

Annex A

TITLE 25. ENVIRONMENTAL PROTECTION

PART I. DEPARTMENT OF ENVIRONMENTAL PROTECTION

Subpart C. PROTECTION OF NATURAL RESOURCES

ARTICLE II. WATER RESOURCES

CHAPTER 109. SAFE DRINKING WATER

Subchapter A. GENERAL PROVISIONS

§ 109.1. Definitions.

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

\* \* \* \* \*

**BAT**—Best Available Technology—The best technology, treatment techniques or other means which the Administrator finds are available for achieving compliance with maximum contaminant levels. **THIS CHAPTER INCORPORATES BY REFERENCE THE BAT SPECIFIED IN 40 CFR PARTS 141 AND 142 (RELATING TO NATIONAL PRIMARY DRINKING WATER REGULATIONS; AND NATIONAL PRIMARY DRINKING WATER REGULATIONS IMPLEMENTATION).**

\* \* \* \* \*

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

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

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

**DBP--Disinfection byproduct.**

\* \* \* \* \*

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

\* \* \* \* \*

**Finished water--[Water that has been treated in compliance with the treatment technique requirements established in this chapter by a permitted public water system and is ready for consumption by the public.] Water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as necessary to maintain water quality in the distribution system (for example, booster disinfection or addition of corrosion control chemicals).**

\* \* \* \* \*

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

\* \* \* \* \*

**GAC10--A GRANULAR ACTIVATED CARBON FILTER BED WITH AN EMPTY BED CONTACT TIME OF 10 MINUTES BASED ON AVERAGE DAILY FLOW AND A CARBON REACTIVATION FREQUENCY OF EVERY 180 DAYS, EXCEPT THAT THE REACTIVATION FREQUENCY FOR GAC10 USED AS A BAT SHALL BE 120 DAYS.**

**GAC20--A GRANULAR ACTIVATED CARBON FILTER BED WITH AN EMPTY BED CONTACT TIME OF 20 MINUTES BASED ON AVERAGE DAILY FLOW AND A CARBON REACTIVATION FREQUENCY OF EVERY 240 DAYS.**

\* \* \* \* \*

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

\* \* \* \* \*

**IDSE--Initial Distribution System Evaluation.**

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

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

**Where,**

**$N_o$  = Initial concentration of viable microorganisms**

**$N_D$  = Concentration of viable microorganisms after disinfection**

**Log = Logarithm to base 10**

**Log inactivation is related to percent inactivation, defined as:**

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

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

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

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

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

**Where,**

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

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

**Log = Logarithm to base 10**

**Log removal is related to percent removal, defined as:**

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

**Common log-removal values and corresponding percent removal values include:**

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

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

$$\underline{\text{Log treatment} = \text{Log removal} + \text{Log inactivation}}$$

**Or,**

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

**Where,**

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

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

**Log = Logarithm to base 10**

**Log treatment is related to percent treatment, defined as:**

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

**Common log treatment values and corresponding percent treatment values include:**

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

\* \* \* \* \*

**Membrane filtration --**

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

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

§ 109.5. Organization of chapter.

\* \* \* \* \*

**(e) SUBCHAPTER L (RELATING TO THE LONG TERM 2 ENHANCED SURFACE WATER TREATMENT RULE) APPLIES TO ALL PUBLIC WATER SYSTEMS USING SURFACE WATER OR GUDI SOURCES.**

**~~{(e)}~~ (f) Subchapter M (relating to additional requirements for groundwater sources) applies to all public water systems that use groundwater, excluding those systems that combine all of their groundwater with surface water or with groundwater under the direct influence of surface water prior to treatment UNDER § 109.202(c)(1) (RELATING TO STATE MCLS, MRDLS AND TREATMENT TECHNIQUE REQUIREMENTS).**

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

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

\* \* \* \* \*

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

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

\* \* \* \* \*

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

reporting and recordkeeping), notify the Department within 1 hour after the water system learns of the violation or the situation, and shall provide public notice in accordance with § 109.408 (relating to Tier 1 public notice—~~{form, manner and frequency}~~ **CATEGORIES, TIMING AND DELIVERY** of notice)

\* \* \* \* \*

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

\* \* \* \* \*

~~**{(D) Monitor source water for *Cryptosporidium* as specified in § 109.1202(f) (relating to monitoring requirements).}**~~

\* \* \* \* \*

**(2) IN ADDITION TO MEETING THE REQUIREMENTS OF PARAGRAPH 1, A PUBLIC WATER SUPPLIER USING SURFACE WATER OR GUDI SOURCES SHALL ALSO COMPLY WITH THE REQUIREMENTS OF, AND ON THE SCHEDULES IN, SUBCHAPTER L (RELATING TO LONG-TERM 2 ENHANCED SURFACE WATER TREATMENT REQUIREMENTS).**

~~{(2)}~~ **(3) A community public water system shall provide continuous disinfection and comply with Subchapter M (relating to additional requirements for groundwater sources) for groundwater sources.**

\* \* \* \* \*

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

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

\* \* \* \* \*

**Subchapter C. MONITORING REQUIREMENTS**

**§ 109.301. General monitoring requirements.**

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



Drinking Water Regulation if the alternative monitoring requirements are in conformance with the Federal act and regulations. The monitoring requirements shall be applied as follows:

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

(i) *TTHM~~[s]~~ and HAA5 Stage 1 DBP Rule.*

\* \* \* \* \*

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

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

\* \* \* \* \*

**(-c-) Beginning April 1, 2008, systems not monitoring under the provisions of subparagraph ~~{(ii)}~~ (v) shall take monthly TOC samples every 30 days at a location prior to any treatment, to qualify for reduced monitoring for TTHM and HAA5 under this subparagraph. In addition to meeting other criteria for reduced monitoring in this section, the source water TOC running annual average must be less than OR EQUAL TO 4.0 mg/L (based on the most recent 4 quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under this section, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.**

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

\* \* \* \* \*

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

(ii) TTHM[s] and HAA5 Stage 2 DBP Rule.

(A) Applicability and schedule.

