

# Regulatory Analysis Form

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(1) Agency  
Department of Environmental Protection

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INDEPENDENT REGULATORY  
REVIEW COMMISSION

(2) I.D. Number (Governor's Office Use)

#7-426

IRRC Number:

27305

(3) Short Title

Long Term 2 Enhanced Surface Water Treatment Rule (LT2)

(4) PA Code Cite

25 Pa. Code, Chapter 109

(5) Agency Contacts & Telephone Numbers

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(6) Type of Rulemaking (Check One)

- Proposed Rulemaking  
 Final Order Adopting Regulation  
 Final Order, Proposed Rulemaking Omitted

(7) Is a 120-Day Emergency Certification Attached?

- No  
 Yes: By the Attorney General  
 Yes: By the Governor

(8) Briefly explain the regulation in clear and nontechnical language.

**Purpose:**

The purpose of the proposed rulemaking package is to amend the Department's Safe Drinking Water regulations to further protect public health against Cryptosporidium and other microbial pathogens in drinking water. These amendments will supplement existing microbial treatment regulations and targets PWSs with higher potential risk from Cryptosporidium. Cryptosporidium is a particular concern because it is highly resistant to chlorine and has been identified as the cause of a number of waterborne disease outbreaks in the United States. EPA has concluded that existing treatment requirements do not provide adequate public health protection in filtered PWSs with the highest source water Cryptosporidium levels. Consequently, these amendments will require PWSs to monitor their source water to determine an average Cryptosporidium level that will be used to establish the degree of additional Cryptosporidium treatment, if any, the filtered PWS must provide. Additional Cryptosporidium treatment must be achieved by using one or more treatment or control processes from a microbial toolbox of options, and systems must report that these toolbox options are adequately maintained.

**Applicability:**

These draft proposed amendments apply to public water systems (PWSs) supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface

water. Approximately 355 PWSs, serving about 8.4 million citizens will be impacted by the proposed amendments. Compliance dates will be determined following four schedules based on population served by the PWS.

***Source Water Monitoring Requirements:***

These amendments require applicable public water systems to monitor their source water (the influent water entering the treatment plant) to determine an average Cryptosporidium level. More specifically, schedule 1-3 systems must monitor for Cryptosporidium, E.coli, and turbidity at least once per month for 24 consecutive months. Schedule 4 systems must initially monitor just for E.coli for one as a screening analysis and are required to monitor for Cryptosporidium only if their E. coli levels exceed specified "trigger" values. Schedule 4 PWS's that exceed the E. coli trigger must monitor for Cryptosporidium for either 12 consecutive months (2 samples per month) or 24 consecutive months (one sample per month).

***Bin Classification and Treatment Technique Requirements:***

Applicable PWSs will be classified in one of four treatment categories (or "bins") based on the results of the source water Cryptosporidium monitoring described in the previous section. The higher the Cryptosporidium oocyst 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, all of which remain in effect under this amendment. 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 1.0-log to 2.5-log of treatment (90-99.7 percent reduction) for Cryptosporidium over and above that provided by existing conventional treatment. Ultimately, this additional treatment establishes a new treatment technique requirement for filter plants whose source water is bin 2 or greater.

***Requirements for Microbial Toolbox Components:***

Filtered PWSs must meet the additional Cryptosporidium treatment required in Bins 2, 3, or 4 by using treatment or control processes from a "microbial toolbox of options. The microbial toolbox provides feasible treatment options specifically targeted at Cryptosporidium and establishes operational and design standards for each option. The toolbox options include standards for Cryptosporidium inactivation and removal processes, which were researched and developed by EPA and are published for the first time in this proposed regulation. More specifically, standards for Cryptosporidium inactivation by ozone, chlorine dioxide, and UV light are established. Standards established for processes that physically remove Cryptosporidium contamination include membranes, bag filters, cartridge filters, pre-sedimentation basins, and riverbank filtration. The development of these standards overcomes an existing significant limitation by providing specific strategies to comply with additional Cryptosporidium treatment.

***Reporting and Record Keeping Requirements:***

PWSs impacted by these proposed amendments must report source water monitoring results and bin determination. PWSs which fall into Bin 2, 3, or 4 must report which toolbox options are used to meet these requirements. Additionally these systems must report monthly that the selected toolbox options are being adequately maintained within specified operating standards.

(9) State the statutory authority for the regulation and any relevant state or federal court decisions.

The Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.4(a), and sections 1917-A and 1920-A of the

Administrative Code of 1929, 71 P.S. §§ 510-17 and 510-20(b).

(10) Is the regulation mandated by any federal or state law or court order, or federal regulation? If yes, cite the specific law, case or regulation, and any deadlines for action.

Yes.

Section 1413 of the Federal Safe Drinking Water Act, 42 U.S.C. § 300g-2a, requires that, in order for the state to retain primary enforcement authority (primacy), the state must adopt drinking water regulations that are "no less stringent than" the national primary drinking water regulations. States must adopt regulations no later than two years after the date on which the regulations are promulgated by EPA, or ask EPA for an extension of up to two years. The federal drinking water primacy regulations at 40 CFR § 142.12(a) also require the state to adopt all new and revised national primary drinking water regulations contained in 40 CFR Part 141 in order to retain primary enforcement responsibility. Furthermore, Section 4(a) of the Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.4(a), requires the Environmental Quality Board to adopt maximum contaminant levels and treatment technique requirements no less stringent than those promulgated under the federal act for all contaminants regulated under the national primary and secondary drinking water regulations. Also Section 5(a) of the state act, 35 P.S. § 721.5(a), requires the Department of Environmental Protection (Department) to adopt and implement a public water supply program which includes those program elements necessary to assume state primary enforcement responsibility under the federal act.

EPA promulgated the Federal LT2ESWTR on January 5, 2006. Therefore, Pennsylvania must adopt regulations implementing the federal rule by January 5, 2008. Failure to do so, and without an EPA-granted extension, may result in Pennsylvania losing primacy. The Department has requested and received an extension to January 4, 2010.

(11) Explain the compelling public interest that justifies the regulation. What is the problem it addresses?

These amendments apply to public water systems (PWSs) supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water (GUDI). Approximately 355 PWSs filter surface or GUDI sources to provide drinking water to about 8.4 million commonwealth citizens. Surface and GUDI sources have been shown to contain *Cryptosporidium* and other pathogens which pose a public health risk. *Cryptosporidium* is a particular concern targeted by the LT2 because it is has been identified as the cause of a number of waterborne disease outbreaks in the United States.

EPA has concluded that existing treatment requirements do not provide adequate public health protection in filtered PWSs with the highest source water *Cryptosporidium* levels. The LT2 rule increases public health protection from *Cryptosporidium* by establishing a method to identify and adequately treat surface and GUDI sources with elevated levels of *Cryptosporidium*.

(12) State the public health, safety, environmental or general welfare risks associated with non-regulation.

Non regulation of source waters with elevated *Cryptosporidium* levels increases the potential that Commonwealth citizens may develop this waterborne disease. *Cryptosporidium* is a common protozoan in the environment. Sources of *Cryptosporidium* oocysts include agricultural runoff and wastewater discharges. If a water system's treatment processes do not efficiently remove *Cryptosporidium*, oocysts may enter finished water at levels that pose health risks. Unlike other pathogens (disease-causing organisms) such as viruses and bacteria, *Cryptosporidium* oocysts are resistant to inactivation using standard disinfection practices, such as Chlorine. Therefore, the successful control of *Cryptosporidium* is dependent on physical removal processes, such as filtration, utilized by PWSs.

In humans, *Cryptosporidium* may cause a severe gastrointestinal infection, termed cryptosporidiosis, which can last several weeks. Cryptosporidiosis usually causes 7 to 14 days of diarrhea, a low-grade fever, nausea and abdominal cramps in individuals with healthy immune systems. There is currently no therapeutic cure for cryptosporidiosis, but the disease is self-limiting in healthy individuals. It does, however, pose serious health and mortality risks for sensitive subpopulations including children, the elderly, pregnant women, organ transplant recipients and persons with weakened immune systems, almost 20% of the population in the United States.

(13) Describe who will benefit from the regulation. (Quantify the benefits as completely as possible and approximate the number of people who will benefit.)

The LT2 rule will further protect public health against *Cryptosporidium* and other microbial pathogens in drinking water supplied to approximately 8.4 million commonwealth citizens and thousands of out of state visitors.

These amendments will supplement existing microbial treatment regulations and targets PWSs with higher potential risk from *Cryptosporidium*. *Cryptosporidium* is a particular concern because it is highly resistant to chlorine and has been identified as the cause of a number of waterborne disease outbreaks in the United States. EPA has concluded that existing treatment requirements do not provided adequate public health protection in filtered PWSs with the highest source water *Cryptosporidium* levels. Consequently, these amendments will require PWSs to monitor their source water to determine an average *Cryptosporidium* level that will be used to establish the degree of additional treatment, if any, the filtered PWS must provide.

Additional *Cryptosporidium* treatment is expected to result in a reduced rate of *Cryptosporidium*-related illnesses and death. EPA estimates that after full implementation of the LT2 rule, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually.

Furthermore, EPA estimates the annual present value of the mean benefit of LT2 rule implementation ranges from \$177 million to \$2.8 billion, depending on the rate of *Cryptosporidium* occurrence.

Projecting the distribution of illnesses and deaths from *Cryptosporidium* within the state of PA is extremely difficult; however, the best available potential estimate would be a \$4.48 million to \$70.84 million annual benefit depending on the rate of *Cryptosporidium* occurrence.

(14) Describe who will be adversely affected by the regulation. (Quantify the adverse effect as completely as possible and approximate the number of people who will be adversely affected.)

No adverse effects are anticipated with these amendments, but rather their implementation will result in increased protection of public health.

(15) List the persons, groups or entities that will be required to comply with the regulation. (Approximate the number of people who will be required to comply.)

These amendments apply to public water systems (PWSs) supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water (GUDI). Approximately 355 PWSs filter surface or GUDI sources to provide drinking water to about 8.4 million commonwealth citizens.

(16) Describe the communications with and input from the public in the development and drafting of the regulation. List the persons and/or groups who were involved, if applicable.

The Draft Proposed LT2 amendments were presented to the Small Systems Technical Assistance Center Advisory Board (TAC Board) on November 13, 2007. On December 12, 2007 a supporting letter with comments was provided. Following the public comment period on the proposed regulations, another briefing will occur at a future TAC meeting.

(17) Provide a specific estimate of the costs and/or savings to the regulated community associated with compliance, including any legal, accounting or consulting procedures which may be required.

