e).

(2) Systems using sources classified in Bin 3 and Bin 4 shall achieve at least 1-log of the additional *Cryptosporidium* treatment required under § 109.1204(a) using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone or UV, as described in § 109.1204(b), (c) and (n)—(q) (relating to requirements for microbial toolbox components).

(g) *Failure to meet treatment credit.* Failure by a system in any month to achieve treatment credit by meeting criteria in § 109.1204(b), (c) and (n)—(q) for microbial toolbox options that is at least equal to the level of treatment required in subsection (e) is a violation of the treatment technique requirement.

(h) *Increased watershed contamination.* If the Department determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under § 109.1202(a) or (b), significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium*, the system shall take actions specified by the Department to address the contamination. These actions may include additional source water monitoring or implementing microbial toolbox options listed in § 109.1204, or both.

(i) *Unfiltered systems determination of Cryptosporidium bin level, initial round.* Following completion of the initial source water monitoring required under § 109.1202(a), unfiltered systems shall calculate their bin classification using the methods listed in subsections (b) and (c).

(j) *Unfiltered systems determination of Cryptosporidium bin level, second round.* Following completion of the

second round of source water monitoring required under subsection (b), unfiltered systems shall calculate their bin classification using the methods listed in subsections (b) and (c).

(k) *Schedule for compliance with Cryptosporidium treatment requirements.* Following initial bin classification under subsection (c), filtered systems shall provide the level of additional treatment for *Cryptosporidium* required under subsections (e)—(h) according to the schedule in subsection (m). The treatments required under subsections (e)—(h) are in addition to existing treatment technique requirements contained in § 109.202(c), which still apply.

(l) *Treatment technique requirements for unfiltered systems.* Following initial determination of the *Cryptosporidium* level under subsection (i), unfiltered systems shall meet all applicable treatment technique requirements of § 109.202(c) and provide the additional level of treatment for *Cryptosporidium* required under subsections (e)—(h) on a schedule approved by the Department but no later than the schedule in subsection (m).

(m) *Cryptosporidium treatment compliance dates.* *Cryptosporidium* treatment compliance dates are as follows:

(1) Systems that serve at least 100,000 people shall comply with *Cryptosporidium* treatment requirements by April 1, 2012.

(2) Systems that serve from 50,000 to 99,999 people shall comply with *Cryptosporidium* treatment requirements by October 1, 2012.

(3) Systems that serve from 10,000 to 49,999 people shall comply with *Cryptosporidium* treatment requirements by October 1, 2013.

(4) Systems that serve less than 10,000 people shall comply with *Cryptosporidium* treatment requirements by October 1, 2014.

(5) On a case by case basis within an agreed upon time frame, the Department may allow up to an additional 2 years for complying with the treatment requirement for systems making capital improvements.

(n) *Change in Cryptosporidium level for filtered system.* If the bin classification for a filtered system increases following the second round of source water monitoring, as determined under subsection (d), the system shall provide the level of treatment for *Cryptosporidium* required under subsections (e)—(h) on a schedule the Department approves.

(o) *Change in Cryptosporidium level for unfiltered system.* If the *Cryptosporidium* bin level for an unfiltered system increases following the second round of monitoring, as determined under subsection (j), the system shall provide the additional level of *Cryptosporidium* treatment under subsections (e)—(h) on a schedule the Department approves.

**§ 109.1204. Requirements for microbial toolbox components.**

(a) A system will receive the treatment credits listed Appendix B to Subchapter L. Microbial Toolbox Summary Table: Options, Treatment Credits and Criteria, by meeting the conditions for microbial toolbox components described in subsections (b)—(q). A system shall apply these treatment credits to meet the treatment technique requirements listed in section § 109.1203 (relating to bin classification and treatment technique requirements).

(b) *Watershed control program.* Filtered systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this subsection. This credit may not be used to maintain the additional log removal credits specified in § 109.1203. This credit may only be applied in addition to the toolbox options used to meet the minimum log removal and may apply in lieu of a toolbox option for which credit has been temporarily revoked. Unfiltered systems are not eligible for this credit.

(1) Systems that intend to apply for the watershed control program credit shall notify the Department of this intent at least 2 years prior to the treatment compliance date applicable to the system in § 109.1203(k)—(o).

(2) Systems shall submit to the Department a proposed watershed control plan at least 1 year before the applicable treatment compliance date in § 109.1203(k)—(o). The Department will approve the watershed control plan for the system to receive watershed control program treatment credit. The watershed control plan must include the following elements:

(i) Identification of an “area of influence” outside of which the likelihood of *Cryptosporidium* or fecal contamination affecting the treatment plant intake is not significant. This is the area to be evaluated in future watershed surveys under paragraph (4)(ii).

(ii) Identification of both potential and actual sources of *Cryptosporidium* contamination and an assessment of the relative impact of these sources on the system’s source water quality.

(iii) An analysis of the effectiveness and feasibility of control measures that could reduce *Cryptosporidium* loading from sources of contamination to the system’s source water.

(iv) A statement of goals and specific actions the system will undertake to reduce source water *Cryptosporidium* levels. The plan must explain how the actions are expected to contribute to specific goals, identify watershed partners and their roles, identify resource requirements and commitments, and include a schedule for plan implementation with deadlines for completing specific actions identified in the plan.

(3) Systems with existing watershed control programs (that is, programs in place on January 5, 2006) are eligible to seek this credit. Their watershed control plans must meet the criteria in paragraph (2) and must specify ongoing and future actions that will reduce source water *Cryptosporidium* levels.

(4) *Systems shall complete the following actions to maintain the 0.5-log credit:*

(i) Submit an annual watershed control program status report to the Department. The annual watershed control program status report must describe the system’s implementation of the approved plan and assess the adequacy of the plan to meet its goals. The report must explain how the system is addressing any shortcomings in plan implementation, including those previously identified by the Department or as the result of the watershed survey conducted under subparagraph (ii). The report must also describe significant changes that have occurred in the watershed since the last watershed sanitary survey. If a system determines during implementation that making a significant change to its approved watershed control program is necessary, the system shall notify the Department prior to making any changes. If a change is likely to reduce the level of source water protection, the system

shall also list in its notification the actions the system will take to mitigate this effect.

(ii) Undergo a watershed sanitary survey every 3 years for community water systems and every 5 years for noncommunity water systems and submit the survey report to the Department. The survey must be conducted according to Department guidelines and by persons the Department approves.

(A) The watershed sanitary survey must meet the following criteria:

(I) Encompass the region identified in the Department-approved watershed control plan as the area of influence.

(II) Assess the implementation of actions to reduce source water *Cryptosporidium* levels.

(III) Identify any significant new sources of *Cryptosporidium*.

(B) If the Department determines that significant changes may have occurred in the watershed since the previous watershed sanitary survey, systems shall undergo another watershed sanitary survey by a date the Department requires, which may be earlier than the regular date in this subparagraph.

(iii) The system shall make the watershed control plan, annual status reports, and watershed sanitary survey reports available to the public upon request. These documents must be in a plain language style and include criteria by which to evaluate the success of the program in achieving plan goals. The Department may approve systems to withhold from the public portions of the annual status report, watershed control plan, and watershed sanitary survey based on water supply security considerations.

(5) If the Department determines that a system is not carrying out the approved watershed control plan, the Department may withdraw the watershed control program treatment credit.

(c) *Alternative source.*

(1) A system may conduct source water monitoring that reflects a different intake location (either in the same source or for an alternate source) or a different procedure for the timing or level of withdrawal from the source (alternative source monitoring). If the Department approves, a system may determine its bin classification under § 109.1203 based on the alternative source monitoring results.