(I) Community water systems and nontransient noncommunity water systems using a primary or residual disinfectant other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light shall monitor for compliance with the MCLs based on the LRAA for TTHM[s] and HAA5. [A consecutive] ANY system [for wholesale system] THAT IS PART OF A COMBINED DISTRIBUTION SYSTEM shall comply at the same time as the system with the earliest compliance date in the combined distribution system. Systems shall comply with [the requirements of] this subparagraph as follows:

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

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

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

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

(-1-) Begin October 1, 2013, if no *Cryptosporidium* monitoring is required under §§ 109.1201--109.1204. [(Editor's Note: §§ 109.1201--109.1204 are proposed to be added at 38 Pa.B. 7035 (December 20, 2008.))]

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

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

(III) ALL SYSTEMS MONITORING UNDER THIS PARAGRAPH SHALL COMPLY WITH SUBPARAGRAPH (i) UNTIL THE DATES SPECIFIED IN THIS SUBPARAGRAPH.

(B) Routine monitoring.

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

(II) A system required to conduct quarterly monitoring shall begin monitoring in the first full calendar quarter that includes the compliance date specified in clause (A). A system required to conduct monitoring at frequencies less than quarterly shall begin monitoring in the calendar month recommended in the IDSE report in accordance with 40 CFR 141.601 and 141.602 (relating to standard monitoring; and system specific studies) as incorporated by reference or the calendar month identified in the [Subchapter G (relating to system management responsibilities)] STAGE 2 DBP RULE monitoring plan [relating to § 109.701(g)(2)(ii)] no later than 12 months after the APPLICABLE compliance date under clause (A).

(III) Monitoring shall be conducted at no fewer than the number of locations identified in the table under subclauses (IV) and (V). All systems shall monitor during the month of highest DBP concentrations. Systems on quarterly monitoring shall [take dual] sample [sets] every 90 days at each monitoring location[, except for community water systems using surface water or GUDI sources serving 500–3,300. Systems on annual monitoring and community water systems using surface water or GUDI sources serving 500–3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location ( and month, if monitored annually)]. SAMPLING AT EACH MONITORING LOCATION SHALL BE CONDUCTED AS FOLLOWS:

(-a-) SYSTEMS USING SURFACE WATER OR GUDI SOURCES SERVING A POPULATION GREATER THAN 3,300 AND SYSTEMS USING GROUNDWATER SOURCES SERVING A POPULATION OF 500 OR GREATER SHALL TAKE DUAL SAMPLE SETS AT EACH MONITORING LOCATION.

(-b-) SYSTEMS USING SURFACE WATER OR GUDI SOURCES SERVING A POPULATION OF 3,300 OR LESS AND SYSTEMS USING GROUNDWATER SOURCES SERVING A POPULATION LESS THAN 500 SHALL TAKE INDIVIDUAL TTHM AND HAA5 SAMPLES AT THE LOCATIONS WITH THE HIGHEST TTHM AND HAA5 CONCENTRATIONS, RESPECTIVELY.

(-c-) SYSTEMS SERVING A POPULATION LESS THAN 500 MAY TAKE A DUAL SAMPLE SET AT ONE LOCATION PER MONITORING PERIOD IF THE HIGHEST TTHM AND HAA5 CONCENTRATIONS OCCUR AT THE SAME LOCATION AND DURING THE SAME MONTH.

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

<u>Population size</u>	<u>Monitoring frequencies</u>	<u>Distribution system monitoring location total per monitoring period</u>
<u>&lt; 500</u>	<u>Annually</u>	<u>2</u>
<u>500--3,300</u>	<u>Quarterly</u>	<u>2</u>
<u>3,301--9,999</u>	<u>Quarterly</u>	<u>2</u>
<u>10,000--49,999</u>	<u>Quarterly</u>	<u>4</u>
<u>50,000--249,999</u>	<u>Quarterly</u>	<u>8</u>
<u>250,000--999,999</u>	<u>Quarterly</u>	<u>12</u>
<u>1,000,000--4,999,999</u>	<u>Quarterly</u>	<u>16</u>
<u>&gt;= 5,000,000</u>	<u>Quarterly</u>	<u>20</u>

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

<u>Population size</u>	<u>Monitoring frequencies</u>	<u>Distribution system monitoring location total per monitoring period</u>
<u>&lt; 500</u>	<u>Annually</u>	<u>2</u>
<u>500--9,999</u>	<u>Annually</u>	<u>2</u>
<u>10,000--99,999</u>	<u>Quarterly</u>	<u>4</u>
<u>100,000--499,999</u>	<u>Quarterly</u>	<u>6</u>
<u>&gt;= 500,000</u>	<u>Quarterly</u>	<u>8</u>

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

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

**(C) Reduced monitoring.**

**(I) Systems may reduce monitoring to the level specified in the table under subclauses (II) and (III) if, after at least 4 consecutive quarters, the LRAA is equal to or less than 0.040 mg/L for TTHM and equal to or less than 0.030 mg/L for HAA5 at all monitoring locations. Only data collected under subparagraph (i) and this subparagraph may be used to qualify for reduced monitoring. Systems with surface water or GUDI sources shall also take monthly TOC samples every 30 days at a location prior to any treatment, to qualify for reduced monitoring for TTHM and HAA5 under this clause. In addition to**

meeting other criteria for reduced monitoring in this clause, the source water TOC running annual average (based on the most recent 4 quarters of monitoring) must be equal to or less than 4.0 mg/L on continuing basis at each treatment plant to reduce monitoring for TTHM and HAA5. Once qualified for reduced monitoring for TTHM and HAA5 under this clause, a system may reduce source water TOC monitoring to quarterly TOC samples taken every 90 days at a location prior to any treatment.

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

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

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

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

(IV) Systems on reduced quarterly monitoring may remain on reduced monitoring as long as the TTHM LRAA is equal to or less than 0.040 mg/L and the HAA5 LRAA is equal to or less than 0.030 mg/L at each monitoring location. Systems on reduced annual or less frequent monitoring may remain on reduced monitoring as long as each TTHM sample result is equal to or less than 0.060 mg/L and each HAA5 sample result is equal to or less than 0.045 mg/L. In addition, the source water TOC running annual average (based on the most recent 4 quarters of monitoring) from samples collected every 90 days at a location prior to any treatment must be equal to or less than 4.0 mg/L at each treatment plant treating surface water or GUDI sources.

(V) If the LRAA based on quarterly monitoring at any monitoring location exceeds either 0.040 mg/L for TTHM or 0.030 mg/L for HAA5 or if the annual (or less frequent) sample at any location exceeds either 0.060 mg/L for TTHM or 0.045 mg/L for HAA5, or if the source water annual average TOC level, before any treatment, is greater than 4.0 mg/L at any treatment plant treating surface water or GUDI sources, the system shall resume routine monitoring under clause (B) or begin increased monitoring if clause (D)(I) applies.