According to EPA, the overall mean annualized LT2 cost impacts to PWSs are estimated to range from approximately \$93 to \$133 million. This range in mean cost estimates is associated with the different *Cryptosporidium* occurrence data sets.

More specifically, PWSs will incur monitoring costs to assess source water *Cryptosporidium* levels, though monitoring requirements vary by PWS size (large vs. small). Estimates of laboratory fees, shipping costs, labor hours for sample collection, and hours for reporting results were used to predict PWS costs for initial source water monitoring under the LT2ESWTR. National monitoring costs for initial monitoring range from \$45 million to \$59 million depending on the occurrence data set and discount rate. In PA, monitoring cost estimates range from \$2.14 million to \$4.46 million for the initial round of monitoring.

All PWSs that conducted initial monitoring were assumed to conduct the second round of monitoring, except for those PWSs that installed treatment that achieves a total of 5.5-log or greater treatment for *Cryptosporidium* as a result of the rule. These PWSs are exempt from monitoring under the LT2ESWTR. EPA estimates that the cost of the second round of source water monitoring will range from \$21 million to \$36 million, depending on the occurrence data set and discount rate used in the estimate. In PA, this translates to approximately \$2.14 million to \$4.46 million cost for the second round of monitoring.

Some PWSs (10% estimate) will incur costs for additional Cryptosporidium treatment, where required. EPA was unable to provide specific cost estimates for additional treatment, due to the variety of options available. In PA, it is estimated that 35 systems may need to provide additional treatment. It is expected that most of these systems will take advantage of the option of optimizing filter plant turbidity to 0.15 NTU (50% lower than current regulatory requirements). Due to ongoing optimization assistance efforts, PA filter plants are well positioned to meet these lower requirements. Optimizing filter plant turbidities is an operational technique, much less costly than installation of additional treatment.

Savings are measured in the fact that additional Cryptosporidium treatment is expected to result in a reduced rate of Cryptosporidium-related illnesses and death. EPA estimates that after full implementation of the LT2 rule, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually. Furthermore, EPA estimates the annual present value of the mean benefit of LT2 rule implementation ranges from \$177 million to \$2.8 billion, depending on the rate of Cryptosporidium occurrence. Projecting the distribution of illnesses and deaths from Cryptosporidium within the state of PA is extremely difficult; however, the best available potential estimate would be a \$4.48 million to \$70.84 million annual benefit depending on the rate of Cryptosporidium occurrence.

(18) Provide a specific estimate of the costs and/or savings to local governments associated with compliance, including any legal, accounting or consulting procedures which may be required.

Maximum cost to Pennsylvania systems that are local government / authorities is estimated to be \$2,187,185.

Savings are measured in the fact that additional Cryptosporidium treatment is expected to result in a reduced rate of Cryptosporidium-related illnesses and death. EPA estimates that after full implementation of the LT2 rule, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually. Furthermore, EPA estimates the annual present value of the mean benefit of LT2 rule implementation ranges from \$177 million to \$2.8 billion, depending on the rate of Cryptosporidium occurrence. Projecting the distribution of illnesses and deaths from Cryptosporidium within the state of PA is extremely difficult; however, the best available potential estimate would be a \$4.48 million to \$70.84 million annual benefit depending on the rate of Cryptosporidium occurrence.

(19) Provide a specific estimate of the costs and/or savings to state government associated with the implementation of the regulation, including any legal, accounting or consulting procedures which may be required.

EPA estimates that States (including primacy agencies) will incur an annualized cost of \$1.1 to 1.4 million. In PA, this translates to \$27,830 to \$35,420.

Savings are measured in the fact that additional Cryptosporidium treatment is expected to result in a reduced rate of Cryptosporidium-related illnesses and death. EPA estimates that after full implementation of the LT2 rule, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually. Furthermore, EPA estimates the annual present value of the

mean benefit of LT2 rule implementation ranges from \$177 million to \$2.8 billion, depending on the rate of Cryptosporidium occurrence. Projecting the distribution of illnesses and deaths from Cryptosporidium within the state of PA is extremely difficult; however, the best available potential estimate would be a \$4.48 million to \$70.84 million annual benefit depending on the rate of Cryptosporidium occurrence.

(20) In the table below, provide an estimate of the fiscal savings and cost associated with implementation and compliance for the regulated community, local government, and state government for the current year and five subsequent years.

	Current FY Year	FY +1 Year	FY +2 Year	FY +3 Year	FY +4 Year	FY +5 Year
<b>SAVINGS:</b>	\$	\$	\$	\$	\$	\$
<b>Regulated Community</b>	0	0	0	0	0	0
<b>Local Government</b>	0	0	0	0	0	0
<b>State Government</b>	0	0	0	0	0	0
<b>Total Savings</b>	0	0	0	0	0	0
<b>COSTS:</b>						
<b>Regulated Community</b>	3,364,900	3,364,900	3,364,900	3,364,900	3,364,900	3,364,900
<b>Local Government</b>	*	*	*	*	*	*
<b>State Government</b>	35,420	35,420	35,420	35,420	35,420	35,420
<b>Total Costs</b>	3,400,320	3,400,320	3,400,320	3,400,320	3,400,320	3,400,320
<b>REVENUE LOSSES:</b>						
<b>Regulated Community</b>	0	0	0	0	0	0
<b>Local Government</b>	0	0	0	0	0	0
<b>State Government</b>	0	0	0	0	0	0
<b>Total Revenue Losses</b>	0	0	0	0	0	0

(20a) Explain how the cost estimates listed above were derived.

These cost estimates reflect *maximum* values derived from EPA's national estimates as published in the preamble of the LT2ESWTR (Federal Register, Vol. 71, No. 3, page 730 to 740). The EPA used estimates based on approximately 14,006 systems nationwide using surface or GUDI sources. Pennsylvania has approximately 354 treatment plants in this category.

Estimated Annual Costs to Regulated Community

The ratio of PA to nationwide is  $354/14,006 = 0.0253$

*Maximum* nationwide cost for regulated community to implement LT2ESWTR = \$133,000,000

*Maximum* cost to Pennsylvania systems:  $\$133,000,000 \times 0.0253 = \$3,364,900$

Estimated percentage of Pennsylvania systems that are “local government” municipalities and authorities = 65% (230 out of 354 plants, estimate obtained from the Safe Drinking Water Program’s PADWIS data system)

*Maximum* cost to Pennsylvania systems that are local government / authorities:  $\$3,364,900 \times 0.65 = \$2,187,185$

*Maximum* cost to Pennsylvania systems that are not local government:  $\$3,364,900 - \$2,187,185 = \$1,177,715$

Estimated Annual Costs to Local Government

\*Included in Regulated Community analysis. Otherwise, no additional costs to local governments anticipated.

Estimated Annual Costs to State Government

*Maximum* nationwide cost to States to implement LT2ESWTR =  $\$1,400,000$

*Maximum* DEP cost to implement the amendments =  $\$1,400,000 \times 0.0253 = \$35,420$

(20b) Provide the past three year expenditure history for programs affected by the regulation.

<b>Program</b>	<b>FY-3</b>	<b>FY-2</b>	<b>FY-1</b>	<b>Current FY</b>
Environmental Protection Operations (#160-10381)	\$85,898,000	\$87,897,000	\$89,847,000	\$98,582,000
Environmental Program Management (#161-10382)	\$37,594,000	\$37,049,000	\$36,868,000	\$39,909,000

(21) Using the cost-benefit information provided above, explain how the benefits of the regulation outweigh the adverse effects and costs.

The benefits of this regulation are measured in the fact that additional Cryptosporidium treatment is expected to result in a reduced rate of Cryptosporidium-related illnesses and death. EPA estimates that after full implementation of the LT2 rule, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually. Furthermore, EPA estimates the annual present value of the mean benefit of LT2 rule implementation ranges from \$177 million to \$2.8 billion, depending on the rate of Cryptosporidium occurrence.

Projecting the distribution of illnesses and deaths from Cryptosporidium within the state of PA is extremely difficult; however, the best available potential estimate would be a \$4.48 million to \$70.84 million annual benefit depending on the rate of Cryptosporidium occurrence.

(These cost estimates are derived from EPA’s national estimates as published in the preamble of the LT2ESWTR (Federal Register, Vol. 71, No. 3, page 730 to 740).

(22) Describe the nonregulatory alternatives considered and the costs associated with those alternatives. Provide the reasons for their dismissal.

Non-regulatory alternatives were not considered. These amendments reflect Federal rules that must be complied with or adopted by the individual states.

(23) Describe alternative regulatory schemes considered and the costs associated with those schemes. Provide the reasons for their dismissal.

Non-regulatory alternatives were not considered. These amendments reflect Federal rules that must be complied with or adopted by the individual states.

(24) Are there any provisions that are more stringent than federal standards? If yes, identify the specific provisions and the compelling Pennsylvania interest that demands stronger regulation.

The proposed amendments are based on federal Long Term 2 Enhanced Surface Water Treatment Rule requirements. The majority of the amendments directly reflect and are no more stringent than federal regulatory language. Specific differences, including more stringent language will be outlined below.

§ 109.1202(a)(5) For filtered systems serving fewer than 10,000 people, the Department may approve monitoring for an indicator other than E. coli under paragraph (a)(3) . The Department also may approve an alternative to the E. coli concentration in subparagraph (a)(4)(i), (ii) or (iv) to trigger Cryptosporidium monitoring. The Department added the following language *“This approval by the Department would be based on EPA-supported research indicating the validity of an alternative to E. coli.”*

The italicized language is necessary because the decision to approve an alternative to E.coli should be based on substantial national research.

§ 109.1202(f)(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.*

§ 109.1202(p) Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, shall collect samples as specified in paragraph (e)(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 § 109.1202(f) (relating to new sources) will apply.*

*Systems may begin monitoring a new source as soon as a sampling schedule and plan has been approved by the Department.*

Additional italicized language was added to the above sections (p) and (f) to clarify the meaning of “new sources”. This language was created in response to ongoing confusion from systems already conducting the sampling on their sources and comments from the TAC board. This addition was necessary because EPA failed to address the issue of exactly what a “new source” was, creating the potential for confusion and lack of necessary monitoring on numerous sources. More importantly EPA failed to address how multiple sources, not utilized during the initial round of sampling, would be dealt with. EPA assumed systems would only utilize one source. The vast majority of PA’s filter plants have more than one source. The Department has chosen to designate any sources not evaluated during the initial round of sampling as a new source. This enables PA to establish a reasonable schedule for the monitoring of these sources, allowing systems time to budget for and conduct the monitoring. This approach also assures public health is adequately protected and unmonitored sources are not utilized without proper treatment. Language in this section was created to fill a void in Federal language, it does not specifically alter existing federal language in a more stringent fashion. In developing this language, the Department worked with the Association of State Drinking Water Administrators (ASDWA) to setup national conference calls with other state regulatory agencies. The Department’s approach is consistent with the national consensus approach, presented to EPA Head Quarters via an ASDWA memo.