(2) If systems conduct alternative source monitoring under paragraph (1), systems shall also monitor their current plant intake concurrently as described in § 109.1202 (relating to monitoring requirements).

(3) Alternative source monitoring under paragraph (1) must meet the requirements for source monitoring to determine bin classification, as described in § 109.1202 and § 109.1206 (relating to reporting and recordkeeping requirements). Systems shall report the alternative source monitoring results to the Department, along with supporting information documenting the operating conditions under which the samples were collected.

(4) If a system determines its bin classification under § 109.1203 using alternative source monitoring results that reflect a different intake location or a different procedure for managing the timing or level of withdrawal from the source, the system shall relocate the intake or permanently adopt the withdrawal procedure, as applicable, no later than the applicable treatment compliance date in § 109.1203(k)—(o).

(d) *Presedimentation.* Systems will receive 0.5-log *Cryptosporidium* treatment credit for a presedimentation basin during any month the process meets the criteria in this subsection.

(1) The presedimentation basin must be in continuous operation and must treat the entire plant flow taken from a surface water or GUDI source.

(2) The system shall continuously add a coagulant to the presedimentation basin.

(3) The presedimentation basin must achieve the performance criteria as follows:

(i) Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows: log<sub>10</sub> (monthly mean of daily influent turbidity)-log<sub>10</sub> (monthly mean of daily effluent turbidity).

(ii) Comply with Department-approved performance criteria that demonstrate at least 0.5-log mean removal of micron-sized particulate material through the presedimentation process.

(e) *2-stage lime softening.* Systems receive an additional 0.5-log *Cryptosporidium* treatment credit for a 2-stage lime softening plant if chemical addition and hardness precipitation occur in two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GUDI source.

(f) *Bank filtration.* Systems receive *Cryptosporidium* treatment credit for bank filtration that serves as pretreatment to a filtration plant by meeting the criteria in this subsection. Systems using bank filtration when they begin source water monitoring under § 109.1202(a) shall collect samples as described in § 109.1202(n) and are not eligible for this credit.

(1) Wells with a groundwater flow path of at least 25 feet receive 0.5-log treatment credit. Wells with a groundwater flow path of at least 50 feet receive 1.0-log treatment credit. The groundwater flow path must be determined as specified in paragraph (4).

(2) Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles and minor cement. A system shall characterize the aquifer at the well site to determine aquifer properties. Systems shall extract a core from the aquifer and demonstrate that in at least 90% of the core length, grains less than 1.0 mm in diameter constitute at least 10% of the core material.

(3) Only horizontal and vertical wells are eligible for treatment credit.

(4) For vertical wells, the groundwater flow path is the measured distance from the edge of the surface water body under high flow conditions (determined by the 100 year floodplain elevation boundary or by the floodway, as defined in Federal Emergency Management Agency flood hazard maps) to the well screen. For horizontal wells, the groundwater flow path is the measured distance from the bed of the river under normal flow conditions to the closest horizontal well lateral screen.

(5) Systems shall monitor each wellhead for turbidity at least once every 4 hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed

1 NTU, the system shall report this result to the Department and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the Department determines that microbial removal has been compromised, the Department may revoke treatment credit until the system implements corrective actions approved by the Department to remediate the problem.

(6) Springs and infiltration galleries are not eligible for treatment credit under this section, but are eligible for credit under subsection (i).

(7) The Department may approve *Cryptosporidium* treatment credit for bank filtration based on a demonstration of performance study that meets the criteria in this paragraph. This treatment credit may be greater than 1.0-log and may be awarded to bank filtration that does not meet the criteria in paragraphs (1)—(5).

(i) The study must follow a Department-approved protocol and must involve the collection of data on the removal of *Cryptosporidium* or a surrogate for *Cryptosporidium* and related hydrogeologic and water quality parameters during the full range of operating conditions.

(ii) The study must include sampling both from the production well and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well.

(g) *Combined filter performance.* Systems using conventional filtration treatment or direct filtration treatment receive an additional 0.5-log *Cryptosporidium* treatment credit during any month the system meets the criteria in this subsection. Combined filter effluent (CFE) turbidity must be less than or equal to 0.15 NTU in at least 95% of the measurements. Turbidity must be measured as described in § 109.304(c) (relating to analytical requirements).

(h) *Individual filter performance.* Systems using conventional filtration treatment or direct filtration treatment will receive 0.5-log *Cryptosporidium* treatment credit, which can be in addition to the 0.5-log credit under subsection (g), during any month the system meets the criteria in this subsection. Compliance with these criteria must be based on individual filter turbidity monitoring as described in § 109.301(1)(iv) (relating to general monitoring requirements), as applicable.

(1) The filtered water turbidity for each individual filter must be less than or equal to 0.15 NTU in at least 95% of the measurements recorded each month.

(2) An individual filter may not have a measured turbidity greater than 0.3 NTU in two consecutive measurements taken 15 minutes apart.

(3) A system that has received treatment credit for individual filter performance and fails to meet the requirements of paragraph (1) or (2) during any month does not receive a treatment technique violation under § 109.1203(g) if the Department determines the following:

(i) The failure was due to unusual and short-term circumstances that could not reasonably be prevented through optimizing treatment plant design, operation, and maintenance.

(ii) The system has experienced no more than two of these failures in any calendar year.

(i) *Demonstration of performance.* The Department may approve *Cryptosporidium* treatment credit for drinking

water treatment processes based on a demonstration of performance study that meets the criteria in this subsection. This treatment credit may be greater than or less than the prescribed treatment credits in § 109.1203(e)—(h) or subsection (d)—(f) and subsections (n)—(q) and may be awarded to treatment processes that do not meet the criteria for the prescribed credits.

(1) Systems cannot receive the prescribed treatment credit for any toolbox option in subsections (d)—(f) or (n)—(q) if that toolbox option is included in a demonstration of performance study for which treatment credit is awarded under this paragraph.

(2) The demonstration of performance study must follow a Department-approved protocol and must demonstrate the level of *Cryptosporidium* reduction the treatment process will achieve under the full range of expected operating conditions for the system.

(3) Approval by the Department will be in writing and may include monitoring and treatment performance criteria that the system shall demonstrate and report on an ongoing basis to remain eligible for the treatment credit. The Department may designate the criteria when necessary to verify that the conditions under which the demonstration of performance credit was approved are maintained during routine operation.

(j) *Bag and cartridge filters.* Systems receive *Cryptosporidium* treatment credit of up to 2.0-log for individual bag or cartridge filters and up to 2.5-log for bag or cartridge filters operated in series by meeting the criteria in paragraphs (1)—(10). To be eligible for this credit, systems shall report the results of challenge testing that meet the requirements of paragraphs (2)—(9) to the Department. The filters must treat the entire plant flow taken from a surface water or groundwater source under the direct influence of surface water source.

(1) The *Cryptosporidium* treatment credit awarded to bag or cartridge filters will be based on the removal efficiency demonstrated during challenge testing that is conducted according to the criteria in paragraphs (2)—(9). A factor of safety equal to 1-log for individual bag or cartridge filters and 0.5-log for bag or cartridge filters in series must be applied to challenge testing results to determine removal credit. Systems may use results from challenge testing conducted prior to January 5, 2006, if the prior testing was consistent with the criteria specified in paragraphs (2)—(9).

(2) Challenge testing must be performed on full-scale bag or cartridge filters, and the associated filter housing or pressure vessel, that are identical in material and construction to the filters and housings the system will use for removal of *Cryptosporidium*. Bag or cartridge filters must be challenge tested in the same configuration that the system will use, either as individual filters or as a series configuration of filters.