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

(VII) A SYSTEM MAY REMAIN ON REDUCED MONITORING AFTER THE DATES IDENTIFIED IN CLAUSE (A) FOR COMPLIANCE WITH THIS

**SUBPARAGRAPH ONLY IF THE CRITERIA SPECIFIED IN ITEMS (-a)--(-c-) ARE MET. IF ANY CONDITION IS NOT MET, THE SYSTEM SHALL RESUME ROUTINE MONITORING AS SPECIFIED IN CLAUSE (B) BY THE DATES SPECIFIED IN CLAUSE (A).**

**(-a-) THE SYSTEM QUALIFIED FOR A 40/30 CERTIFICATION UNDER 40 CFR 141.603 (RELATING TO 40/30 CERTIFICATION) AS INCORPORATED BY REFERENCE OR HAS RECEIVED A VERY SMALL SYSTEM WAIVER UNDER 40 CFR 141.604 (RELATING TO VERY SMALL SYSTEM WAIVERS) AS INCORPORATED BY REFERENCE.**

**(-b-) THE SYSTEM MEETS THE REDUCED MONITORING CRITERIA IN THIS CLAUSE.**

**(-c-) THE SYSTEM HAS NOT CHANGED OR ADDED MONITORING LOCATIONS FROM THOSE USED FOR COMPLIANCE MONITORING IN SUBPARAGRAPH (i).**

**(D) Increased monitoring.**

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

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

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

**~~[(IV) A system may remain on reduced monitoring after the dates identified in clause (A) for compliance with this subparagraph only if it qualified for a 40/30 certification under 40 CFR 141.603 (relating to 40/30 certification) as incorporated by reference or has received a very small system waiver under 40 CFR 141.603 as incorporated by reference, plus meets the reduced monitoring criteria in clause (C), and has not changed or added monitoring locations from those used for compliance monitoring in subparagraph (i). If a system's monitoring locations under this subparagraph differ from monitoring locations under subparagraph (i), the system may not remain on reduced monitoring after the dates identified in clause (A) for compliance with this subparagraph.]~~**



(E) General monitoring and compliance requirements.

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

(II) A system required to monitor yearly or less frequently shall determine that each sample result is less than the MCL. If any single sample result exceeds the MCL, the system shall comply with the requirements of clause (D). If no sample result exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

(III) A system required to conduct quarterly monitoring, shall make compliance calculations at the end of the 4<sup>th</sup> calendar quarter that follows the compliance date ~~[and at the end of each subsequent quarter,]~~ (or earlier if the LRAA calculated based on fewer than 4 quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters) AND AT THE END OF EACH SUBSEQUENT CALENDAR QUARTER. A system required to conduct monitoring at a frequency that is less than quarterly shall make compliance calculations beginning with the first compliance sample taken after the compliance date.

*(Editors Note: Please leave the parentheses in the above text as parentheses: do not change to dashes.)*

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

(iii) CHlorite.\* \* \*

\* \* \* \* \*

[(iii)] (iv) Bromate. Community water systems and nontransient noncommunity water systems that use ozone for disinfection or oxidation shall monitor for bromate.

\* \* \* \* \*

(B)Reduced monitoring.

(I) [For] Until March 31, 2009, systems that have an average source water bromide concentration that is less than 0.05 mg/L based upon representative monthly bromide measurements for 1 year, the required monitoring is reduced from monthly to

quarterly. Systems on reduced monitoring shall continue to take monthly samples for source water bromide. If the running annual average source water bromide concentration, computed quarterly, equals or exceeds 0.05 mg/L based upon representative monthly measurements, the system shall revert to routine monitoring as prescribed by clause (A).

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

[(iv)] (v) *[Disinfection byproducts] DBP precursors.* \* \* \*

**§ 109.304. Analytical requirements.**

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

\* \* \* \* \*

(c) For the purpose of determining compliance with the monitoring and analytical requirements established under this subchapter ~~{and}, {Subchapter}~~ **SUBCHAPTERS K, L and {Subchapter} M** (relating to lead and copper; **LONG TERM 2 ENHANCED SURFACE WATER TREATMENT RULE; and additional requirements for groundwater sources**), the Department will consider only samples analyzed by a laboratory accredited by the Department, except that measurements for turbidity, fluoridation operation, residual disinfectant concentration, temperature, pH, alkalinity, orthophosphates, silica, calcium, conductivity, daily chlorite, and magnesium hardness may be performed by a person meeting one of the following requirements:

\* \* \* \* \*

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

## Subchapter D. PUBLIC NOTIFICATION

### § 109.407. General public notification requirements.

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

\* \* \* \* \*

(2) Failure to comply with a prescribed treatment technique requirement in Subchapter B, G [or], K, L or M [(relating to MCLs, MRDLs or treatment technique requirements; system management requirements; and lead and copper)].

\* \* \* \* \*

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

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

\* \* \* \* \*

~~(7) [Occurrence of a waterborne disease outbreak, as defined in § 109.1 (relating to definitions), or other emergency situation as defined in § 109.701(a)(3)(iii) (relating to reporting and recordkeeping) that adversely affects the quality or quantity of the finished water and has a significant potential to have serious adverse effects on human health as a result of short-term exposure.]~~

*(Editor's Note: text moved to new #10)*

**VIOLATION OF A TREATMENT TECHNIQUE REQUIREMENT FOR CRYPTOSPORIDIUM AS DEFINED IN § 109.1203 (RELATING TO BIN CLASSIFICATION AND TREATMENT TECHNIQUE REQUIREMENTS), RESULTING FROM A FAILURE TO PROVIDE THE LEVEL OF TREATMENT APPROPRIATE FOR THE SYSTEM'S BIN CLASSIFICATION.**

~~(8) [Other violations or situations with significant potential to have serious adverse effects on human health as a result of short-term exposure, as determined by the Department on a case-by-case basis.]~~

*(Editor's Note: text moved to new #11)*

**Detection of *E. coli* in source water samples as specified in §§ 109.1303 and 109.1304 (relating to triggered monitoring requirements for groundwater sources; and assessment source water monitoring).**