§109.1203(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 § 109.1203 (a)-(c) and according to the schedule in § 109.1203(k)-(o). (1) *If the system bin classification is bin 1 and the system is in full compliance with applicable treatment technique requirements under § 109.202(c), the system shall provide additional Cryptosporidium treatment requirements as follows:*

The above italicized language was added for all system types in 109.1203 (e). The Department felt it was necessary to clarify the intent of the federal regulation – provide additional treatment beyond that already required. Incorporating a Chapter 109-specific reference to existing regulatory requirements should help prevent confusion on the part of the regulated community.

§ 109.1203 (m)(5) *On a case by case basis within an agreed upon timeframe, the Departments may allow up to an additional 2 years for complying with the treatment requirement for systems making capital improvements.*

The above italicized language was added based on comments from the TAC board that this would help provide clarification and prevent confusion.

Throughout the federal LT2 rule, specific language was incorporated to provide a compliance approach for unfiltered systems. As per existing Chapter 109 requirements, PA does not allow unfiltered systems. However, a small number of systems have sources which were thought to be ground water; therefore, these sources had been used in an unfiltered status. It was recently determined that some of these well sources are actually under the influence of surface water or GUDI. Unfiltered language was incorporated into the state LT2 regulation to address these sources. However, the unfiltered source testing requirements and bin determination are essentially identical to the filtered source testing requirements. This language is more stringent than federal language; but, necessary in order to be

consistent with existing Chapter 109 language. Most importantly, it is necessary to assure that public health and safety is adequately protected by the addition of proper filtration on unfiltered surface and GUDI sources.

§ 109.1204 (b) Watershed control program. Systems receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements. *This credit may not be used to maintain the additional log removal credits specified in § 109.1203 (relating to bin classification and treatment technique requirements). 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.*

The above italicized text is more stringent than federal language. It is necessary to avoid imposition of treatment technique violations upon water systems due to events which they have no control over. The watershed control program (WCP) option is different than other toolbox options in that it relates to efforts undertaken outside of the filter plant operations to reduce *Cryptosporidium* loading entering the filter plant. Additionally, this option focuses on source water protection, as opposed to in-plant treatment and monthly reporting. The Department anticipates that in a scenario where a spill or other contamination of the source water was to occur upstream of the filter plant intake, the WCP credit could be revoked. If systems rely on this credit to maintain the minimum *Cryptosporidium* log removal credit, a treatment technique violation would be incurred by the water system through no action of their own. The italicized language allows systems to pursue this valuable toolbox option, while preventing situations where systems rely on this option to maintain a monthly treatment technique; avoiding the previously mentioned scenario. The Department anticipates that systems will wish to pursue additional log removal treatment beyond the minimum required by their bin classification (bin 2 and greater). It would be wise for systems to do this in order to provide a margin of safety regarding the removal of *Cryptosporidium*. The italicized language is consistent with this thinking.

§ 109.1204 (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 Subpart L, by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subsection (n).

*(1) The Department may approve alternative chlorine dioxide CT values to those listed in subsection (o) on a site-specific basis.*

*(2) The Department will base this approval on a site-specific study a system conducts that follows a Department-approved protocol.*

The Department chose to remove the above italicized text from the regulation. The CT values published in the federal regulation are based on extensive research and are the minimum dosages necessary to assure proper operation of this treatment process. In order to assure consistent application of this technology on a level that is protective of public health and safety, the Department felt it was best to remove the text allowing site-specific deviations.

§ 109.1204 (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 Subpart L, by meeting the corresponding ozone CT values for the applicable water temperature, as described in subsection (n).

*(1) The Department may approve alternative Ozone CT values to those listed in subsection (p) on a site-specific basis.*

*(2) The Department will base this approval on a site-specific study a system conducts that follows a Department-approved protocol.*

The Department chose to remove the above italicized text from the regulation. The CT values published in the federal regulation are based on extensive research and are the minimum dosages necessary to assure proper operation of this treatment process. In order to assure consistent application of this technology on a level that is protective of public health and safety, the Department felt it was best to remove the text allowing site-specific deviations.

*§ 109.1204 q(2)iii The Department may accept alternative validation testing approaches, if these approaches are first approved by EPA.*

The Department chose to add the above italicized text in order to assure adequate research is conducted on a particular UV treatment unit prior to validation and approval. This is necessary to assure proper operation of this treatment process and national standards are consistently upheld. In order to assure consistent application of this technology on a level that is protective of public health and safety, the Department felt it was best to work closely with EPA and other state regulators to develop alternative validation testing approaches. This should help prevent systems from incurring additional costs necessary to validate an already properly-validated treatment unit.

*§ 109.1205 (i) Microbial toolbox reporting requirements, established by the EPA under the National Primary Drinking Water regulations in 40 CFR 141.721(f) are incorporated by reference except as otherwise established by this chapter. Systems are required to report items specified § 109.1204 for all toolbox components for which they are requesting treatment credit, as outlined in appendix to subpart L. Alternatively, the State may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.*

The Department deleted the italicized text because it is contradictory to other LT2 regulatory language, which outlines detailed reporting requirements; and the overall intent of the regulation, to assure increased treatment is maintained on sources with elevated Cryptosporidium. It is critical that systems using sources with elevated Cryptosporidium levels, adequately and vigilantly maintain this additional treatment. In order to assure adequate protection of public health and safety, monthly reporting is necessary. EPA has established no other mechanism to assure proper operation without such reporting. Therefore, this alternative would result in state and national inconsistencies regarding treatment requirements. Systems required to conduct this reporting, would be doing such to assure compliance with a more stringent treatment technique for the removal of Cryptosporidium, shown to be an acute public health risk. Monthly reporting for treatment technique compliance has always been the minimum requirement for previous treatment techniques. Therefore, it is a reasonable expectation to maintain this requirement as a mechanism to assure adequate Cryptosporidium treatment remains in place.

(25) How does the regulation compare with those of other states? Will the regulation put Pennsylvania at a competitive disadvantage with other states?

The federal LT2ESWTR will need to be either complied with, or adopted, by 49 other states. Because of this, the amendments will not put Pennsylvania at a competitive disadvantage with any other state.

(26) Will the regulation affect existing or proposed regulations of the promulgating agency or other state agencies? If yes, explain and provide specific citations.

The amendments will be incorporated into the existing language of 25 Pa Code Chapter 109. Other than this incorporation, the amendments should not affect any existing or proposed regulations of DEP or any other state agency.

(27) Will any public hearings or informational meetings be scheduled? Please provide the dates, times, and locations, if available.

No public hearings or informational meetings were scheduled for these amendments.

(28) Will the regulation change existing reporting, record keeping, or other paperwork requirements? Describe the changes and attach copies of forms or reports which will be required as a result of implementation, if available.

The amendments will create minor changes in the reporting, record keeping and paperwork requirements. It is anticipated that our current data reporting forms can be modified to facilitate any additional monitoring and reporting and that no additional data or paperwork will be necessary.

(29) Please list any special provisions which have been developed to meet the particular needs of affected groups or persons including, but not limited to, minorities, elderly, small businesses, and farmers.

The amendments should have no effect on one particular group relative to another. The amendments were originally developed to protect everyone and should have no effect on any one particular group. However, the Safe Drinking Water Program is prepared to develop special provisions, or provide special services, to accommodate any such group as the need arises.

(30) What is the anticipated effective date of the regulation; the date by which compliance with the regulation will be required; and the date by which any required permits, licenses or other approvals must be obtained? .

The final Federal LT2ESWTR was published in the Federal Register on January 5, 2006. Working under an EPA approved extension request, Pennsylvania must adopt and implement the requirements of this regulation by January 4, 2010.

(31) Provide the schedule for continual review of the regulation.

The amendments will be reviewed in accordance with the Sunset Review Schedule published by the Department.

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Copy below is hereby approved as to form and legality.  
Attorney General

*Amy M. Elliott*  
By: (Deputy Attorney General)

**NOV 19 2008**

DATE OF APPROVAL

Check if applicable  
Copy not approved. Objections attached.

Copy below is hereby certified to be true and  
correct copy of a document issued, prescribed or  
promulgated by:

DEPARTMENT OF ENVIRONMENTAL  
PROTECTION  
ENVIRONMENTAL QUALITY BOARD

(AGENCY)

DOCUMENT/FISCAL NOTE NO. 7-426

DATE OF ADOPTION August 19, 2008

BY *Joseph R. Powers*

TITLE JOSEPH R. POWERS  
ACTING CHAIRMAN

EXECUTIVE OFFICER CHAIRMAN OR SECRETARY

Copy below is hereby approved as to form and legality  
Executive of Independent Agencies

*Andrew C. Clark*  
BY Andrew C. Clark

**OCT 21 2008**  
DATE OF APPROVAL

(Deputy General Counsel)  
(~~Chief Counsel - Independent Agency~~)  
(Strike inapplicable title)

Check if applicable. No Attorney General Approval  
or objection within 30 days after submission.

**NOTICE OF PROPOSED RULEMAKING**

**DEPARTMENT OF ENVIRONMENTAL PROTECTION  
ENVIRONMENTAL QUALITY BOARD**

**Long Term 2 Enhanced Surface Water Treatment Rule**

**25 Pa. Code, Chapter 109**



**Notice of Proposed Rulemaking**  
**Department of Environmental Protection**  
**Environmental Quality Board**  
**(25 Pa. Code, Chapter 109)**  
**(Safe Drinking Water)**  
**Long Term 2 Enhanced Surface Water Treatment Rule**

**Preamble**

The Environmental Quality Board (Board) proposes to amend 25 *Pa. Code*, Chapter 109 (relating to safe drinking water). The amendments pertain to public water systems (PWSs) supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water. The Long Term 2 Enhanced Surface Water Treatment Rule (LT2) will further protect public health against *Cryptosporidium* and other microbial pathogens in drinking water. These amendments will supplement existing microbial treatment regulations and targets PWSs with higher potential risk from *Cryptosporidium*. *Cryptosporidium* is a particular concern because it is highly resistant to chlorine and has been identified as the cause of a number of waterborne disease outbreaks in the United States. EPA has concluded that existing treatment requirements do not provide adequate public health protection in filtered PWSs with the highest source water *Cryptosporidium* levels. Consequently, these amendments will require PWSs to monitor their source water to determine an average *Cryptosporidium* level that will be used to establish the degree of additional treatment, if any, the filtered PWS must provide. Additional *Cryptosporidium* treatment must be achieved by using one or more treatment or control processes from a microbial toolbox of options, and systems must report that these toolbox options are adequately maintained.