(3) Challenge testing must be conducted using *Cryptosporidium* or a surrogate that is removed no more efficiently than *Cryptosporidium*. The microorganism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate must be determined using a method capable of discretely quantifying the specific microorganism or surrogate used in the test; gross measurements such as turbidity may not be used.

(4) The maximum feed water concentration that can be used during a challenge test must be based on the



detection limit of the challenge particulate in the filtrate (that is, filtrate detection limit) and must be calculated using the following equation:

$$\text{Maximum Feed Concentration} = 1 \times 10^4 \times (\text{Filtrate Detection Limit})$$

(5) Challenge testing must be conducted at the maximum design flow rate for the filter as specified by the manufacturer.

(6) Each filter evaluated must be tested for a duration sufficient to reach 100% of the terminal pressure drop, which establishes the maximum pressure drop under which the filter may be used to comply with this subchapter.

(7) Removal efficiency of a filter must be determined from the results of the challenge test and expressed in terms of log removal values using the following equation:

$$\text{LRV} = \text{LOG}_{10}(C_f) - \text{LOG}_{10}(C_p)$$

Where: LRV = log removal value demonstrated during challenge testing;  $C_f$  = the feed concentration measured during the challenge test; and  $C_p$  = the filtrate concentration measured during the challenge test. In applying this equation, the same units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, then the term  $C_p$  must be set equal to the detection limit.

(8) Each filter tested must be challenged with the challenge particulate during three periods over the filtration cycle: within 2 hours of start-up of a new filter; when the pressure drop is between 45 and 55% of the terminal pressure drop; and at the end of the cycle after the pressure drop has reached 100% of the terminal pressure drop. An LRV must be calculated for each of these challenge periods for each filter tested. The LRV for the filter ( $\text{LRV}_{\text{filter}}$ ) must be assigned the value of the minimum LRV observed during the three challenge periods for that filter.

(9) If less than 20 filters are tested, the overall removal efficiency for the filter product line must be set equal to the lowest  $\text{LRV}_{\text{filter}}$  among the filters tested. If 20 or more filters are tested, the overall removal efficiency for the filter product line must be set equal to the 10th percentile of the set of  $\text{LRV}_{\text{filter}}$  values for the various filters tested. The percentile is defined by  $(i/(n+1))$  where  $i$  is the rank of  $n$  individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(10) If a previously tested filter is modified in a manner that could change the removal efficiency of the filter product line, challenge testing to demonstrate the removal efficiency of the modified filter must be conducted and submitted to the Department.

(k) *Membrane filtration.*

(1) *Cryptosporidium treatment credit.* Systems receive *Cryptosporidium* treatment credit for membrane filtration that meets the criteria of this paragraph. Membrane cartridge filters that meet the definition of membrane filtration in § 109.1 (relating to definitions) are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under the following:

(i) The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (2).

(ii) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in paragraph (3).

(2) *Challenge testing.* The membrane used by the system shall undergo challenge testing to evaluate removal efficiency, and the system shall report the results of challenge testing to the Department. Challenge testing must be conducted according to the criteria in subparagraphs (i)—(vii). Systems may use data from challenge testing conducted prior to January 5, 2006, if the prior testing was consistent with the criteria in subparagraphs (i)—(vii).

(i) Challenge testing must be conducted on either a full-scale membrane module, identical in material and construction to the membrane modules used in the system's treatment facility, or a smaller-scale membrane module, identical in material and similar in construction to the full-scale module. A module is defined as the smallest component of a membrane unit in which a specific membrane surface area is housed in a device with a filtrate outlet structure.

(ii) Challenge testing must be conducted using *Cryptosporidium* oocysts or a surrogate that is removed no more efficiently than *Cryptosporidium* oocysts. The organism or surrogate used during challenge testing is referred to as the challenge particulate. The concentration of the challenge particulate, in both the feed and filtrate water, must be determined using a method capable of discretely quantifying the specific challenge particulate used in the test; gross measurements such as turbidity may not be used.

(iii) The maximum feed water concentration that can be used during a challenge test is based on the detection limit of the challenge particulate in the filtrate and must be determined according to the following equation:

$$\text{Maximum Feed Concentration} = 3.16 \times 10^6 \times (\text{Filtrate Detection Limit})$$

(iv) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric % of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (that is, backwashing).

(v) Removal efficiency of a membrane module must be calculated from the challenge test results and expressed as a log removal value according to the following equation:

$$\text{LRV} = \text{LOG}_{10}(C_f) - \text{LOG}_{10}(C_p)$$

Where: LRV = log removal value demonstrated during the challenge test;  $C_f$  = the feed concentration measured during the challenge test; and  $C_p$  = the filtrate concentration measured during the challenge test. Equivalent units must be used for the feed and filtrate concentrations. If the challenge particulate is not detected in the filtrate, the term  $C_p$  is set equal to the detection limit for the purpose of calculating the LRV. An LRV must be calculated for each membrane module evaluated during the challenge test.

(vi) The removal efficiency of a membrane filtration process demonstrated during challenge testing must be

expressed as a log removal value ( $LRV_{C-Test}$ ). If less than 20 modules are tested, then  $LRV_{C-Test}$  is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then  $LRV_{C-Test}$  is equal to the 10th percentile of the representative LRVs among the modules tested. The percentile is defined by  $(i/(n+1))$  where  $i$  is the rank of  $n$  individual data points ordered lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

(vii) The challenge test must establish a quality control release value (QCRV) for a nondestructive performance test that demonstrates the *Cryptosporidium* removal capability of the membrane filtration module. This performance test must be applied to each production membrane module used by the system that was not directly challenge tested in order to verify *Cryptosporidium* removal capability. Production modules that do not meet the established QCRV are not eligible for the treatment credit demonstrated during the challenge test.

(viii) If a previously tested membrane is modified in a manner that could change the removal efficiency of the membrane or the applicability of the nondestructive performance test and associated QCRV, additional challenge testing to demonstrate the removal efficiency of, and determine a new QCRV for, the modified membrane must be conducted and submitted to the Department.

(3) *Direct integrity testing.* Systems shall conduct direct integrity testing in a manner that demonstrates a removal efficiency equal to or greater than the removal credit awarded to the membrane filtration process and meets the requirements described in subparagraphs (i)—(vi). A direct integrity test is defined as a physical test applied to a membrane unit to identify and isolate integrity breaches (that is, one or more leaks that could result in contamination of the filtrate).

(i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

(ii) The direct integrity method must have a resolution of 3 micrometers or less, where resolution is defined as the size of the smallest integrity breach that contributes to a response from the direct integrity test.

(iii) The direct integrity test must have a sensitivity sufficient to verify the log treatment credit awarded to the membrane filtration process by the Department, where sensitivity is defined as the maximum log removal value that can be reliably verified by a direct integrity test. Sensitivity must be determined using the approach in either clause (A) or (B) as applicable to the type of direct integrity test the system uses.

(A) For direct integrity tests that use an applied pressure or vacuum, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = \text{LOG}_{10} (Q_p / (\text{VCF} \times Q_{\text{breach}}))$$

Where:  $LRV_{DIT}$  = the sensitivity of the direct integrity test;  $Q_p$  = total design filtrate flow from the membrane unit;  $Q_{\text{breach}}$  = flow of water from an integrity breach associated with the smallest integrity test response that can be reliably measured, and VCF = volumetric concentration factor. The volumetric concentration factor is the ratio of the suspended solids concentration on the high pressure side of the membrane relative to that in the feed water.