**(9) A breakdown in treatment for groundwater sources as specified in § 109.1307(a)(1)(ii) (RELATING TO SYSTEM MANAGEMENT RESPONSIBILITIES).**

**(10) Occurrence of a waterborne disease outbreak, as defined in § 109.1 (relating to definitions), or other emergency situation as defined in § 109.701(a)(3)(iii) (relating to reporting and recordkeeping) that adversely affects the quality or quantity of the**

**finished water and has a significant potential to have serious adverse effects on human health as a result of short-term exposure.**

*(Editor’s Note: text from existing #7)*

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

*(Editor’s Note: text from existing #8)*

\* \* \* \* \*

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

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

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

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

\* \* \* \* \*

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

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

(1) Monitoring violations under Subchapter C [**or**], K, **L or M** [~~**(relating to monitoring requirements; and lead and copper)**~~], except when a Tier 1 notice is required under § 109.408 (relating to Tier 1 public notice--categories, timing and delivery of notice) or [**where**] **when** the Department determines that a Tier 2 notice is required.

\* \* \* \* \*

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

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

- (1) The nature of the significant deficiency and the date the significant deficiency was identified by the Department.**
- (2) The Department-approved plan and schedule for correction of the significant deficiency, including interim measures, progress to date, and any interim measures completed.**
- (3) For systems with a large proportion of non-English speaking consumers specified in § 109.411(c)(2) (RELATING TO CONTENT OF A PUBLIC NOTICE), information in the appropriate languages regarding the importance of the notice or a telephone number or address where consumers may contact the system to obtain a translated copy of the notice or assistance in the appropriate language.**

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

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

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

**(b) Delivery of the special notice for failure to determine bin classification or *Cryptosporidium* level. The owner or operator of a community or noncommunity water system that is required to determine a bin classification under § 109.1203 (relating to bin classification and treatment technique requirements), or to determine *Cryptosporidium* level under § 109.1203(i) and (j), shall notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed to report the determination as specified in ~~§ 109.1205(h)~~ § 109.1206(h) (relating to reporting and recordkeeping requirements) or**

§ 109.1203(i) and (j), initial round and second round, respectively. The notice shall be repeated as specified in § 109.409(b)(3). The notice is not required if the system is complying with a Department-approved schedule to address the violation.

(c) Form and manner of the special notice.

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

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

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

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

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

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

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

**Subchapter E. PERMIT REQUIREMENTS**

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

(a) *Permit application requirements.* An application for a public water system construction permit shall be submitted in writing on forms provided by the Department and shall be accompanied by plans, specifications, engineer’s report, water quality analyses and other data, information or documentation reasonably necessary to enable the Department to determine compliance with the act and this chapter. The Department will make available to the applicant the Public Water Supply Manual, available from the Bureau of Water Standards and Facility Regulation, Post Office Box [8467] **8774**, Harrisburg, Pennsylvania 17105 which contains acceptable design standards and technical guidance. Water quality analyses shall be conducted by a laboratory accredited under this chapter.

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

**(XII) FOR SURFACE WATER OR GUDI SOURCES, *E. COLI* OR CRYPTOSPORIDIUM, OR BOTH, AS SPECIFIED IN § 109.1202 (RELATING TO MONITORING REQUIREMENTS).**

~~{(XII)}~~ **(XIII)** Other contaminants that the Department determines necessary to evaluate the potability of the source.

\* \* \* \* \*

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

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

\* \* \* \* \*

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

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

~~**(A) Require treatment no greater than disinfection to provide water of a quality that meets the primary MCLs established under Subchapter B (relating to MCLs, MRDLs or treatment technique requirements).**~~

~~**(B) The treatment provided is not required under § 109.1302 (relating to treatment technique requirements) to meet at least 4-log treatment of viruses.**~~

\* \* \* \* \*

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

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

\* \* \* \* \*



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

\* \* \* \* \*

**(b) A NONCOMMUNITY WATER SYSTEM PROVIDING 4-LOG TREATMENT OF A GROUNDWATER SOURCE UNDER § 109.1302(B) (RELATING TO TREATMENT TECHNIQUE REQUIREMENTS) THAT HAS NOT OBTAINED A CONSTRUCTION PERMIT UNDER § 109.503 (RELATING TO PUBLIC WATER SYSTEM CONSTRUCTION PERMITS) AND AN OPERATIONS PERMIT UNDER § 109.504 (RELATING TO PUBLIC WATER SYSTEM OPERATION PERMITS) SHALL OBTAIN A NONCOMMUNITY WATER SYSTEM 4-LOG TREATMENT OF GROUNDWATER PERMIT UNDER § 109.1306 (RELATING TO INFORMATION DESCRIBING 4-LOG TREATMENT AND COMPLIANCE MONITORING) AND COMPLY WITH SUBSECTION (a)(2)(ii).**

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

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

**Subchapter F. DESIGN AND CONSTRUCTION STANDARDS**

**§ 109.602. Acceptable design.**

(a) A public water system shall be designed to provide an adequate and reliable quantity and quality of water to the public. The design [shall] **must** ensure that the system will, upon completion, be capable of providing water that complies with the primary and secondary MCLs, MRDLs and treatment techniques established in [Subchapter] **Subchapters B, L and M** (relating to MCLs, MRDLs or treatment technique requirements; **LONG TERM 2 ENHANCED SURFACE WATER TREATMENT REQUIREMENTS; and additional requirements for groundwater sources**) except as further provided in this section.