This proposal was adopted by the Board at its meeting of August 19, 2008.

**A. Effective Date**

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

**B. Contact Persons**

For further information contact Barry Greenawald, 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. Information regarding submitting comments on this proposal appears in Section J of this preamble. Persons with a disability may use the AT&T Relay Service by calling 1-800-654-5984 (TDD users) or 1-800-654-5988 (voice users). This proposal is available electronically through the DEP Web site (<http://www.depweb.state.pa.us>).

**C. Statutory Authority**

The proposed 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. §§ 510-7 and 510-20).

#### **D. Background and Purpose**

These proposed amendments apply to public water systems (PWSs) supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water (GUDI). Approximately 355 PWSs filter surface or GUDI sources to provide drinking water to about 8.4 million commonwealth citizens and thousands of visitors. Surface and GUDI sources have been shown to contain *Cryptosporidium* and other pathogens which pose a public health risk. *Cryptosporidium* is a particular concern targeted by the LT2 because it has been identified as the cause of a number of waterborne disease outbreaks in the United States.

*Cryptosporidium* is a common protozoan in the environment. Sources of *Cryptosporidium* oocysts include agricultural runoff and wastewater discharges. If a water system's treatment processes do not efficiently remove *Cryptosporidium*, oocysts may enter finished water at levels that pose health risks. Unlike other pathogens (disease-causing organisms) such as viruses and bacteria, *Cryptosporidium* oocysts are resistant to inactivation using standard disinfection practices, such as Chlorine. Therefore, the successful control of *Cryptosporidium* is dependent on physical removal processes, such as filtration, utilized by PWSs.

In humans, *Cryptosporidium* may cause a severe gastrointestinal infection, termed cryptosporidiosis, which can last several weeks. Cryptosporidiosis usually causes 7 to 14 days of diarrhea, a low-grade fever, nausea and abdominal cramps in individuals with healthy immune systems. There is currently no therapeutic cure for cryptosporidiosis, but the disease is self-limiting in healthy individuals. It does, however, pose serious health and mortality risks for sensitive subpopulations including children, the elderly, pregnant women, organ transplant recipients and persons with weakened immune systems, almost 20% of the population in the United States.

EPA has concluded that existing treatment requirements do not provide adequate public health protection in filtered PWSs with the highest source water *Cryptosporidium* levels. The LT2 rule increases public health protection from *Cryptosporidium* by establishing a method to identify and adequately treat surface and GUDI sources with elevated levels of *Cryptosporidium*. More specifically, the rule requires the following.

PWSs must monitor their source water (the influent water entering the treatment plant) to determine an average *Cryptosporidium* level. More specifically, large systems must monitor for *Cryptosporidium*, E.coli, and turbidity at least once per month for 24 consecutive months. Small systems may initially monitor just for E.coli as a screening analysis and are required to monitor for *Cryptosporidium* only if their E. coli levels exceed specified "trigger" values. Small PWS's that exceed the E. coli trigger will be required to monitor for *Cryptosporidium*.

Applicable PWSs will be classified in one of four treatment categories (or "bins") based on the results of the source water *Cryptosporidium* monitoring described in the previous section. The higher the *Cryptosporidium* oocyst 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, all of which remain in effect under this amendment. 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 1.0-log to 2.5-log of treatment (90-99.7 percent reduction) for Cryptosporidium over and above that provided by existing conventional treatment.

Filtered PWSs must meet the additional Cryptosporidium treatment required in Bins 2, 3, or 4 by using treatment or control processes from a “microbial toolbox of options. The microbial toolbox provides feasible treatment options specifically targeted at Cryptosporidium and establishes operational and design standards for each option. The toolbox options include standards for Cryptosporidium inactivation and removal processes, which were researched and developed by EPA and are published for the first time in this proposed regulation. More specifically, standards for Cryptosporidium inactivation by ozone, chlorine dioxide, and UV light are established. Standards established for processes that physically remove Cryptosporidium contamination include membranes, bag filters, cartridge filters, pre-sedimentation basins, and riverbank filtration. The development of these standards overcomes an existing significant limitation by providing specific strategies to comply with additional Cryptosporidium treatment.

EPA believes that implementation of the LT2 will significantly reduce levels of infectious Cryptosporidium in finished drinking water. In addition, the treatment technique requirements of this regulation will increase protection against other microbial contaminants by improving overall filter plant treatment. Considering that approximately 355 PWSs would be impacted by this regulation, it is in the best interest of this Commonwealth's public health protection and economic development goals to incorporate the LT2 into Chapter 109.

The draft proposed LT2 amendments were presented to the Small Systems Technical Assistance Center Advisory Board (TAC Board) on November 13, 2007. On December 12, 2007, the TAC Board provided a letter supporting the draft proposed regulations, and included written comments. The most noteworthy comments included: upfront clarification of applicability to surface and GUDI, support of additional Department language on EPA research, need to add definition of “bin”, consistent methodology for Challenge testing, value of adding Microbial Toolbox Summary and Reporting Requirements as Appendices to Chapter 109, and acceptance of validation testing requirements. All LT2 specific comments were thoroughly considered and the majority of them were addressed and/or incorporated into the proposed regulations.

#### **E. Summary of Regulatory Requirements**

The proposed amendments are based on federal Long Term 2 Enhanced Surface Water Treatment Rule requirements. The majority of the amendments directly reflect and are no more stringent than federal regulatory language. Specific differences, including more stringent language will be outlined below.

Additions to existing Chapter 109 language follow:

*§ 109.1. Definitions.*

The Department has added definitions for the following terms in 109.1: *Bag filter, Bank filtration, Bin, Cartridge filter, Flowing stream, Lake/reservoir, Membrane filtration, Plant intake, Presedimentation, Significant deficiency, and 2-stage lime softening*. These terms are vital to the clear interpretation of the LT2 and had not been previously defined in Chapter 109.

Additionally, the following text was added to the existing definition of *Conventional filtration*, “*any treatment train that includes coagulation/flocculation, clarification, and granular media filtration is regarded as conventional. The clarification step must be a solid/liquid separation process where accumulated solids are removed during this separate component of the treatment system*.” This text was incorporated because it provides valuable clarification to help ensure consistent statewide implementation and application of the existing definition. This additional text is consistent with EPA language provided in the preamble of the LT2 regulation. Via a memo and verbal discussion, EPA Headquarters indicated this language should be used to clarify any confusion when implementing regulations and applying the Conventional classification.

§ 109.202.

Alerts GUDI sources that they must monitor source water for *Cryptosporidium*.

§ 109.204. *Disinfection profiling and benchmarking.*

Updates an existing incorporation of federal requirements by reference.

§ 109.304. *Analytical requirements.*

Alerts systems that they must use an approved laboratory to analyze *Cryptosporidium* samples.

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

Incorporates federal language regarding required public notification for failure to adequately conduct all necessary source water monitoring.

§ 109.705. *Sanitary surveys.*

Incorporates federal language which outlines the requirements of a system for responding to and correcting significant deficiencies identified in a sanitary survey report.

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

Alerts bottled water and vended water systems to the treatment technique requirements (additional treatment for elevated *Cryptosporidium* source water levels) of the LT2. These would only apply in the rare circumstance where a bottled or vended system utilizes surface or GUDI as a source.

§ 109.1003. *Monitoring requirements.*

Alerts bottled water and vended water systems to the source water monitoring requirements of the LT2. These would only apply in the rare circumstance where a bottled or vended system utilizes surface or GUDI as a source.

New language added to Chapter 109 via Subchapter L. Long Term 2 Enhanced Surface Water Treatment Rule follow:

**§ 109.1201. Scope.**

These proposed amendments apply to public water systems (PWSs) supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water. Approximately 355 PWSs, serving about 8.4 million citizens will be impacted by the proposed amendments. Compliance dates will be determined following four schedules based on population served by the PWS.

Language in this section is identical to federal language.

**§ 109.1202. Monitoring requirements.**

These amendments require applicable public water systems to monitor their source water (the influent water entering the treatment plant) to determine an average Cryptosporidium level. More specifically, schedule 1-3 systems must monitor for Cryptosporidium, E.coli, and turbidity at least once per month for 24 consecutive months. Schedule 4 systems may initially monitor just for E.coli as a screening analysis and are required to monitor for Cryptosporidium only if their E. coli levels exceed specified "trigger" values. Schedule 4 PWS's that exceed the E. coli trigger must monitor for Cryptosporidium for either 12 consecutive months (2 samples per month) or 24 consecutive months (one sample per month). Provisions are included which may allow seasonal sources to conduct less overall monitoring, a total of 12 samples evenly spaced within the season of operation. Sampling start dates are staggered with the largest systems monitoring first and the smallest last. This allows small systems more time to prepare and budget for the sampling. It also helps prevent overwhelming demand on the analytical laboratories.

Language in this section is identical to federal language with the following exceptions, identified by italics:

§ 109.1202(a)(5) For filtered systems serving fewer than 10,000 people, the Department may approve monitoring for an indicator other than E. coli under paragraph (a)(3) . The Department also may approve an alternative to the E. coli concentration in subparagraph (a)(4)(i), (ii) or (iv) to trigger Cryptosporidium monitoring. The Department added the following language "*This approval by the Department would be based on EPA-supported research indicating the validity of an alternative to E. coli.*"

The italicized language is necessary because the decision to approve an alternative to E.coli should be based on substantial national research.

§ 109.1202(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.*

§ 109.1202(p) Multiple sources.

Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, shall collect samples as specified in paragraph (e)(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 § 109.1202(f) (relating to new sources) will apply. Systems may begin monitoring a new source as soon as a sampling schedule and plan has been approved by the Department.*

Additional italicized language was added to the above sections (p) and (f) to clarify the meaning of “new sources”. This language was created in response to ongoing confusion from systems already conducting the sampling on their sources and comments from the TAC board. This addition was necessary because EPA failed to address the issue of exactly what a “new source” was, creating the potential for confusion and lack of necessary monitoring on numerous sources. More importantly EPA failed to address how multiple sources, not utilized during the initial round of sampling, would be dealt with. EPA assumed systems would only utilize one source. The vast majority of Pa’s filter plants have more than one source. The Department has chosen to designate any sources not evaluated during the initial round of sampling as a new source. This enables PA to establish a reasonable schedule for the monitoring of these sources, allowing systems time to budget for and conduct the monitoring. This approach also assures public health is adequately protected and unmonitored sources are not utilized without proper treatment. Language in this section was created to fill a void in Federal language, it does not specifically alter existing federal language in a more stringent fashion. In developing this language, the Department worked with the Association of State Drinking Water Administrators (ASDWA) to setup national conference calls with other state regulatory agencies. The Department’s approach is consistent with the national consensus approach, presented to EPA Head Quarters via an ASDWA memo.