(B) For direct integrity tests that use a particulate or molecular marker, the direct integrity test sensitivity must be calculated according to the following equation:

$$LRV_{DIT} = \text{LOG}_{10}(C_f) - \text{LOG}_{10}(C_p)$$

Where:  $LRV_{DIT}$  = the sensitivity of the direct integrity test;  $C_f$  = the typical feed concentration of the marker used in the test; and  $C_p$  = the filtrate concentration of the marker from an integral membrane unit.

(iv) Systems shall establish a control limit within the sensitivity limits of the direct integrity test that is indicative of an integral membrane unit capable of meeting the removal credit awarded by the Department.

(v) If the result of a direct integrity test exceeds the control limit established under subparagraph (iv), the system shall remove the membrane unit from service. Systems shall conduct a direct integrity test to verify any repairs, and may return the membrane unit to service only if the direct integrity test is within the established control limit.

(vi) Systems shall conduct direct integrity testing on each membrane unit at a frequency of at least once each day that the membrane unit is in operation. The Department may approve less frequent testing, based on demonstrated process reliability, the use of multiple barriers effective for *Cryptosporidium*, or reliable process safeguards.

(4) *Indirect integrity monitoring.* Systems shall conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in subparagraphs (i)—(v). Indirect integrity monitoring is defined as monitoring some aspect of filtrate water quality that is indicative of the removal of particulate matter. A system that implements continuous direct integrity testing of membrane units in accordance with the criteria in subparagraphs (i)—(v) is not subject to the requirements for continuous indirect integrity monitoring. Systems shall submit a monthly report to the Department summarizing all continuous indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken in each case.

(i) Unless the Department approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.

(ii) Continuous monitoring must be conducted at least once every 15 minutes.

(iii) Continuous monitoring must be separately conducted on each membrane unit.

(iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (that is, two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in paragraph (3)(i)—(v).

(v) If indirect integrity monitoring includes a Department-approved alternative parameter and if the alternative parameter exceeds a Department-approved control limit for a period greater than 15 minutes, direct integrity testing shall immediately be performed on the associated membrane units as specified in paragraph (3)(i)—(v).

(1) *Second stage filtration.* Systems receive 0.5-log *Cryptosporidium* treatment credit for a separate second stage of filtration that consists of sand, dual media, GAC or other fine grain media following granular media

filtration if approved by the Department. To be eligible for this credit, the first stage of filtration must be preceded by a coagulation step and both filtration stages must treat the entire plant flow taken from a surface water or GUDI source. A cap, such as GAC, on a single stage of filtration is not eligible for this credit. The Department will approve the treatment credit based on an assessment of the design characteristics of the filtration process.

(m) *Slow sand filtration (as secondary filter)*. Systems are eligible to receive 2.5-log *Cryptosporidium* treatment credit for a slow sand filtration process that follows a separate stage of filtration if both filtration stages treat entire plant flow taken from a surface water or GUDI source and no disinfectant residual is present in the influent water to the slow sand filtration process. The Department will approve the treatment credit based on an assessment of the design characteristics of the filtration process. This subsection does not apply to treatment credit awarded to slow sand filtration used as a primary filtration process.

(n) *Inactivation toolbox components*. Calculation of CT values.

(1) Systems with treatment credit for chlorine dioxide or ozone under subsection (o) or (p) must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in § 109.304(c) and 40 CFR 141.74(b)(3) (relating to analytical and monitoring requirements).

(2) Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Under this approach, systems shall add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.

(o) *Chlorine dioxide*. Systems are eligible to receive the *Cryptosporidium* treatment credit listed in Table 1, CT Values (mg \* min/L) for *Cryptosporidium* Inactivation by Chlorine Dioxide, contained in Appendix A to Subchapter L by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subsection (n).

(p) *Ozone*. Systems receive the *Cryptosporidium* treatment credit listed in Table 2, CT Values (mg \* min/L) for *Cryptosporidium* Inactivation by Ozone, contained in Appendix A to Subchapter L, by meeting the corresponding ozone CT values for the applicable water temperature, as described in subsection (n).

(q) *Ultraviolet light*. Systems receive *Cryptosporidium*, *Giardia lamblia* and virus treatment credits for ultraviolet (UV) light reactors by achieving the corresponding UV dose values shown in Table 3, UV Dose for *Cryptosporidium*, *Giardia lamblia* and Virus Inactivation, contained in Appendix A to Subchapter L, as described in paragraph (1). Systems shall validate and monitor UV reactors as described in paragraphs (2) and (3) to demonstrate that they are achieving a particular UV dose value for treatment credit.

(1) *UV dose table*. The treatment credits listed in Table 3 are for UV light at a wavelength of 254 nm as produced by a low pressure mercury vapor lamp. To receive treatment credit for other lamp types, systems shall demonstrate an equivalent germicidal dose through reactor validation testing, as described in paragraph (2). The UV dose values in this table are applicable only to post-filter applications of UV in filtered systems.

(2) *Reactor validation testing*. Systems shall use UV reactors that have undergone validation testing, conducted by a party acceptable to the Department, to determine the operating conditions under which the reactor delivers the UV dose required in paragraph (1) (that is, validated operating conditions). These operating conditions must include flow rate, UV intensity as measured by a UV sensor and UV lamp status.

(i) When determining validated operating conditions, systems shall account for the following factors:

(A) UV absorbance of the water.

(B) Lamp fouling and aging.

(C) Measurement uncertainty of on-line sensors.

(D) UV dose distributions arising from the velocity profiles through the reactor.

(E) Failure of UV lamps or other critical system components.

(F) Inlet and outlet piping or channel configurations of the UV reactor.

(ii) Validation testing must include the following: Full scale testing of a reactor that conforms uniformly to the UV reactors used by the system and inactivation of a test microorganism whose dose response characteristics have been quantified with a low pressure mercury vapor lamp.

(iii) The Department may accept alternative validation testing approaches, if these approaches are first approved by the EPA.

(3) *Reactor monitoring*.

(i) Systems shall monitor their UV reactors to determine if the reactors are operating within validated conditions, as determined under paragraph (2). This monitoring must include UV intensity as measured by a UV sensor, flow rate, lamp status, and other parameters the Department designates based on UV reactor operation. Systems shall verify the calibration of UV sensors and shall recalibrate sensors in accordance with a protocol the Department approves.

(ii) To receive treatment credit for UV light, systems shall treat at least 95% of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose, as described in paragraphs (1) and (2). Systems shall demonstrate compliance with this condition by the monitoring required under subparagraph (i).

**§ 109.1205. Grandfathering Previously Collected Data.**

A system may comply with the initial source water monitoring requirements of § 109.1202 (relating to monitoring requirements) by grandfathering previously collected data. The system shall meet the grandfathering requirements established by EPA under the National Primary Drinking Water Regulations in 40 CFR 141.707 (relating to grandfathering previously collected data) which are incorporated by reference.

**§ 109.1206. Reporting and recordkeeping requirements.**

(a) *Source water reporting time frame*. Systems shall report results from the source water monitoring required under § 109.1202 (relating to monitoring requirements) no later than 10 days after the end of the first month following the month when the sample is collected.

(b) *Methods for reporting initial source water monitoring results to EPA.* Systems serving at least 10,000 people shall report as follows:

(1) All systems serving at least 10,000 people shall report the results from the initial source water monitoring required under § 109.1202(a) to the EPA electronically at <https://intranet.epa.gov/lt2/>.

(2) If a system is unable to report monitoring results electronically, the system may use an alternative approach for reporting monitoring results the EPA approves.

(c) *Methods for reporting initial source water monitoring results to the Department.* Systems serving less than 10,000 people shall report results from the initial source water monitoring required under § 109.1202(a) to the Department using a method approved by the Department.