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

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

\* \* \* \* \*

**(3) FOR SURFACE WATER AND GUDI SOURCES PERMITTED AFTER (EDITOR'S NOTE: THE BLANK REFERS TO THE EFFECTIVE DATE OF ADOPTION OF THIS FINAL RULEMAKING) THAT ARE DETERMINED TO BE BIN 2 OR HIGHER, THE MINIMUM TREATMENT DESIGN FOR FILTRATION AND DISINFECTION MUST ALSO MEET THE REQUIREMENTS OF §§ 109.1203 AND 109.1204 (RELATING TO BIN CLASSIFICATION AND TREATMENT TECHNIQUE REQUIREMENTS; AND REQUIREMENTS FOR MICROBIAL TOOLBOX COMPONENTS).**

~~[(3)]~~ **(4) For community water systems using groundwater, the minimum treatment design standard for disinfection technologies utilized at the entry point is a total of 99.99% treatment of viruses.**

**(5) FOR NONCOMMUNITY WATER SYSTEMS USING GROUNDWATER WITH AN E. COLI-POSITIVE GROUNDWATER SOURCE SAMPLE COLLECTED UNDER § 109.505(3) (RELATING TO REQUIREMENTS FOR NONCOMMUNITY WATER SYSTEMS), THE MINIMUM TREATMENT DESIGN STANDARD FOR DISINFECTION TECHNOLOGIES UTILIZED AT THE ENTRY POINT IS A TOTAL OF 99.99% TREATMENT OF VIRUSES.**

**§ 109.611. Disinfection.**

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

**Subchapter G. SYSTEM MANAGEMENT RESPONSIBILITIES**

**§ 109.701. Reporting and recordkeeping.**

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

\* \* \* \* \*

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

(i) **[For systems] Systems** monitoring for chlorine dioxide under § 109.301(13):

(A) The dates, results, and locations of the samples that were taken during the previous month.

(B) Whether the MRDL was exceeded.

(C) Whether the MRDL was exceeded during any 2-consecutive daily samples and whether the resulting violation was acute or nonacute] shall report the number of days chlorine dioxide was used at each entry point during the last month.

(ii) [For systems] Systems monitoring for either chlorine or chloramines under § 109.301(13) [:] **SHALL REPORT THE FOLLOWING:** [~~the arithmetic average of all distribution samples taken in the last month.~~]

(A) The number of samples taken during [~~each~~] **THE** month [~~of the previous quarter~~].

(B) [The monthly arithmetic average of all samples taken in each month for the last 12 months.

(C) The arithmetic average of all monthly averages for the last 12 months.

(D) Whether the MRDL was exceeded.] ~~shall report the~~ **THE arithmetic average of all distribution samples taken in the last month.**

~~[(9) Reporting requirements for disinfection byproducts.~~

~~(i) Systems monitoring for TTHMs and HAA5 under § 109.301(12) shall report the following:~~

~~(A) Systems monitoring on a quarterly or more frequent basis shall report the following:~~

~~(I) The number of samples taken during the last quarter.~~

~~(II) The date, location and result of each sample taken during the last quarter.~~

~~(III) The arithmetic average of all samples taken in the last quarter.~~

~~(IV) The annual arithmetic average of the quarterly arithmetic averages for the last 4 quarters.~~

~~(V) Whether the annual arithmetic average exceeds the MCL for either TTHM or HAA5.~~

~~(B) Systems monitoring less than quarterly, but no less than annually shall report the following:~~

~~(I) The number of samples taken during the last year.~~

~~(II) The date, location and result of each sample taken during the last monitoring period.~~

~~(III) The arithmetic average of all samples taken in the last year.~~

~~(IV) Whether the annual arithmetic average exceeds the MCL for either TTHM or HAA5.~~

- ~~(C) Systems monitoring less than annually shall report the following:
 
  - ~~(I) The date, location and result of the last sample taken.~~
  - ~~(II) Whether the sample exceeds the MCL for either TTHM or HAA5.~~~~
- ~~(ii) Systems monitoring for chlorite under § 109.301(12) shall report the following:
 
  - ~~(A) The number of samples taken during the last month.~~
  - ~~(B) The date, location and result of each entry point and distribution sample taken during the last month.~~
  - ~~(C) The arithmetic average of each three-sample set of distribution samples taken during the last month.~~
  - ~~(D) Whether the monthly arithmetic average exceeds the MCL.~~~~
- ~~(iii) Systems monitoring for bromate under § 109.301(12) shall report the following:
 
  - ~~(A) The number of samples taken during the last quarter.~~
  - ~~(B) The date, location and result of each sample taken during the last quarter.~~
  - ~~(C) The arithmetic average of the monthly arithmetic averages of all samples taken in the last year.~~
  - ~~(D) Whether the annual arithmetic average exceeds the MCL.]~~~~

~~[(10)] Reporting requirements for [disinfection byproducts] DBP precursors.]~~

~~[Systems monitoring for TOC under 109.301(12) shall report in accordance with 40 CFR 141.134(d) (relating to reporting and recordkeeping requirements for disinfection byproduct precursors and enhanced coagulation or enhanced softening).]~~

~~[(11)]~~ (9) *Noncompliance report.* Except where a different reporting period is specified in this chapter, the water supplier shall report to the Department within 48 hours the failure to comply with any National Primary Drinking Water Regulation, including the failure to comply with any monitoring requirement set forth in this chapter.

**(Editors Note: The original proposed language approved by EQB was to have deleted the text for the existing paragraph 9 and renumber paragraph 10, but the opening bracket was erroneously dropped when the proposed rulemaking was published. But now, based on comments received, all of paragraphs 9 and 10 will be deleted from final rulemaking and paragraph 11 has been renumbered as paragraph 9.)**

\* \* \* \* \*

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

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

\* \* \* \* \*

(2) Records of performance monitoring required under § 109.301, **EXCEPT FOR TURBIDITY**, which shall be kept for at least 3 years. **RECORDS OF TURBIDITY PERFORMANCE MONITORING REQUIRED UNDER § 109.301 SHALL BE KEPT FOR AT LEAST 5 YEARS.** At a minimum, these records ~~[shall]~~ **MUST** contain the reporting requirements under subsection (a).

\* \* \* \* \*

(g) *Monitoring plans for disinfectants, [disinfection byproducts] DBPs and [disinfection byproduct] DBP precursors.*

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

[(1)] (i) The plan ~~[shall]~~ **must** include the following components:

[(i)] (A) \* \* \*

[(ii)] (B) \* \* \*

[(iii)] (C) \* \* \*

[(iv)] (D) \* \* \*

[(2)] (ii) \* \* \*

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

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

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

**(ii) Stage 2 DPB Rule[~~s-compliances~~] monitoring plan.**

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

**(I) Monitoring locations,**

(II) Monitoring dates,

(III) Compliance calculation procedures,

~~(IV) Monitoring plans for any other systems in the combined distribution system if the Department has reduced monitoring requirements under the Department authority.~~

(B) Public water systems not required to submit an IDSE report under either 40 CFR 141.601 or 141.602 (relating to standard monitoring; and system specific studies) as incorporated by reference, and do not have sufficient § 109.301(12)(i) monitoring locations to identify the required number of STAGE 2 DBP RULE compliance monitoring locations, shall identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of STAGE 2 DBP RULE compliance monitoring locations have been identified. The system shall also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. Systems that have more STAGE 1 DBP RULE monitoring locations than required for STAGE 2 DBP RULE compliance monitoring shall identify which locations will be used for STAGE 2 DBP RULE compliance monitoring by alternating selection of STAGE 1 DBP RULE MONITORING locations representing high TTHM levels and high HAA5 levels until the required number of STAGE 2 DBP RULE compliance monitoring locations have been identified.