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

Applicable PWSs will be classified in one of four treatment categories (or “bins”) based on the results of the source water Cryptosporidium monitoring described in the previous section. The higher the Cryptosporidium oocyst 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, all of which remain in effect under this amendment. 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 1.0-log to 2.5-log of treatment (90-99.7 percent reduction) for *Cryptosporidium* over and above that provided by existing conventional treatment. Ultimately, this additional treatment establishes a new treatment technique requirement for filter plants whose source water is bin 2 or greater. As with monitoring, Bin determination and compliance dates are staggered with large systems being impacted first and small systems last.

Language in this section is similar to federal language with the following exceptions, identified by italics:

§109.1203(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 § 109.1203 (a)-(c) and according to the schedule in § 109.1203(k)-(o). (1) If the system bin classification is bin 1 *and the system is in full compliance with applicable treatment technique requirements under § 109.202(c)*, the system shall provide additional *Cryptosporidium* treatment requirements as follows:

The above italicized language was added for all system types in 109.1203 (e). The Department felt it was necessary to clarify the intent of the federal regulation – provide additional treatment beyond that already required. Incorporating a Chapter 109-specific reference to existing regulatory requirements should help prevent confusion on the part of the regulated community.

§ 109.1203 (m)(5) *On a case by case basis within an agreed upon timeframe*, the Departments may allow up to an additional 2 years for complying with the treatment requirement for systems making capital improvements.

The above italicized language was added based on comments from the TAC board that this would help provide clarification and prevent confusion.

Throughout the federal LT2 rule, specific language was incorporated to provide a compliance approach for unfiltered systems. As per existing Chapter 109 requirements, PA does not allow unfiltered systems. However, a small number of systems have sources which were thought to be ground water; therefore, these sources had been used in an unfiltered status. It was recently determined that some of these well sources are actually under the influence of surface water or GUDI. Unfiltered language was incorporated into the state LT2 regulation to address these sources. However, the unfiltered source testing requirements and bin determination are essentially identical to the filtered source testing requirements. This language is more stringent than federal language; but, necessary in order to be consistent with existing Chapter 109 language. Most importantly, it is necessary to assure that public health and safety is adequately protected by the addition of proper filtration on unfiltered surface and GUDI sources.

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

Filtered PWSs must meet the additional Cryptosporidium treatment required in Bins 2, 3, or 4 by using treatment or control processes from a “microbial toolbox of options. The microbial toolbox provides feasible treatment options specifically targeted at Cryptosporidium and establishes operational and design standards for each option. The toolbox options include standards for Cryptosporidium inactivation and removal processes, which were researched and developed by EPA and are published for the first time in this proposed regulation. More specifically, standards for Cryptosporidium inactivation by ozone, chlorine dioxide, and UV light are established. Standards established for processes that physically remove Cryptosporidium contamination include membranes, bag filters, cartridge filters, pre-sedimentation basins, and riverbank filtration. The development of these standards overcomes an existing significant limitation by providing specific strategies to comply with additional Cryptosporidium treatment.

Language in this section is identical to federal language with the following exceptions, identified by italics:

*§ 109.1204 (b) Watershed control program. Systems receive 0.5-log Cryptosporidium treatment credit for implementing a watershed control program that meets the requirements. This credit may not be used to maintain the additional log removal credits specified in § 109.1203 (relating to bin classification and treatment technique requirements). 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.*

The above italicized text is more stringent than federal language. It is necessary to avoid imposition of treatment technique violations upon water systems due to events which they have no control over. The watershed control program (WCP) option is different than other toolbox options in that it relates to efforts undertaken outside of the filter plant operations to reduce Cryptosporidium loading entering the filter plant. Additionally, this option focuses on source water protection, as opposed to in-plant treatment and monthly reporting. The Department anticipates that in a scenario where a spill or other contamination of the source water was to occur upstream of the filter plant intake, the WCP credit could be revoked. If systems rely on this credit to maintain the minimum Cryptosporidium log removal credit, a treatment technique violation would be incurred by the water system through no action of their own. The italicized language encourages source water protection and allows systems to pursue this valuable toolbox option, while preventing situations where systems rely on this option to maintain a monthly treatment technique; avoiding the previously mentioned scenario. The Department anticipates that systems will wish to pursue additional log removal treatment beyond the minimum required by their bin classification (bin 2 and greater). It would be wise for systems to do this in order to provide a margin of safety regarding the removal of Cryptosporidium. The italicized language is consistent with this thinking.

***§ 109.1205 Reporting and record keeping requirements.***

PWSs impacted by these proposed amendments must report source water monitoring results and bin determination. PWSs which fall into Bin 2, 3, or 4 must report which toolbox options are used to meet these requirements. Additionally these systems must report monthly that the selected toolbox options are being adequately maintained within specified operating standards.

Language in this section is identical to federal language with the following exceptions, identified by italics:

§ 109.1204 (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 Subpart L, by meeting the corresponding chlorine dioxide CT value for the applicable water temperature, as described in subsection (n).

*(1) The Department may approve alternative chlorine dioxide CT values to those listed in subsection (o) on a site-specific basis.*

*(2) The Department will base this approval on a site-specific study a system conducts that follows a Department-approved protocol.*

The Department chose to remove the above italicized text from the regulation. The CT values published in the federal regulation are based on extensive research and are the minimum dosages necessary to assure proper operation of this treatment process. In order to assure consistent application of this technology on a level that is protective of public health and safety, the Department felt it was best to remove the text allowing site-specific deviations.

§ 109.1204 (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 Subpart L, by meeting the corresponding ozone CT values for the applicable water temperature, as described in subsection (n)

*(1) The Department may approve alternative Ozone CT values to those listed in subsection (p) on a site-specific basis.*

*(2) The Department will base this approval on a site-specific study a system conducts that follows a Department-approved protocol.*

The Department chose to remove the above italicized text from the regulation. The CT values published in the federal regulation are based on extensive research and are the minimum dosages necessary to assure proper operation of this treatment process. In order to assure consistent application of this technology on a level that is protective of public health and safety, the Department felt it was best to remove the text allowing site-specific deviations.

§ 109.1204 (q)(2)iii The Department may accept alternative validation testing approaches, *if these approaches are first approved by EPA.*

The Department chose to add the above italicized text in order to assure adequate research is conducted on a particular UV treatment unit prior to validation and approval. This is necessary to assure proper operation of this treatment process and national standards are consistently upheld. In order to assure consistent application of this technology on a level that is protective of public health and safety, the Department felt it was best to work closely with EPA and other state regulators to develop alternative validation testing approaches. This should help prevent systems from incurring additional costs necessary to validate an already properly-validated treatment unit.

§ 109.1205 (i)

(i) Microbial toolbox reporting requirements. Microbial toolbox reporting requirements, established by the EPA under the National Primary Drinking Water regulations in 40 CFR 141.721(f) are incorporated by reference except as otherwise established by this chapter. Systems are required to report items specified § 109.1204 for all toolbox components for which they are requesting treatment credit, as outlined in appendix to subpart L. *Alternatively, the State may approve a system to certify operation within required parameters for treatment credit rather than reporting monthly operational data for toolbox options.*

The Department deleted the above italicized text because it is contradictory to other LT2 regulatory language, which outlines detailed reporting requirements; and the overall intent of the regulation, to assure increased treatment is maintained on sources with elevated Cryptosporidium. It is critical that systems using sources with elevated Cryptosporidium levels, adequately and vigilantly maintain this additional treatment. In order to assure adequate protection of public health and safety, monthly reporting is necessary. EPA has established no other mechanism to assure proper operation without such reporting. Therefore, this alternative would result in state and national inconsistencies regarding treatment requirements. Systems required to conduct this reporting, would be doing such to assure compliance with a more stringent treatment technique for the removal of Cryptosporidium, shown to be an acute public health risk. Monthly reporting for treatment technique compliance has always been the minimum requirement for previous treatment techniques. Therefore, it is a reasonable expectation to maintain this requirement as a mechanism to assure adequate Cryptosporidium treatment remains in place.

## **F. Benefits, Costs and Compliance**

### **Benefits**

The LT2 rule will further protect public health against Cryptosporidium and other microbial pathogens in drinking water supplied to approximately 8.4 million commonwealth citizens and thousands of out of state visitors. These amendments will supplement existing microbial treatment regulations and targets PWSs with higher potential risk from Cryptosporidium. Cryptosporidium is a particular concern because it is highly resistant to chlorine and has been identified as the cause of a number of waterborne disease outbreaks in the United States. EPA has concluded that existing treatment requirements do not provide adequate public health protection in filtered PWSs with the highest source water Cryptosporidium levels. Consequently, these amendments will require PWSs to monitor their source water to determine an average Cryptosporidium level that will be used to establish the degree of additional treatment, if any, the filtered PWS must provide.

Additional Cryptosporidium treatment is expected to result in a reduced rate of Cryptosporidium-related illnesses and death. EPA estimates that after full implementation of the LT2 rule, on average, the nation is expected to avoid 89,375 to 1,459,126 illnesses and 20 to 314 deaths annually.

Furthermore, EPA estimates the annual present value of the mean benefit of LT2 rule implementation ranges from \$177 million to \$2.8 billion, depending on the rate of Cryptosporidium occurrence.

Projecting the distribution of illnesses and deaths from *Cryptosporidium* within the state of PA is extremely difficult; however, the best available potential estimate would be a \$4.48 million to \$70.84 million annual benefit depending on the rate of *Cryptosporidium* occurrence.

### **Compliance Costs**

The LT2 rule applies to PWSs supplied by surface water source and public water systems supplied by a ground water source under the direct influence of surface water (GUDI). Approximately 355 PWSs treat surface or GUDI sources to ultimately provide drinking water to about 8.4 million commonwealth citizens and thousands of out-of-State visitors. All 355 PWSs will be affected by this rule to varying degrees. According to EPA, the overall mean annualized LT2 cost impacts to PWSs are estimated to range from approximately \$93 to \$133 million. This range in mean cost estimates is associated with the different *Cryptosporidium* occurrence data sets. In PA, this translates to \$2,352,900 to \$3,364,900.