(d) *Methods for reporting second round of source water monitoring results to the Department.* All systems shall report results from the second round of source water monitoring required under § 109.1202(b) to the Department using a method approved by the Department.

(e) *Source water reporting data elements.* Systems shall report the applicable information in paragraphs (1) and (2) for the source water monitoring required under § 109.1202.

(1) *Cryptosporidium data elements.* Systems shall report data elements in subparagraphs (i)—(vii) for each *Cryptosporidium* analysis. Systems shall report, in a form acceptable to the Department, data elements in subparagraphs (viii)—(x) as applicable.

(i) PWS ID.

(ii) Source ID.

(iii) Sample collection date.

(iv) Sample type (field or matrix spike).

(v) Sample volume filtered (L), to nearest 1/4 L.

(vi) Indicate whether 100% of filtered volume was examined.

(vii) Number of oocysts counted.

(viii) For matrix spike samples, systems shall also report the sample volume spiked and estimated number of oocysts spiked. These data are not required for field samples.

(ix) For samples in which less than 10 L is filtered or less than 100% of the sample volume is examined, systems shall also report the number of filters used and the packed pellet volume.

(x) For samples in which less than 100% of sample volume is examined, systems shall also report the volume of resuspended concentrate and volume of this resuspension processed through immunomagnetic separation.

(2) *E. coli data elements.* Systems shall report, in a form acceptable to the Department, the following data elements for each *E. coli* analysis:

(i) PWS ID.

(ii) Source ID.

(iii) Sample collection date.

(iv) Analytical method number.

(v) Method type.

(vi) Source type (flowing stream, lake/reservoir, GUDI).

(vii) *E. coli*/100 mL.

(viii) Turbidity, if monitoring is required under § 109.1202.

(f) *Sampling schedule reporting.* Systems shall report sampling schedules under § 109.1202 (h)—(j) and source water monitoring results under subsections (a)—(e) unless they notify the Department that they will not conduct source water monitoring due to meeting the criteria of § 109.1202(d).

(g) *Bin classification reporting.* Systems shall report their *Cryptosporidium* bin classification as follows:

(1) Systems shall report their initial bin classification under § 109.1203(c) (relating to bin classification and treatment technique requirements) to the Department for approval no later than 6 months after the system is required to complete initial source water monitoring based on the schedule in § 109.1202(c).

(2) Systems shall report their bin classification under § 109.1203(c) to the Department for approval no later than 6 months after the system is required to complete the second round of source water monitoring based on the schedule in § 109.1202(c).

(3) The bin classification report to the Department will include a summary of source water monitoring data and the calculation procedure used to determine bin classification.

(4) Failure to comply with the conditions of this subsection is a violation of the treatment technique requirement.

(h) *Microbial toolbox reporting requirements.* Systems are required to report items specified § 109.1204 (relating to requirements for microbial toolbox components) for all toolbox components for which they are requesting treatment credit. Systems must report to the State in accordance with Appendix C to Subchapter L. Microbial Toolbox Reporting Requirements in a form acceptable to the Department. Systems using treatment options other than conventional, direct, slow sand or diatomaceous earth filtration for bin 1 sources shall also report, in a form acceptable to the Department, the items specified in § 109.1204 for the treatment options used.

(i) *Reporting significant change in disinfection practices.* Prior to making a significant change in disinfection practice, systems shall report disinfection profiles and benchmarks to the Department as established by the EPA under the National Primary Drinking Water regulations in 40 CFR 141.708 and 141.709 (relating to requirements when making a significant change in disinfection practice; and developing the disinfection profile and benchmark), which are incorporated by reference in § 109.204 (relating to disinfection profiling and benchmarking).

(j) *Source water monitoring recordkeeping requirements.* Systems shall keep results from the initial round of source water monitoring under § 109.1202(a) and the second round of source water monitoring under § 109.1202(b) until 3 years after bin classification under § 109.1203 (b) and (c).

(k) *Notification retention.* Systems shall keep any notification to the Department that they will not conduct source water monitoring due to meeting the criteria of § 109.1202(d) for 3 years.

(l) *Results retention.* Systems shall keep the results of treatment monitoring associated with microbial toolbox options under § 109.1204, as applicable, for 3 years.

**Subchapter M. ADDITIONAL REQUIREMENTS FOR GROUNDWATER SOURCES**

- Sec.
- 109.1301. Scope.
- 109.1302. Treatment technique requirements.
- 109.1303. Triggered monitoring requirements for groundwater sources.
- 109.1304. Assessment source water monitoring.
- 109.1305. Compliance monitoring.
- 109.1306. Information describing 4-log treatment and compliance monitoring.
- 109.1307. System management responsibilities.

**§ 109.1301. Scope.**

Beginning December 1, 2009, this subchapter applies to all public water systems that use groundwater excluding those systems that combine all of their groundwater with either surface water or with groundwater under the direct influence of surface water prior to treatment under § 109.202(c)(1) (relating to State MCLs, MRDLs, and treatment technique requirements). For the purpose of this subchapter, "groundwater system" is defined as any public water system meeting this applicability statement including systems obtaining finished groundwater from another supplier.

**§ 109.1302. Treatment technique requirements.**

(a) *Community groundwater systems.* Community groundwater systems are required to provide continuous disinfection under § 109.202(c)(2) (relating to state MCLs, MRDLs and treatment technique requirements) and in addition shall:

(1) Comply with triggered monitoring requirements under § 109.1303 (relating to triggered monitoring requirements for groundwater sources) until beginning compliance monitoring under paragraph (5).

(2) Maintain at each groundwater entry point a residual disinfectant concentration no less than 0.40 mg/L expressed as free chlorine or its equivalent as approved by the Department, or other minimum residual approved by the Department as demonstrated under § 109.1306 (relating to information describing 4-log treatment and compliance monitoring) to provide 4-log treatment of viruses.

(3) Demonstrate how at least 4-log treatment of viruses will be provided by submitting information as required under § 109.1306 (relating to information describing 4-log treatment and compliance monitoring) when directed by the Department or no later than:

- (i) October 1, 2010, for systems serving more than 500 persons.
  - (ii) October 1, 2011, for systems serving 100 to 500 persons.
  - (iii) October 1, 2012, for systems serving less than 100 persons.
- (4) Provide at least 4-log treatment of viruses prior to the first customer when directed by the Department or no later than:
- (i) April 1, 2011, for systems serving more than 500 persons.
  - (ii) April 1, 2012, for systems serving 100 to 500 persons.
  - (iii) April 1, 2013, for systems serving less than 100 persons.
  - (iv) A Department-approved alternative compliance schedule.

(5) Conduct compliance monitoring as described in § 109.1305 (relating to compliance monitoring) when

directed by the Department following notification of approval by the Department that at least 4-log treatment of viruses has been demonstrated for a groundwater source or sources.

(6) Provide at least 4-log treatment of viruses for new sources permitted after December 1, 2009, and conduct compliance monitoring as described in § 109.1305 beginning the first day the source is put into service.

(b) *Noncommunity groundwater systems including bottled water and vended water systems, retail water facilities and bulk water hauling systems.*

(1) Noncommunity groundwater systems may demonstrate at least 4-log treatment of viruses is provided prior to the first customer by submitting information as required under § 109.1306. Systems demonstrating at least 4-log treatment of viruses under this paragraph shall:

(i) Comply with compliance monitoring requirements under § 109.1305 when directed by the Department following notification of approval by the Department that at least 4-log treatment of viruses has been demonstrated for a groundwater source or sources.

(ii) Comply with triggered monitoring requirements under § 109.1303 until beginning compliance monitoring under subparagraph (i).