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

(D) A public water system may revise its monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Department-approved reasons, after consultation with the Department regarding the need for changes and the appropriateness of changes. A system that changes monitoring locations, shall replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Department may also require modifications in the system's monitoring plan. ~~[A system using surface water or GUDI sources and serving more than 3,300 people,]~~ SYSTEMS shall submit a copy of ~~[its]~~ THE modified monitoring plan to the Department prior to the date the system is required to comply with the revised monitoring plan.

(iii) Operational evaluation levels.

(A) The operational evaluation level for TTHM and HAA5 is the sum of the two previous quarterly results plus twice the current quarter's result, divided by ~~[4]~~ FOUR. ~~[Each quarter, public]~~ PUBLIC water systems THAT ARE MONITORING QUARTERLY shall calculate the TTHM and HAA5 operation

evaluation levels for each monitoring location AT THE END OF EACH CALENDAR QUARTER.

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

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

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

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

(iv) Reporting and recordkeeping requirements.

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

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

\* \* \* \* \*

**(g) ADDITIONAL REPORTING AND RECORDKEEPING REQUIREMENTS FOR SYSTEMS USING SURFACE WATER OR GUDI SOURCES. IN ADDITION TO THE REPORTING AND RECORDKEEPING REQUIREMENTS OF THIS SUBCHAPTER, SYSTEMS USING SURFACE WATER OR GUDI SOURCES SHALL ALSO COMPLY WITH THE REPORTING AND RECORDKEEPING REQUIREMENTS OF § 109.1206 (RELATING TO REPORTING AND RECORDKEEPING REQUIREMENTS).**

**(i) m ADDITIONAL REPORTING AND RECORDKEEPING REQUIREMENTS FOR SYSTEMS USING GROUNDWATER SOURCES. IN ADDITION TO THE REPORTING AND RECORDKEEPING REQUIREMENTS OF THIS SUBCHAPTER, SYSTEMS USING GROUNDWATER SOURCES SHALL ALSO COMPLY WITH THE REPORTING AND RECORDKEEPING REQUIREMENTS OF § 109.1307 (RELATING TO SYSTEM MANAGEMENT RESPONSIBILITIES).**

*These subsections need to be renumbered because of the Gen Update revisions (published 5/23/09)*

**§ 109.705. Sanitary surveys.**

\* \* \* \* \*

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

(1) Undergo a sanitary survey conducted by the Department by June 29, 1994, and thereafter undergo a subsequent sanitary survey conducted by the Department at a minimum **frequency** of every 3 years **[after the initial sanitary survey depending on the type of source, treatment and population served] [or every 5 years if notified by the Department that the system has an outstanding performance record].**

(2) Increase the number of routine coliform samples collected to at least five samples per month if the Department does not conduct a sanitary survey by June 29, 1994, or within 3 years **[the appropriate frequency as described in paragraph (1)]** following the initial or a subsequent sanitary survey. This increased sampling frequency shall be in place of the monitoring frequency requirements for coliforms in § 109.301(3)(i) (relating to general monitoring requirements) and **[shall]** remain in effect through the month in which the next sanitary survey is conducted by the Department.

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

(1) Undergo an initial sanitary survey conducted by the Department by June 29, 1999, and thereafter undergo a subsequent sanitary survey at a minimum of every 5 years after the initial sanitary survey **[except that noncommunity systems using only protected and disinfected groundwater shall undergo subsequent sanitary surveys at a minimum of every 10 years after the initial sanitary survey].**

(2) Increase the number of routine coliform samples collected to at least five samples per month if the Department does not conduct a sanitary survey by June 29, 1999, or within 5 **[or 10 years using the criteria in paragraph (1)] years** following the initial or a subsequent sanitary survey. This increased sampling frequency shall be in place of the monitoring frequency requirements for coliforms in § 109.301(3)(i) and shall remain in effect through the month in which the next sanitary survey is conducted by the Department.



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

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

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

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

## Subchapter H. LABORATORY CERTIFICATION

### § 109.801. Certification requirement.

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

### § 109.810. Reporting and notification requirements.

\* \* \* \* \*

~~(b) [A laboratory accredited under Chapter 252 shall whenever]~~ **Whenever** an MCL, MRDL or a treatment technique performance requirement under § 109.202 (relating to State MCLs, MRDLs and treatment technique requirements) is violated, or a sample result requires the collection of check samples under § 109.301 (relating to general monitoring requirements) ~~or a sample collected under Subchapter M (relating to additional requirements for groundwater sources) is *E. coli* positive a laboratory accredited under Chapter 252 shall:~~

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

*(Editor's Note: the proposed revisions were based on the existing Ch 109 language at that time. Since then, § 109.810(b) was revised as part of the General Update revisions, so these final revisions show the proposed changes based on the currently existing language.)*

\* \* \* \* \*

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

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

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

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

\* \* \* \* \*

(b) **THE MCL FOR TOTAL COLIFORMS ESTABLISHED UNDER § 109.202(a) (RELATING TO STATE MCLS, MRDLS AND TREATMENT TECHNIQUE REQUIREMENTS) IS NOT ELIGIBLE FOR A VARIANCE.**

(c) The Department may grant one or more variances to a public water system from a treatment technique requirement upon a finding that the public water supplier applying for the variance has demonstrated that, because of the nature of the raw water source of the system the treatment technique is not necessary to protect the health of the persons served by the system. The treatment technique requirements established under § 109.202(c) [~~relating to State MCLs, MRDLS and treatment techniques requirements~~ and ], **THE TREATMENT TECHNIQUE REQUIREMENTS ESTABLISHED UNDER §§ 109.1203 AND 109.1302 (RELATING TO BIN CLASSIFICATION AND TREATMENT TECHNIQUE REQUIREMENTS; AND TREATMENT TECHNIQUE REQUIREMENTS)** are not eligible for a variance.