More specifically, PWSs will incur monitoring costs to assess source water *Cryptosporidium* levels, though monitoring requirements vary by PWS size (large vs. small). Source water monitoring costs are structured on a per-plant basis. There are three types of monitoring that plants may be required to conduct turbidity, *E. coli*, and *Cryptosporidium*. Source water turbidity is a common water quality parameter used for plant operational control. Also, to meet Surface Water Treatment Rule (SWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR), and Interim Enhanced Surface Water Treatment Rule (IESWTR) requirements, most PWSs have turbidity analytical equipment in-house and operators are experienced with turbidity measurement. Thus, EPA assumes that the incremental turbidity monitoring burden associated with the LT2 is negligible.

Estimates of laboratory fees, shipping costs, labor hours for sample collection, and hours for reporting results were used to predict PWS costs for initial source water monitoring under the LT2. National monitoring costs for initial monitoring range from \$45 million to \$59 million depending on the occurrence data set and discount rate. In PA, monitoring cost estimates range from \$1.14 million to \$1.49 million.

Filtered plants in small PWSs initially will be required to conduct 1 year of biweekly *E. coli* source water monitoring. These plants will be required to monitor for *Cryptosporidium* if *E. coli* levels exceed 10 *E. coli*/100 mL for lakes and reservoir sources or 50 *E. coli*/100 mL for flowing stream sources. EPA estimated the percent of small plants that would be triggered into *Cryptosporidium* monitoring as being equal to the percent of large plants that would fall into any bin requiring additional treatment. EPA Survey data indicate that approximately 75 to 80 percent of small PWSs will not exceed the *E. coli* trigger values and, consequently, will not be required to monitor for *Cryptosporidium*. *E. coli* (\$25/sample) is far less costly to analyze than *Cryptosporidium* \$500/sample; therefore, this approach will significantly reduce the burden for small PWSs. In Pa, 260 small systems (serve < 10,000 customers) are affected by LT2. If EPA estimates are true, 195 small systems will avoid *cryptosporidium* sampling costs, needing to spend \$650 per system to sample. This equates to a total cost savings 12,000 per small system or \$2.46 million total. Conversely 65 small systems may be required to incur the full sampling cost of \$12,650 per system.

All PWSs that conducted initial monitoring were assumed to conduct the second round of monitoring, except for those PWSs that installed treatment that achieves a total of 5.5-log or

greater treatment for Cryptosporidium as a result of the rule. These PWSs are exempt from monitoring under the LT2. EPA estimates that the cost of the second round of source water monitoring will range from \$21 million to \$36 million, depending on the occurrence data set and discount rate used in the estimate. In PA, this translates to approximately \$531,130 to \$910,800 cost for the second round of monitoring.

Some PWSs (10% estimate) will incur costs for additional Cryptosporidium treatment, where required. EPA was unable to provide specific cost estimates for additional treatment, due to the variety of options available. In PA, it is estimated that 35 systems may need to provide additional treatment. It is expected that most of these systems will take advantage of the option of optimizing filter plant turbidity to 0.15 NTU (50% lower than current regulatory requirements). Due to ongoing optimization assistance efforts, PA filter plants are well positioned to meet these lower requirements. Optimizing filter plant turbidities is an operational technique, much less costly than installation of additional treatment.

EPA estimates that States (including primacy agencies) will incur an annualized cost of \$1.1 to 1.4 million. In PA, this translates to \$27,830 to \$35,420.

EPA estimates that all households served by surface and GUDI sources will face some increase in household costs due to implementation of the LT2. Over 95 percent of all households are estimated to face an annual cost increase of less than \$12. Households served by small PWSs that install advanced technologies will face the greatest increases in annual costs. Approximately 8.4 million commonwealth citizens and thousands of visitors receive drinking water from filter plants affected by LT2.

### **Compliance Assistance Plan**

The Department's Safe Drinking Water Program utilizes the Commonwealth's PENNVEST Program in order to offer financial assistance to eligible public water systems. This assistance is in the form of a low-interest loan, with some augmenting grant funds for hardship cases. Eligibility is based upon factors such as public health impact, compliance necessity and project/operational affordability.

In addition, the Department has instituted a number of assistance programs, including the highly successful and nationally recognized Filter Plant Performance Evaluation Program. More recently, the Department contracted with the Pennsylvania Section American Water Works Association under the Partnership for Safe Water Program (Partnership). The Partnership promotes and supports filtered surface water suppliers who are committed to going beyond compliance. The Department is a leading participant in the EPA Area Wide Optimization Program (AWOP). This National program provides compliance assistance tools, which state regulatory agencies can share with water suppliers. The Department has been utilizing a data collection and analysis tool – Optimization Assessment Software (OAS) – for approximately 3 years. Utilizing the OAS software will help systems prepare to take advantage of the optimized turbidity toolbox options of the LT2 regulation.

Finally, the Bureau of Water Standards and Facility Regulation has a section dedicated to providing both training and outreach support services to public water system operators. As a result of the Department's efforts outlined above, this Commonwealth's public water suppliers

are well positioned to manage the risk and meet the more rigorous public health protection measures included in the LT2.

### **Paperwork Requirements**

The amendments will require monitoring and reporting of source water *Cryptosporidium* levels. A small number of water systems, those with elevated source water *Cryptosporidium*, will need to report monthly that they are maintaining additional treatment. Modifying the existing data reporting forms, possibly creating a new form, should easily facilitate this additional monitoring and reporting. In effect, little additional paperwork will be necessary.

### **G. Sunset Review**

This regulation 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.

### **H. Regulatory Review**

Under Section 5(a) of the Regulatory Review Act (71 P.S. § 745.5(a)), on November 24, 2008, the Department submitted a copy of these proposed amendments to the Independent Regulatory Review Commission (IRRC) and the Chairpersons of the House and Senate Environmental Resources and Energy Committees. In addition to submitting the proposed amendments, the Department has provided IRRC and the Committees with a copy of a detailed regulatory analysis form prepared by the Department. A copy of this material is available to the public upon request.

Under section 5(g) of the Regulatory Review Act, IRRC may convey any comments, recommendations or objections to the proposed regulations within 30 days of the close of the public comment period. The comments, recommendations or objections shall specify the regulatory review criteria that have not been met. The Act specifies detailed procedures for review of these issues by the Department, the General Assembly and the Governor prior to final publication of the regulations.

### **I. Public Comments**

**Written Comments** - Interested persons are invited to submit comments, suggestions, or objections regarding the proposed regulation to the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477 (express mail: Rachel Carson State Office Building, 16th Floor, 400 Market Street, Harrisburg, PA 17101-2301). Comments submitted by facsimile will not be accepted. Comments, suggestions or objections must be received by the Board by January 5, 2009. Interested persons may also submit a summary of their comments to the Board. The summary may not exceed one page in length and must also be received by the Board by January 5, 2009. The one-page summary will be provided to each member of the Board in the agenda packet distributed prior to the meeting at which the final regulation will be considered.

**Electronic Comments** – Comments may be submitted electronically to the Board at [RegComments@state.pa.us](mailto:RegComments@state.pa.us) and must also be received by the Board by January 5, 2009. A

subject heading of the proposal and a return name and address must be included in each transmission.

BY:

JOHN HANGER  
Acting Chairman  
Environmental Quality Board

ANNEX A

TITLE 25. ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE II. WATER RESOURCES

CHAPTER 109. SAFE DRINKING WATER

Subchapter A. GENERAL PROVISIONS

§ 109.1. Definitions.

\*\*\*\*\*

*Bag filter*-Pressure-driven separation devices that remove particulate matter larger than 1 micrometer using an engineered porous filtration media. They are 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 ground water through a riverbed or bank(s). Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other well.

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

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*Cartridge filter*-A pressure-driven separation device that removes particulate matter larger than 1 micrometer using an engineered porous filtration media, 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.

\*\*\*\*\*

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

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

\*\*\*\*\*

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.

\*\*\*\*\*

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) Includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

\*\*\*\*\*

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.

\*\*\*\*\*

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 2 distinct unit clarification processes in series prior to filtration.

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

### § 109.202.

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(c)(1)(vi)(D) Monitor source water for Cryptosporidium as specified in § 109.1202(f).

### § 109.204. Disinfection profiling and benchmarking.

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(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.

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## Subchapter C. MONITORING REQUIREMENTS

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### § 109.304. Analytical requirements.

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(d) *Cryptosporidium*. A system shall have *Cryptosporidium* samples analyzed by a laboratory that is approved under 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.

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## Subchapter D. PUBLIC NOTIFICATION

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### § 109.417. 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 non-community water system that is required to monitor source water under § 109.1202(a)-(h) (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 timing for a Tier 2 public notice).

(b) *Delivery of the special notice for failure to determine bin classification or *Cryptosporidium* level.* The owner or operator of a community or non-community 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 § 109.1205(h) (relating to bin classification reporting) 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 shall 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 presentation of a public notice).

(2) Mandatory language contained in the special notice. 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 in order 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.

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#### Subchapter G. SYSTEM MANAGEMENT RESPONSIBILITIES

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#### § 109.705. Sanitary surveys.

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(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 ground water 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 (d)(1) if such deficiencies are within the control of the system.

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

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

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(a) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall supply drinking water that complies with the MCLs, MRDSs, and treatment technique requirements under §§ 109.202 [and] 109.203 and 109.1203

**§ 109.1003. Monitoring requirements.**

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(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), with § 109.302 (relating to special monitoring requirements), and shall comply with § 109.1202(a)-(h) (relating to source water Cryptosporidium monitoring requirements).

**Subchapter L. LONG TERM 2 ENHANCED SURFACE WATER TREATMENT RULE**

**§ 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 ground water source under the direct influence of surface water.

(1) Wholesale systems shall comply with the requirements of this subchapter based on the population of the largest system in the combined distribution system.

(2) The requirements of this subchapter for filtered systems apply to systems required by National Primary Drinking Water Regulations to provide filtration treatment, whether or not the system is currently operating a filtration 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 E. coli monitoring.

(i) A filtered system serving less than 10,000 people shall sample its source water for E. coli at least once every 2 weeks for 12 months.

(ii) 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 (a)(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 § 109.1202(c) (relating to source water monitoring schedule).

(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 (a)(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 (a)(3).

(iv) Systems using ground water 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 (a)(3). The Department also may approve an alternative to the E. coli concentration in subparagraph (a)(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 and/or trigger level will provide a more accurate identification of whether a system will exceed the Bin 1 Cryptosporidium level in § 109.1203(c).