(2) Noncommunity groundwater systems not demonstrating at least 4-log treatment to the Department shall:

(i) Comply with triggered monitoring requirements under § 109.1303.

(ii) Comply with the requirements of assessment source water monitoring as described in § 109.1304 (relating to assessment source water monitoring) if the Department determines a groundwater source is at risk to fecal contamination. The Department will consider any factors that identify sources at risk to fecal contamination, including one or more of the following:

- (A) Sensitivity of the source aquifer to fecal contamination.
- (B) Proximity to sources of fecal contamination.
- (C) Microbiological sampling history.

(c) *Groundwater systems with significant deficiencies or source water E. coli contamination.*

(1) A groundwater system with a significant deficiency or an *E. coli*-positive groundwater source sample collected under § 109.505(a)(3), § 109.1303(a) or § 109.1304(a) (relating to requirements for noncommunity water systems; triggered monitoring requirements for groundwater sources; and assessment source water monitoring) shall correct all significant deficiencies and, if directed by the Department, shall implement one or more of the following corrective actions:

- (i) Provide an alternative source of water.
- (ii) Eliminate the source of contamination.

(iii) Submit information required under § 109.1306 and provide treatment that reliably achieves at least 4-log treatment of viruses before the first customer for the groundwater source or sources and comply with compliance monitoring requirements under § 109.1305.

(2) A groundwater system with a significant deficiency or an *E. coli*-positive groundwater source sample collected under § 109.1303(a) or § 109.1304(a) will receive one of the following forms of notification:

(i) Written notice from the Department of a significant deficiency.

(ii) Notification from a laboratory under § 109.810(b) (relating to reporting and notification requirements) that a groundwater source sample collected under § 109.1303(a) or § 109.1304(a) was found to be *E. coli*-positive.

(iii) Direction from the Department that an *E. coli* positive sample collected under § 109.1303(a) requires corrective action.

(3) Within 30 days of receiving initial notification under paragraph (2), the groundwater system shall consult with the Department regarding the appropriate corrective action unless the Department directs the groundwater system to implement a specific corrective action.

(4) Within 120 days of receiving initial notification under paragraph (2), or earlier if directed by the Department, the groundwater system shall correct all significant deficiencies if applicable and shall either:

(i) Have completed corrective action in accordance with applicable Department plan review processes or other Department guidance or direction, if any, including Department-specified interim measures.

(ii) Be in compliance with a Department-approved corrective action plan and schedule subject to the following conditions:

(A) The groundwater system shall request and obtain approval from the Department for any subsequent modifications to a Department-approved corrective action plan and schedule.

(B) If the Department specifies interim measures for protection of the public health pending Department approval of the corrective action plan and schedule or pending completion of the corrective action plan, the system shall comply with these interim measures as well as with any schedule specified by the Department.

**§ 109.1303. Triggered monitoring requirements for groundwater sources.**

(a) Groundwater systems not required to conduct compliance monitoring under § 109.1302 (relating to treatment technique requirements), of one or more groundwater sources shall collect a source water sample within 24 hours of notification of a total coliform-positive routine sample collected under § 109.301(3)(i) (relating to general monitoring requirements) and have it analyzed for the presence of *E. coli*. The system shall collect a sample from each groundwater source that is not provided with Department-approved 4-log treatment of viruses and is connected to the distribution system from which the total coliform-positive sample was collected.

(b) The Department may extend the 24-hour time limit under subsection (a) to a maximum of 72 hours if the system adequately demonstrates a logistical problem outside the system's control in having the source sample or samples analyzed within 30 hours of collection. A logistical problem outside the system's control may include a coliform-positive sample result received over a holiday or weekend in which the services of a Department-accredited laboratory are not available within the prescribed sample holding time.

(c) Systems that obtain written approval from the Department prior to receiving notification of a total coliform-positive routine sample collected under § 109.301(3)(i) may conduct monitoring under subsection (a) at one or more sources within the groundwater system

that are representative of multiple sources used by that system. The Department will consider any factors that identify sources as representative of multiple sources including one or more of the following:

(1) The sources draw water from the same hydrogeologic setting.

(2) Multiple distribution systems where no interconnection exists are supplied by separate sources.

(d) A groundwater source sample required under subsection (a) shall be collected at a location prior to any treatment.

(e) A public water system obtaining finished groundwater from another public water system shall notify the supplying system or systems within 24 hours of being notified of a total coliform-positive sample collected under § 109.301(3)(i).

(f) Prior to expiration of the 24-hour deadline under subsection (a), source water monitoring requirements are not required when one of the following apply:

(1) The Department determines and notifies the public water system that a total coliform-positive routine sample collected under § 109.301(3)(i) is caused by a distribution system deficiency.

(2) The total coliform-positive result has been invalidated by the Department under § 109.301(3)(iii).

(g) The following apply to an invalidation of an *E. coli* sample for groundwater source sampling:

(1) The Department may invalidate an *E. coli*-positive groundwater source sample collected under this section if:

(i) The system provides the Department with written notice from the laboratory that improper sample analysis occurred.

(ii) The Department determines and documents in writing that there is substantial evidence that the *E. coli*-positive groundwater source sample is not related to source water quality.

(2) If the Department invalidates an *E. coli*-positive groundwater source sample, the groundwater system shall collect a replacement source water sample under subsection (a) within 24 hours of being notified by the Department of its invalidation decision and have the replacement sample analyzed for *E. coli*. The Department may extend the 24-hour time limit on a case-by-case basis to 72 hours.

(h) For an *E. coli*-positive source water sample collected under subsection (a) that is not invalidated under subsection (g):

(1) The Department may require a groundwater system to perform a corrective action as described under § 109.1302(c) (relating to treatment technique requirements).

(2) If the Department does not require corrective action under § 109.1302(c), the system shall collect five additional source water samples from the same source within 24 hours of being notified of the *E. coli*-positive sample. If one of the additional samples collected under this paragraph is *E. coli*-positive, the groundwater system shall perform a corrective action as described under § 109.1302(c).

(3) The system shall comply with Tier 1 public notification requirements under § 109.408 (relating to Tier 1 category, timing and delivery of notice).

(i) Systems providing water to another public water system receiving notification under subsection (e) shall comply with subsection (a).

**§ 109.1304. Assessment source water monitoring.**

(a) To enable the Department to determine if a groundwater system is using a groundwater source with fecal contamination, the Department may require a groundwater system to conduct monitoring for *E. coli*. If directed by the Department to conduct monitoring under this section, a water supplier shall:

(1) Collect a total of 12 samples from each groundwater source.

(i) The system may obtain written approval from the Department to conduct monitoring at one or more sources within the groundwater system that are representative of multiple sources used by the system. The Department will consider any factors that identify sources as representative of multiple sources drawing water from the same hydrogeologic setting.

(ii) For sources providing water to the public 12 months out of the year, groundwater systems shall collect one sample during each month.

(iii) For sources providing water to the public for less than 12 months out of the year, groundwater systems shall collect 12 samples evenly distributed over the operational period.

(iv) Samples collected under § 109.1303(a) (relating to triggered monitoring requirement for groundwater sources) may be used to satisfy the requirements of this subsection, if approved by the Department.

(v) If a groundwater system obtains an *E. coli*-positive groundwater source sample, the groundwater system shall perform a corrective action as described under § 109.1302(c) (relating to treatment technique requirements).

(vi) The groundwater system may discontinue assessment source water monitoring if the system demonstrates they provide at least 4-log treatment of viruses under § 109.1302(b)(1) or if directed by the Department.

(2) Collect groundwater source samples at a location prior to any treatment of the groundwater source.