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

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

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

\* \* \* \* \*

**(4) Management or restructuring changes or both as provided in 40 CFR 142.20(b)(1)(i) (relating to State-issued variances and exemptions) cannot**

**reasonably be made that will result in compliance with the applicable MCL or treatment technique requirement or, if compliance cannot be achieved, improve the quality of the drinking water.**

**(b) THE MCL FOR TOTAL COLIFORMS ESTABLISHED UNDER § 109.202(a) (RELATING TO STATE MCLS, MRDLs AND TREATMENT TECHNIQUE REQUIREMENTS) IS NOT ELIGIBLE FOR AN EXEMPTION.**

**(c) The treatment technique requirements established under § 109.202(c) [~~(relating to State MCLS, MRDLs and treatment technique requirements) and~~], THE treatment technique requirements established under §§ 109.1102(b), 109.1203 AND 109.1302 (relating to action levels and treatment technique requirements; BIN CLASSIFICATION AND TREATMENT TECHNIQUE REQUIREMENTS; AND TREATMENT TECHNIQUE REQUIREMENTS) are not eligible for an exemption.**

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

The Department will consider comments received during the comment period and testimony in the record of a public hearing held with respect to the request for a variance or exemption before making a determination. The Department will consider the availability of alternative water sources, risks to the public health from granting the relief requested and other relevant factors including the following considerations:

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

\* \* \* \* \*

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

\* \* \* \* \*

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

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

\* \* \* \* \*

**(c) If the Department makes a determination to grant a variance or exemption request, it will document its findings as required under 40 CFR 142.20(a)(1) (RELATING TO**

**STATE ISSUED VARIANCES AND EXEMPTIONS UNDER SECTION 1415(a) AND SECTION 1416 OF THE ACT) for granting a variance, and under 40 CFR 142.20(b)(1) for granting an exemption.**

**§ 109.908. Compliance schedules.**

\* \* \* \* \*

**(e) In accordance with 40 CFR 142.20(b)(2) (RELATING TO STATE ISSUED VARIANCES AND EXEMPTIONS UNDER SECTION 1415(a) AND SECTION 1416 OF THE ACT), the Department may renew an exemption for a public water system that serves fewer than 3,300 persons and which needs financial assistance for the necessary improvements under the initial compliance schedule, provided the Department establishes that the system is taking all practicable steps to meet the requirements of this subchapter and the established compliance schedule to achieve full compliance with the applicable MCL or treatment technique requirement. The Department must document its findings in granting an extension under this subsection.**

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

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

\* \* \* \* \*

**(c) BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS SHALL COMPLY WITH THE TREATMENT TECHNIQUE REQUIREMENTS UNDER SUBCHAPTER L (RELATING TO BIN CLASSIFICATION AND TREATMENT TECHNIQUE REQUIREMENTS)**

**~~{(e)}~~ (d) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with Subchapter M (relating to additional requirements for groundwater sources). FOR THE PURPOSE OF DETERMINING COMPLIANCE WITH SUBCHAPTER M, BOTTLED WATER AND VENDED SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS USING GROUNDWATER SOURCES SHALL COMPLY WITH STANDARDS PERTAINING TO NONCOMMUNITY GROUNDWATER SYSTEMS.**

**§ 109.1003. Monitoring requirements.**

(a) *General monitoring requirements.* Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall monitor for compliance with the MCLs and MRDLs in accordance with § 109.301 (relating to general monitoring requirements) and ~~{shall}~~ comply with § 109.302 (relating to special monitoring requirements) ~~[and § 109.1202 (relating to monitoring requirements)]~~. The monitoring requirements shall be applied as

follows, except that systems which have installed treatment to comply with primary MCL shall conduct quarterly operational monitoring for the contaminant which the facility is designed to remove:

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

\* \* \* \* \*

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

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

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

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

(II) Systems that use groundwater sources that qualify for reduced monitoring shall remain on reduced monitoring if the TTHM **annual** average is no greater than 0.060 mg/L and the HAA5 **annual** average is no greater than 0.045 mg/L. Systems that exceed these levels shall resume routine monitoring as prescribed in clause (A), except that systems that exceed either a TTHM or HAA5 MCL shall increase monitoring to at least **[1] one** sample per quarter per entry point beginning in the quarter immediately following the quarter in which the system exceeds the TTHM or HAA5 MCL.

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

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

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

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

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

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

**(B) Reduced monitoring.**

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

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

\* \* \* \* \*

*(b) Sampling requirements.*

(1) For bottled water and vended water systems, retail water facilities and bulk water hauling systems, samples taken to determine compliance with ~~[MCLs, MRDLs, monitoring requirements, including special monitoring requirements for unregulated contaminants, and treatment techniques]~~ SUBSECTION (a) shall be taken from each entry point.

\* \* \* \* \*

**(f) Additional monitoring requirements for surface water and GUDI sources. BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS SHALL COMPLY WITH THE MONITORING REQUIREMENTS UNDER SUBCHAPTER L (RELATING TO LONG-TERM 2 ENHANCED SURFACE WATER TREATMENT REQUIREMENTS).**

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

**§ 109.1008. System management responsibilities.**

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

\* \* \* \* \*

**(4) IN ADDITION TO THE REQUIREMENTS OF THIS SUBSECTION, BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS USING SURFACE WATER OR GUDI SOURCES SHALL ALSO COMPLY WITH THE REPORTING AND RECORDKEEPING REQUIREMENTS OF SUBCHAPTER L (RELATING TO LONG-TERM 2 ENHANCED SURFACE WATER TREATMENT REQUIREMENTS).**

**(5) IN ADDITION TO THE REQUIREMENTS OF THIS SUBSECTION, BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS USING GROUNDWATER SOURCES, INCLUDING PURCHASED GROUNDWATER, SHALL ALSO COMPLY WITH THE REPORTING AND RECORDKEEPING REQUIREMENTS OF SUBCHAPTER M (RELATING TO ADDITIONAL REQUIREMENTS FOR GROUNDWATER SOURCES).**

\* \* \* \* \*

(Editor Note: The following subchapter is new. It appears in regular text to enhance readability.)

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

109.1201 Scope.

109.1202 Monitoring requirements.

109.1203 Bin classification and treatment technique requirements.

109.1204 Requirements for microbial toolbox components.

109.1205 **GRANDFATHERING PREVIOUSLY COLLECTED DATA.**

**109.1206** Reporting and recordkeeping requirements.

**§ 109.1201. Scope.**

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

(b) *Applicability.* This subchapter applies to public water systems supplied by a surface water source and public water systems supplied by a groundwater source under the direct influence of surface water.