(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 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 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 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 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 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 (relating to bin classification and treatment technique requirements).

(2) If a system chooses to provide the level of treatment in paragraph (d)(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 § 109.1202(i)-(k). 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 ground water 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 six 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 § 109.1202(f) apply to public water systems supplied by a surface water or ground water source under the direct influence of surface water systems 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 § 109.304, § 109.1202, and § 109.1205(a)-(e) is a monitoring violation.

(h) *Grandfathering monitoring data.* Systems may use (grandfather) monitoring data collected prior to the applicable monitoring start date in subsection (c) to meet the initial source water monitoring requirements in subsection (a). Grandfathered data may substitute for an equivalent number of months at the end of the monitoring period. All data submitted under this subsection shall meet the requirements in § 109.1205(f) (relating to grandfathering data).

(i) *Source water sampling schedules.* Systems required to conduct source water monitoring under § 109.1202 (a)-(h) 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 § 109.1202(c) for each round of required monitoring.

(2) Sampling schedule submissions. 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 § 109.1202(a) to 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 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 § 109.1202(a) to the Department.

(4) Systems shall submit sampling schedules for the second round of source water monitoring § 109.1202(b) to the Department.

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

(j) *Source water sample collection period.* Systems shall collect samples within 2 days before or 2 days after the dates indicated in their sampling schedule (i.e., within a 5 day period around the schedule date) unless one of the conditions of paragraph (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 five-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(c) (relating to analytical requirements), 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.

(k) Missed samples. Systems that fail to meet the criteria of subsection (j) for any source water sample required under § 109.1202(a)-(h) 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.

(l) Source water sampling locations. Systems required to conduct source water monitoring under § 109.1202(a)-(h) shall collect samples for each plant that treats a surface water or GUDI source. Where 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 § 109.1202(a)-(h) for all plants.

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

(n) 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.

(o) Bank filtration.

(1) Systems that receive Cryptosporidium treatment credit for bank filtration to meet existing treatment technique requirements of § 109.202(c) (relating to treatment technique requirements for pathogenic bacteria, viruses, and protozoan cysts), 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 bank filtration).

(p) Multiple sources. Systems with plants that use multiple water sources, including multiple surface water sources and blended surface water and ground water sources, shall collect samples as specified in paragraph (e)(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 § 109.1202(f) (relating to new sources) will apply. Systems may begin monitoring a new source as soon as a sampling schedule and plan have been approved 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 (e)(2)(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.

(q) Additional requirements. A system shall submit a description of its sampling location(s) to the Department at the same time as the sampling schedule required under § 109.1202(i)- (k) (relating to source water sampling). 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 location(s), 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 initial round of source water monitoring), 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 paragraphs (b)(1) through (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 one year (i.e., 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 (b)(1) - (4).

(c) Cryptosporidium bin concentration thresholds. Systems required to monitor for Cryptosporidium under 109.1202(a)-(h) shall use Cryptosporidium bin concentration calculated under subsections (a)-(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) 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 paragraphs (b)(1) - (4) . Systems shall then redetermine their bin classification using this bin concentration and the table in 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 § 109.1203 (a)-(c) and according to the schedule in § 109.1203(k)-(o). The treatment required under § 109.1203(e)(1)-(4) are in addition to existing treatment technique requirements contained in 109.202(c), 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 and the system is in full compliance with applicable treatment technique requirements under § 109.202(c), the system shall provide additional Cryptosporidium treatment requirements as follows:

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

(ii) For direct filtration treatment must provide no additional treatment.

(iii) For alternative filtration technologies must provide no additional treatment.

(2) *Bin 2.* If the system bin classification is bin 2 and the system is in full compliance with applicable treatment technique requirements under § 109.202(c), the system shall provide additional Cryptosporidium treatment requirements as follows:

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

(ii) For direct filtration treatment must provide 1.5 log additional treatment.

(iii) For 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 and the system is in full compliance with applicable treatment technique requirements under § 109.202(c), the system shall provide additional Cryptosporidium treatment requirements as follows:

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

(ii) For direct filtration treatment must provide 2.5 log additional treatment.

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

(4) *Bin 4.* If the system bin classification is bin 4 and the system is in full compliance with applicable treatment technique requirements under § 109.202(c), the system shall provide additional Cryptosporidium treatment requirements as follows:

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

(ii) For direct filtration treatment must provide 3 log additional treatment.

(iii) For 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, 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 subsection (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) and (c) and 109.1204(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 109.1204(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 § 109.1202(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 and/or implementing microbial toolbox options listed in § 109.1204.

(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 109.1203(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 109.1202(b), unfiltered systems shall calculate their bin classification using the methods listed in 109.1203(b) and (c).

(k) Schedule for compliance with Cryptosporidium treatment requirements. Following initial bin classification under § 109.1203(c), filtered systems shall provide the level of additional treatment for Cryptosporidium required under § 109.1203(e)-(h) according to the schedule in subsection (m). The treatment required under § 109.1203(e)-(h) are in addition to existing treatment technique requirements contained in 109.202(c), which still apply.

(l) Following initial determination of the Cryptosporidium level under § 109.1203(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 § 109.1203(e)-(h) on a schedule approved by the state 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 no later than April 1, 2012.

(2) Systems that serve from 50,000 to 99,999 people shall comply with Cryptosporidium treatment requirements no later than October 1, 2012.

(3) Systems that serve from 10,000 to 49,999 people shall comply with Cryptosporidium treatment requirements no later than October 1, 2013.

(4) Systems that serve less than 10,000 people shall comply with Cryptosporidium treatment requirements no later than October 1, 2014.

(5) On a case by case basis within an agreed upon timeframe, 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 changes following the second round of source water monitoring, as

determined under § 109.1203(d), the system shall provide the level of treatment for Cryptosporidium required under § 109.1203(e)-(h) on a schedule the Department approves.

(o) Change in Cryptosporidium level for unfiltered system. If the Cryptosporidium level for an unfiltered system changes following the second round of monitoring, as determined under § 109.1203(j), and if the system shall provide a different level of Cryptosporidium treatment under §§ 109.1203(i) and (j) due to this change, the system shall meet this treatment requirement 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 (b) - (g) of this section. A system shall apply these treatment credits to meet the treatment technique requirements listed in section § 1203.

(b) Watershed control program. Systems receive 0.5-log Cryptosporidium treatment credit for implementing a watershed control program that meets the requirements. This credit may not be used to maintain the additional log removal credits specified in § 109.1203 (relating to bin classification and treatment technique requirements). 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.

(1) Systems that intend to apply for the watershed control program credit shall notify the Department of this intent no later than 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 no later than one 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 elements in subparagraphs (b)(2)(i) - (iv).

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

(4) Systems shall complete the actions in subparagraphs (b)(5)(i) - (iii) 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 (b)(5)(ii) . The report must also describe any 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 such changes. If any 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 five 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 subparagraph (b)(5)(ii) .

(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 (b)(1) , systems shall also monitor their current plant intake concurrently as described in § 109.1202(a)-(h) (relating to monitoring requirements).

(3) Alternative source monitoring under paragraph (b)(1) must meet the requirements for source monitoring to determine bin classification, as described in § 109.1202(a)-(h)

through § 109.1205(a)-(e) (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) (relating to bin classification and treatment technique requirements).

(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 in subparagraph (3)(i) or (ii).

(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:  $\log_{10}(\text{monthly mean of daily influent turbidity}) - \log_{10}(\text{monthly mean of daily effluent turbidity})$ .

(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 2 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(o) and are not eligible for this credit.

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

ground water 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 four 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 § 109.204(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 (f)(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(s) and from monitoring wells that are screened and located along the shortest flow path between the surface water source and the production well(s).

(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 (a), 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) No individual filter may have a measured turbidity greater than 0.3 NTU in 2 consecutive measurements taken 15 minutes apart.

(3) Any system that has received treatment credit for individual filter performance and fails to meet the requirements of paragraph (h)(1) or (2) during any month does not receive a treatment technique violation under § 109.1203(c) 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 2 such 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 § 109.1204(d)-(f) through 109.1204(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 § 109.1204(d)-(f) through 109.1204(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 (j)(1) - (10). To be eligible for this credit, systems shall report the results of challenge testing that meet the requirements of paragraphs (j)(2) - (9) to the Department. The filters must treat the entire plant flow taken from a surface water or ground water 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 (j)(2) - (j)(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 (j)(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 discreetly 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 (i.e., filtrate detection limit) and must be calculated using the following equation:  
Maximum Feed Concentration =  $1 \times 10^4 \times$  (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 the requirements of 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:

$$\text{LRV} = \text{LOG}_{10}(\text{Cf}) - \text{LOG}_{10}(\text{Cp})$$

Where: LRV = log removal value demonstrated during challenge testing; Cf = the feed concentration measured during the challenge test; and Cp = 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 Cp 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 (LRV<sub>filter</sub>) 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 LRV<sub>filter</sub> 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 LRV<sub>filter</sub> 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 are eligible for this credit. The level of treatment credit a system receives is equal to the lower of the values determined under subparagraph (l)(1)(i) and (ii).

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

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 (i.e., 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:  $LRV = \text{LOG}_{10}(C_f) \times \text{LOG}_{10}(C_p)$  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 (LRVC-Test). If less than 20 modules are tested, then LRVC-Test is equal to the lowest of the representative LRVs among the modules tested. If 20 or more modules are tested, then LRVC-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 non-destructive 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 non-destructive 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 (1)(3)(i) - (vi). A direct integrity test is defined as a physical test applied to a membrane unit in order to identify and isolate integrity breaches (i.e., 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 (1)(3)(iii)(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:  $LRVDIT = \text{LOG}_{10} (Q_p / (VCF \times Q_{\text{breach}}))$  Where: LRVDIT = 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:  $LRVDIT = \text{LOG}_{10}(C_f) - \text{LOG}_{10}(C_p)$  Where: LRVDIT = 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 (1)(3)(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 not less than 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 (1)(4)(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 (l)(3)(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 a frequency of no less than 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 (i.e., 2 consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in subparagraphs (l)(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 subparagraphs (l)(3)(i) - (v).

(l) *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 (b) or (c) must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in § 141.74(a) - (b).

(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 (q)(1). Systems shall validate and monitor UV reactors as described in paragraphs (q)(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 this table 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 (q)(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 (q)(1) (i.e., 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 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 (q)(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 (q)(1) and (2). Systems shall demonstrate compliance with this condition by the monitoring required under subparagraph (q)(3)(i).