(b) The following apply to an invalidation of an *E. coli* sample for groundwater source sampling:

(1) A groundwater system may obtain a Department invalidation of an *E. coli*-positive groundwater source sample collected under this section as follows:

(i) The system provides the Department with written notice from the laboratory that improper sample analysis occurred.

(ii) The Department determines and documents in writing that there is substantial evidence that the *E. coli*-positive groundwater source sample is not related to source water quality.

(2) If the Department invalidates an *E. coli*-positive groundwater source sample, the groundwater system shall collect a replacement source water sample under subsection (a) within 24 hours of being notified by the Department of its invalidation decision and have the replacement sample analyzed for *E. coli*. The Department may extend the 24-hour time limit on a case-by-case basis to 72 hours.

**§ 109.1305. Compliance monitoring.**

(a) *Chemical disinfection.* Groundwater systems demonstrating at least 4-log treatment of viruses using chemical disinfection shall monitor for and maintain the Department-approved residual disinfection concentration every day the system serves the public from the groundwater source.

(1) A groundwater system serving greater than 3,300 people shall:

(i) Continuously monitor the residual disinfectant concentration at the entry point or other location approved by the Department and record the results at least every 15 minutes each day that water from the groundwater source is served to the public.

(ii) Maintain the Department-approved minimum residual disinfectant concentration every day the public water system serves water from the groundwater source to the public.

(iii) Conduct grab sampling every 4 hours until the continuous monitoring equipment is returned to service if there is a failure in the continuous monitoring equipment. The system shall resume continuous residual disinfectant monitoring within 14 days.

(2) A groundwater system serving 3,300 or fewer people shall comply with one of the following subparagraphs:

(i) The groundwater system shall maintain the Department-approved minimum residual disinfectant concentration every day the public water system serves water from the groundwater source to the public. The groundwater system shall take a daily grab sample at the entry point or other location approved by the Department during the hour of peak flow or at any other time specified by the Department. If any daily grab sample measurement falls below the Department-approved minimum residual disinfectant concentration, the groundwater system shall take follow up samples every 4 hours until the residual disinfectant concentration is restored to the Department-approved minimum level.

(ii) Monitor the disinfectant residual concentration continuously and meet the requirements of paragraph (1).

(b) *Alternative treatment.* Groundwater systems demonstrating at least 4-log treatment of viruses using a Department-approved alternative treatment method, including a combination of treatment methods shall:

(1) Monitor the alternative treatment in accordance with all Department-approved monitoring requirements.

(2) Operate the alternative treatment in accordance with all compliance requirements that the Department determines to be necessary to achieve at least 4-log treatment of viruses.

**§ 109.1306. Information describing 4-log treatment and compliance monitoring.**

(a) Community water systems, noncommunity water systems which hold a valid operation permit under § 109.504 (relating to public water system operation permits) and bottled water and vended water systems, retail water facilities and bulk water hauling systems which hold a valid permit under § 109.1005 (relating to permit requirements) demonstrating at least 4-log treatment of viruses under § 109.1302 (relating to treatment technique requirements) shall submit information in writing on forms provided by the Department and may include plans, specifications, engineer's report, water

quality analyses and other data, information or documentation reasonably necessary to enable the Department to evaluate:

- (1) Treatment effectiveness.
- (2) The methodology the system will use to comply with § 109.1305 (relating to compliance monitoring).
- (b) A noncommunity water system not covered under subsection (a) demonstrating at least 4-log treatment of viruses under § 109.1302 (relating to treatment technique requirements) shall:
  - (1) File an amendment to the system description as described under § 109.505(a)(2)(ii) (relating to requirements for noncommunity water systems).
  - (2) Submit an application for a noncommunity water system 4-log treatment of groundwater sources permit. The application shall be submitted in writing on forms provided by the Department.
  - (3) Submit plans, specifications, engineer's report, water quality analyses and other data, information or documentation reasonably necessary to enable the Department to determine compliance with the act and this chapter. The Department will make available to the applicant the *Public Water Supply Manual*, available from the Bureau of Water Standards and Facility Regulation, Post Office Box 8774, Harrisburg, Pennsylvania 17105 which contains acceptable design standards and technical guidance. Water quality analyses shall be conducted by a laboratory accredited under this chapter.
  - (c) Plans, specifications and engineer's reports must comply with the following:
    - (1) The drawings, specifications and engineer's report shall be prepared by or under the supervision of a professional engineer registered to practice in this Commonwealth or in the state in which the public water system is located.
    - (2) The front cover or flyleaf of each set of drawings, of each copy of the engineer's report, and of each copy of specifications must bear the signature and imprint of the seal of the registered engineer. Drawings must bear an imprint or a legible facsimile of the seal.

**§ 109.1307. System management responsibilities.**

- (a) *Reporting.* Groundwater systems shall comply with the following requirements and otherwise comply with § 109.701 (relating to reporting and recordkeeping):
  - (1) A groundwater system conducting compliance monitoring under § 109.1305 (relating to compliance monitoring):
    - (i) Shall report to the Department, for each entry point or other Department-approved monitoring location:
      - (A) The date, time and lowest value each day the residual disinfectant concentration remains equal to or greater than the Department-required minimum value established under § 109.1306 (relating to information describing 4-log treatment and compliance monitoring).
      - (B) The initial date, time and value for each occurrence that the residual disinfectant concentration is less than the Department-required minimum, and the subsequent

date, time and value that the residual disinfectant concentration is equal to or greater than the required minimum.

- (C) Each date the entry point is not in operation.
  - (ii) That experiences a breakdown in treatment shall notify the Department within 1 hour after the water system learns of the violation or the situation and provide public notice in accordance with § 109.408 (relating to Tier 1 public notice—categories, timing and delivery). A breakdown in treatment occurs whenever the system fails to meet, for greater than 4 continuous hours, any Department-specified requirements relating to:
    - (A) Minimum residual disinfectant concentration.
    - (B) Alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within 4 hours.
  - (2) After completing any corrective action under § 109.1302(c) (relating to treatment technique requirements), a groundwater system shall notify the Department within 30 days of completion of the corrective action.
    - (b) *Recordkeeping.* Groundwater systems shall comply with § 109.701 and maintain the following information in its records:
      - (1) *Corrective actions.* Documentation shall be kept for at least 10 years.
      - (2) *Notice to the public as required under Subchapter D (relating to public notification).* Documentation shall be kept for at least 3 years.
      - (3) *Records of invalidation of E. coli-positive groundwater source samples under §§ 109.1303 (g) and 109.1304 (b).* Documentation shall be kept for at least 5 years.
      - (4) *Records of notification to other public water systems.* For a public water system obtaining groundwater from another public water system, documentation of notification to the supplier of total-coliform positive samples that are not invalidated under § 109.301(3)(iii) (relating to general monitoring requirements). Documentation shall be kept for at least 5 years.
      - (5) *Compliance monitoring.* For systems, including suppliers providing water to another public water system, that are required to perform compliance monitoring under § 109.1305 (relating to compliance monitoring):
        - (i) Documentation of the records of the Department-specified minimum disinfectant residual shall be kept for at least 10 years.
        - (ii) Documentation of the records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the Department-prescribed minimum residual disinfectant concentration for more than 4 hours, shall be kept for at least 5 years.
        - (iii) Documentation of the records of the Department-specified compliance requirements specified by the Department for Department-approved alternative treatment and records of the date and duration of any failure to meet alternative treatment operating requirements for more than 4 hours, shall be kept for at least 5 years.



**Appendix A to Subchapter L. Long-Term 2 Enhanced Surface Water Treatment Rule.**  
**Table 1. CT VALUES (MG•MIN/L) FOR *Cryptosporidium* INACTIVATION BY CHLORINE DIOXIDE<sup>1</sup>**

Log Credit	Water Temperature, ° C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25 .....	159	153	140	128	107	90	69	45	29	19	12
(ii) 0.5 .....	319	305	279	256	214	180	138	89	58	38	24
(iii) 1.0 .....	637	610	558	511	429	360	277	179	116	75	49
(iv) 1.5 .....	956	915	838	767	643	539	415	268	174	113	73
(v) 2.0 .....	1275	1220	1117	1023	858	719	553	357	232	150	98
(vi) 2.5 .....	1594	1525	1396	1278	1072	899	691	447	289	188	122
(vii) 3.0 .....	1912	1830	1675	1534	1286	1079	830	536	347	226	147

<sup>1</sup> Systems may use the equation to determine log credit between the indicated values:  $\text{Log credit} = (0.001506 \times (1.09116)^{\text{Temp}}) \times \text{CT}$ .

**Table 2. CT VALUES (MG•MIN/L) FOR *Cryptosporidium* INACTIVATION BY OZONE<sup>1</sup>**

Log Credit	Water Temperature, ° C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25 .....	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
(ii) 0.5 .....	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
(iii) 1.0 .....	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
(iv) 1.5 .....	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
(v) 2.0 .....	48	46	42	38	32	26	20	12	7.8	4.9	3.1
(vi) 2.5 .....	60	58	52	48	40	33	25	16	9.8	6.2	3.9
(vii) 3.0 .....	72	69	63	57	47	39	30	19	12	7.4	4.7

<sup>1</sup> Systems may use the equation to determine log credit between the indicated values:  $\text{Log credit} = (0.0397 \times (1.09757)^{\text{Temp}}) \times \text{CT}$ .

**Table 3. UV DOSE TABLE FOR *Cryptosporidium*, *Giardia lamblia*, AND VIRUS INACTIVATION CREDIT**

Log Credit	<i>Cryptosporidium</i> UV dose (mJ/cm <sup>2</sup> )	<i>Giardia lamblia</i> UV dose (mJ/cm <sup>2</sup> )	Virus UV dose (mJ/cm <sup>2</sup> )
(i) 0.5 .....	1.6	1.5	39
(ii) 1.0 .....	2.5	2.1	58
(iii) 1.5 .....	3.9	3.0	79
(iv) 2.0 .....	5.8	5.2	100
(v) 2.5 .....	8.5	7.7	121
(vi) 3.0 .....	12	11	143
(vii) 3.5 .....	15	15	163
(viii) 4.0 .....	22	22	186

Appendix B to Subchapter L. Long-Term 2 Enhanced Surface Water Treatment Rule.

MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA

<i>Toolbox Option</i>	<i>Cryptosporidium treatment credit with design and implementation criteria</i>
<b>Source Protection and Management Toolbox Options</b>	
(1) Watershed control program . . . . .	0.5-log credit for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in § 109.1204(b).
(2) Alternative source/intake management . . . . .	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in § 109.1204(c).
<b>Pre Filtration Toolbox Options</b>	
(3) Presedimentation basin with coagulation . . . . .	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative State-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in § 109.1204(d).
(4) Two-stage lime softening . . . . .	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in § 109.1204(e).
(5) Bank filtration . . . . .	0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in § 109.1204(f).
<b>Treatment Performance Toolbox Options</b>	
(6) Combined filter performance . . . . .	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in § 109.1204(g).
(7) Individual filter performance . . . . .	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in § 109.1204(h).
(8) Demonstration of performance . . . . .	Credit awarded to unit process or treatment train based on a demonstration to the State with a State-approved protocol. Specific criteria are in § 109.1204(i).
<b>Additional Filtration Toolbox Options</b>	
(9) Bag or cartridge filters (individual filters) . . . . .	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in § 109.1204(j).
(10) Bag or cartridge filters (in series) . . . . .	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in § 109.1204(j).
(11) Membrane filtration . . . . .	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in § 109.1204(k).
(12) Second stage filtration . . . . .	0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in § 109.1204(l).
(13) Slow sand filters . . . . .	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in § 109.1204(m).

<i>Toolbox Option</i>	<i>Cryptosporidium treatment credit with design and implementation criteria</i>
<b>Inactivation Toolbox Options</b>	
(14) Chlorine dioxide . . . . .	Log credit based on measured CT in relation to CT table. Specific criteria in § 109.1204(o).
(15) Ozone . . . . .	Log credit based on measured CT in relation to CT table. Specific criteria in § 109.1204(p).
(16) UV . . . . .	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria in § 109.1204(q).

**Appendix C to Subchapter L. Long-Term 2 Enhanced Surface Water Treatment Rule.**

**MICROBIAL TOOLBOX REPORTING REQUIREMENTS**

<i>Toolbox option</i>	<i>Systems must submit the following information</i>	<i>On the following schedule</i>
(1) Watershed control program (WCP).	(i) Notice of intention to develop a new or continue an existing watershed control program. (ii) Watershed control plan . . . . . (iii) Annual watershed control program status report . . . . . (iv) Watershed sanitary survey report . . . . .	No later than two years before the applicable treatment compliance date in § 109.1203  No later than one year before the applicable treatment compliance date in § 109.1203 Every 12 months, beginning one year after the applicable treatment compliance date in § 109.1203  For community water systems, every three years beginning three years after the applicable treatment compliance date in § 109.1203. For noncommunity water systems, every five years beginning five years after the applicable treatment compliance date in § 109.1203.
(2) Alternative source/intake management.	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results.	No later than the applicable treatment compliance date in § 109.1203.
(3) Presedimentation . . . . .	Monthly verification of the following: (i) Continuous basin operation (ii) Treatment of 100% of the flow (iii) Continuous addition of a coagulant (iv) At least 0.5-log mean reduction of influent turbidity or compliance with alternative State-approved performance criteria.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(4) Two-stage lime softening	Monthly verification of the following: (i) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration (ii) Both stages treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(5) Bank filtration . . . . .	(i) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit). (ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause.	No later than the applicable treatment compliance date in § 109.1203.  Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(6) Combined filter performance.	Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(7) Individual filter performance.	Monthly verification of the following: (i) Individual filter effluent (IFE ) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter (ii) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.

<i>Toolbox option</i>	<i>Systems must submit the following information</i>	<i>On the following schedule</i>
(8) Demonstration of performance.	(i) Results from testing following a State approved protocol.	No later than the applicable treatment compliance date in § 109.1203.
(9) Bag filters and cartridge filters.	(ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(10) Membrane filtration .	(i) Demonstration that the following criteria are met: (A) Process meets the definition of bag or cartridge filtration; (B) Removal efficiency established through challenge testing that meets criteria in this subpart.	No later than the applicable treatment compliance date in § 109.1203.
(11) Second stage filtration . . . . .	(ii) Monthly verification that 100% of plant flow was filtered.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(12) Slow sand filtration (as secondary filter).	(i) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this subpart; (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline.	No later than the applicable treatment compliance date in § 109.1203.
(13) Chlorine dioxide . . . . .	(ii) Monthly report summarizing the following: (A) All direct integrity tests above the control limit; (B) If applicable, any turbidity or alternative state-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(14) Ozone . . . . .	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(15) UV . . . . .	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from subpart H sources.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(16) UV . . . . .	Summary of CT values for each day as described in § 141.720.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(17) UV . . . . .	Summary of CT values for each day as described in § 141.720.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(18) UV . . . . .	(i) Validation test results demonstrating operating conditions that achieve required UV dose.	No later than the applicable treatment compliance date in § 109.1203.
(19) UV . . . . .	(ii) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in 141.720(d).	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.

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