§ 109.1205 Reporting and record keeping requirements.

(a) Source water reporting time frame. Systems shall report results from the source water monitoring required under § 109.1202(a)-(h) 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 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 that 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 (e)(1) and (2) for the source water monitoring required under § 109.1202(a)-(h).

(1) Cryptosporidium data elements. Systems shall report data elements (i)-(vii) for each Cryptosporidium analysis. Systems shall report data elements (viii)-(x) as applicable.

(i) PWS ID.

(ii) Facility 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 the following data elements for each E. coli analysis:

(i) PWS ID.

(ii) Facility 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.

(f) Grandfathering data. Grandfathering previously collected data requirements, established by the EPA under the National Primary Drinking Water regulations in 40 CFR 141.707 are incorporated by reference except as otherwise established by this chapter.

(g) Sampling schedule reporting. Systems shall report sampling schedules under § 109.1202(i)-(k) and source water monitoring results under § 109.1205(a)-(e) unless they notify the Department that they will not conduct source water monitoring due to meeting the criteria of § 109.1202(d).

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

(1) Systems shall report their initial bin classification under subsection (c) 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 subsection (h) is a violation of the treatment technique requirement.

(i) Microbial toolbox reporting requirements. Systems are required to report items specified § 109.1204 for all toolbox components for which they are requesting treatment credit. Systems must report to the State in accordance with Appendix C to subpart L. Microbial Toolbox Reporting Requirements.

(j) 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 - §141.709, which are incorporated by reference in § 109.204.

(k) Source water monitoring record keeping 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).

(l) 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.

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



Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building  
P.O. Box 2063  
Harrisburg, PA 17105-2063  
November 24, 2008

Policy Office

717-783-8727

Kim Kaufman, Executive Director  
Independent Regulatory Review Commission  
333 Market Street, 14<sup>th</sup> Floor  
Harrisburg, PA 17101

Re: Proposed Rulemaking: Stage 2 Disinfectants and Disinfection Byproducts Rule  
(25 Pa. Code, Chapter 109) (#7-427); and

Proposed Rulemaking: Long Term 2 Enhanced Surface Water Treatment Rule  
(25 Pa. Code, Chapter 109) (#7-426)

Dear Mr. Kaufman:

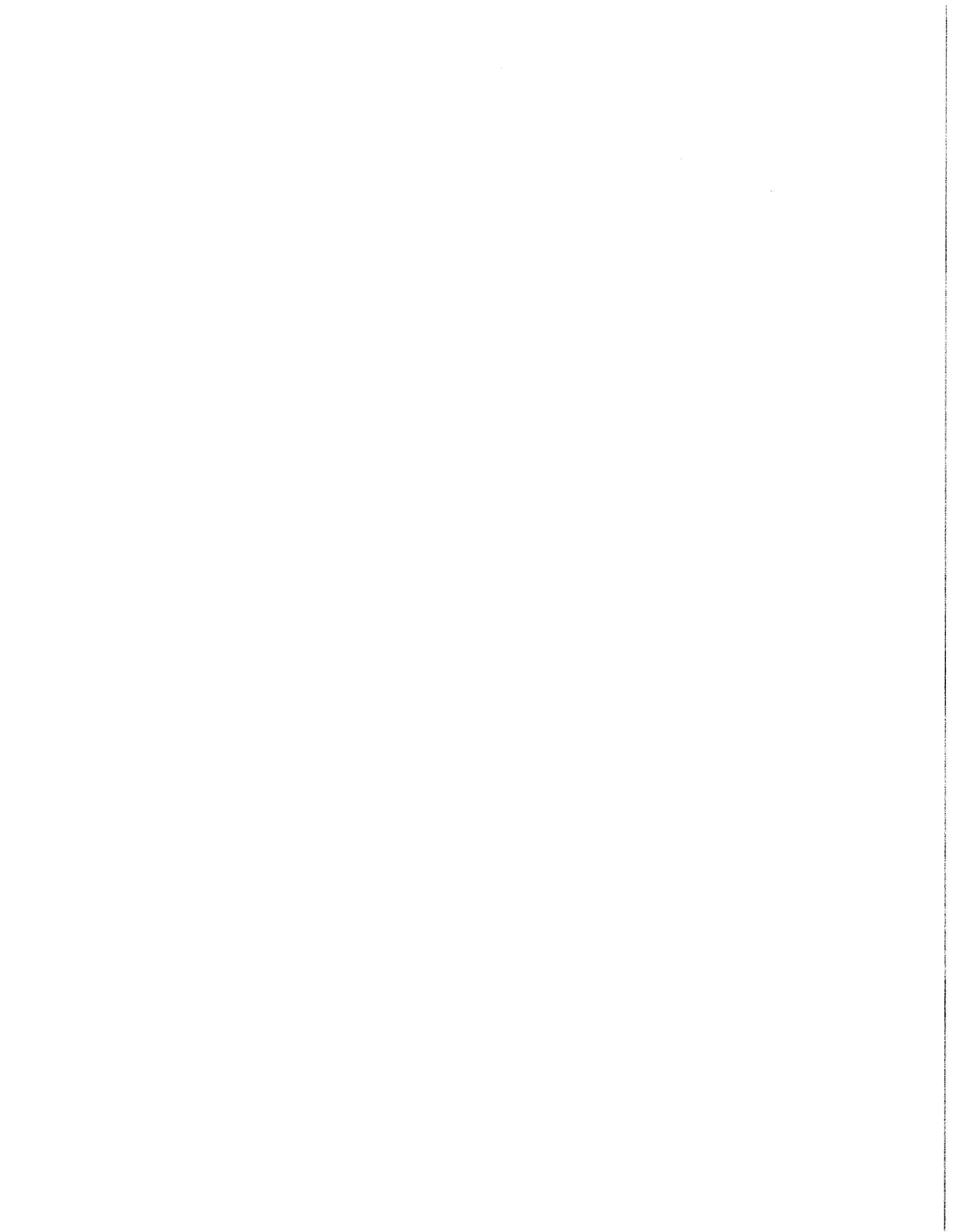
Enclosed are copies of two proposed regulations for review and comment by the Independent Regulatory Review Commission pursuant to Section 5(a) of the Regulatory Review Act. The proposals are scheduled for publication in the *Pennsylvania Bulletin* on December 6, 2008, with a 30-day public comment period, respectively. The Environmental Quality Board (EQB) adopted these proposals on August 19, 2008, with provision for a 30-day public comment period for each rulemaking.

The Stage 2 Disinfectants and Disinfection Byproducts Proposed Rulemaking will amend the Commonwealth's Safe Drinking Water regulations at 25 Pa Code, Chapter 109 to incorporate federal provisions concerning disinfection byproducts (DBPs). While DBPs disinfect water by controlling harmful microorganisms, they can react with organic and inorganic matter in the water to form byproducts that pose health risks at certain levels. This rulemaking will augment the Stage 1 DBP Rule that was promulgated by the Commonwealth in 2001 by targeting the highest risk monitoring sites where customers are exposed to high levels of DBPs. EPA promulgated the federal Stage 2 DBP rule on January 4, 2006. The amendments will apply to community water systems and nontransient noncommunity water systems that add a primary or residual disinfectant other than ultraviolet light (UV) or deliver water that has been treated with a primary or residual disinfectant other than UV.

The proposed amendments were submitted for review to the Small Water Systems Technical Assistance Center Advisory Board (TAC) for review and discussion on November 15, 2007. The TAC Board supports the proposed revisions and notes that the revisions contained in the rulemaking are necessary for the Department to receive primacy for this aspect of the Drinking Water Program and are no more stringent than federal requirements.

The proposed Long Term 2 Enhanced Surface Water Treatment Rulemaking will amend the Department's Safe Drinking Water regulations at 25 Pa Code, Chapter 109 by incorporating





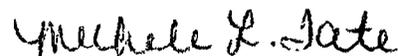
requirements contained in the Federal Long Term 2 Enhanced Surface Water Treatment Rule (LT2) which was promulgated by the U.S. EPA on January 5, 2006. The rulemaking applies to public water systems supplied by a surface water source and public water systems supplied by a ground water source under the direct influence of surface water (GUDI) and were developed to further protect public health against Cryptosporidium and other microbial pathogens in drinking water. In Pennsylvania, approximately 355 public water systems will be impacted by the proposed amendments.

On November 13, 2007, the TAC Board reviewed the proposed rulemaking. Although the Board is supportive of the revisions to the regulations, the Board provided written comments to the Department which outline a number of concerns. Those concerns, which are identified in the Preamble of the rulemaking, were addressed by the Department and amendments were made to the rulemaking, as necessary, to directly incorporate TAC's suggestions.

The Department will provide the Commission with the assistance required to facilitate a thorough review of these proposals. Section 5(g) of the Regulatory Review Act provides that the Commission may, within 30 days of the close of the comment period, convey to the agency its comments, recommendations and objections to the proposed regulation. The Department will consider any comments, recommendation or suggestions made by the Commission, as well as the Committees and public commentators, prior to final adoption of the regulation.

Please contact me at 717-783-8727 if you have any questions or need additional information.

Sincerely,



Michele L. Tate  
Regulatory Coordinator

Enclosures





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**TRANSMITTAL SHEET FOR REGULATIONS SUBJECT TO  
THE REGULATORY REVIEW ACT**

INDEPENDENT REGULATORY  
REVIEW COMMISSION

I.D. NUMBER: 7- 426  
SUBJECT: Long Term 2 Enhanced Surface Water Treatment Rule  
AGENCY: DEPARTMENT OF ENVIRONMENTAL PROTECTION

**TYPE OF REGULATION**

- Proposed Regulation
- Final Regulation
- Final Regulation with Notice of Proposed Rulemaking Omitted
- 120-day Emergency Certification of the Attorney General
- 120-day Emergency Certification of the Governor
- Delivery of Tolloed Regulation
  - a.  With Revisions
  - b.  Without Revisions

**FILING OF REGULATION**

**DATE**

**SIGNATURE**

**DESIGNATION**

<u>11-24-08</u>	<u></u>	Majority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
<u>11/24/08</u>	<u>X </u>	Minority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
<u>11/24/08</u>	<u></u>	Majority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
<u>11-24-08</u>	<u></u>	Minority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY
<u>4/24/09</u>	<u></u>	INDEPENDENT REGULATORY REVIEW COMMISSION
_____	_____	ATTORNEY GENERAL (for Final Omitted only)
<u>11-24-08</u>	<u></u>	LEGISLATIVE REFERENCE BUREAU (for Proposed only)

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