~~[(1) Wholesale systems]~~ **SYSTEMS THAT ARE PART OF A COMBINED DISTRIBUTION SYSTEM** shall comply with the requirements of this subchapter based on the population of the largest system in the combined distribution system.

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

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



- (i) For systems using lake/reservoir sources, the annual mean *E. coli* concentration is greater than 10 *E. coli*/100 mL.
  - (ii) For systems using flowing stream sources, the annual mean *E. coli* concentration is greater than 50 *E. coli*/100 mL.
  - (iii) The system does not conduct *E. coli* monitoring as described in paragraph (3).
  - (iv) Systems using groundwater sources under the direct influence of surface water (GUDI) shall comply with this paragraph based on the *E. coli* level that applies to the nearest surface water body. If no surface water body is nearby, the system shall comply based on the requirements that apply to systems using lake/reservoir sources.
- (5) For filtered systems serving less than 10,000 people, the Department may approve monitoring for an indicator other than *E. coli* under paragraph (3). The Department also may approve an alternative to the *E. coli* concentration in paragraph (4)(i), (ii) or (iv) to trigger *Cryptosporidium* monitoring. This approval by the Department would be based on EPA-supported research indicating the validity of an alternative to *E. coli*. The Department will provide this approval to the system in writing and will include the basis for the Department's determination that the alternative indicator, trigger level, or both, will provide a more accurate identification of whether a system will exceed the Bin 1 *Cryptosporidium* level in § 109.1203(c) (relating to bin classification and treatment technique requirements).
- (6) Unfiltered systems serving less than 10,000 people shall sample their source water for *Cryptosporidium* at least twice per month for 12 months or at least monthly for 24 months.
- (7) Systems may sample more frequently than required under this section if the sampling frequency is evenly spaced throughout the monitoring period.
- (b) *Second round of source water monitoring.* Systems shall conduct a second round of source water monitoring that meets the requirements for monitoring parameters, frequency, and duration described in subsection (a), unless they meet the monitoring exemption criteria in subsection (d). Systems shall conduct this monitoring on the schedule in subsection (c).
- (c) *Source water monitoring schedule.* Systems shall begin the monitoring required in subsections (a) and (b) as follows:
- (1) At least 100,000 people:
    - (i) Begin the first round of source water monitoring no later than the month beginning October 1, 2006.
    - (ii) Begin the second round of source water monitoring **AT LEAST 6 YEARS AFTER SUBMITTING THE INITIAL BIN CLASSIFICATION BUT** no later than the month beginning April 1, 2015.
  - (2) From 50,000 to 99,999 people:
    - (i) Begin the first round of source water monitoring no later than the month beginning April 1, 2007.

- (ii) Begin the second round of source water monitoring **AT LEAST 6 YEARS AFTER SUBMITTING THE INITIAL BIN CLASSIFICATION BUT** no later than the month beginning October 1, 2015.
- (3) From 10,000 to 49,999 people:
- (i) Begin the first round of source water monitoring no later than the month beginning April 1, 2008.
- (ii) Begin the second round of source water monitoring **AT LEAST 6 YEARS AFTER SUBMITTING THE INITIAL BIN CLASSIFICATION BUT** no later than the month beginning October 1, 2016.
- (4) Less than 10,000 people and monitor for *E coli*:
- (i) Begin the first round of source water monitoring no later than the month beginning October 1, 2008.
- (ii) Begin the second round of source water monitoring **AT LEAST 6 YEARS AFTER SUBMITTING THE INITIAL BIN CLASSIFICATION BUT** no later than the month beginning October 1, 2017.
- (5) Less than 10,000 and monitor for *Cryptosporidium*:
- (i) Begin the first round of source water monitoring no later than the month beginning April 1, 2010.
- (ii) Begin the second round of source water monitoring **AT LEAST 6 YEARS AFTER SUBMITTING THE INITIAL BIN CLASSIFICATION BUT** no later than the month beginning April 1, 2019.
- (d) *Source water monitoring avoidance.*
- (1) *5.5 log treatment.* A filtered system is not required to conduct source water monitoring under this subchapter if the system will provide a total of at least 5.5-log of treatment for *Cryptosporidium*, equivalent to meeting the treatment requirements of Bin 4 in § 109.1203.
- (2) *Notification.* If a system chooses to provide the level of treatment in paragraph (1), as applicable, rather than start source water monitoring, the system shall notify the Department in writing no later than the date the system is otherwise required to submit a sampling schedule for monitoring under subsections ~~[(i)--(k)]~~ **(h) -- (j)**. Alternatively, a system may choose to stop sampling at any point after it has initiated monitoring if it notifies the Department in writing that it will provide this level of treatment. Systems shall install and operate technologies to provide this level of treatment by the applicable treatment compliance date in § 109.1203(k)--(o).
- (e) *Plants operating only part of the year.* Public water systems supplied by a surface water source and public water systems supplied by a groundwater source under the direct influence of surface water that operate for only part of the year shall conduct source water monitoring in accordance with this subchapter, but with the following modifications:

(1) Systems shall sample their source water only during the months that the plant operates unless the Department specifies another monitoring period based on plant operating practices.

(2) Systems with plants that operate less than 6 months per year and that monitor for *Cryptosporidium* shall collect at least six *Cryptosporidium* samples per year during each of 2 years of monitoring. Samples must be evenly spaced throughout the period the plant operates or is anticipated to operate.

(f) *New sources.*

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

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

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

(g) *Monitoring violations.* Failure to collect any source water sample required under this section in accordance with the sampling schedule, sampling location, analytical method, approved laboratory and reporting requirements of this subsection, §§ 109.304 and ~~109.1205(a)--(e)~~ 109.1206(a)--(e) (relating to analytical requirements; and reporting and recordkeeping requirements) 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. Data submitted under this subsection must meet the requirements in § 109.1205(f).~~

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

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

- (2) A system must comply with the following:
- (i) A system serving at least 10,000 people shall submit its sampling schedule for the initial round of source water monitoring under subsection (a) to the EPA electronically at <https://intranet.epa.gov/lt2/>.
  - (ii) If a system is unable to submit the sampling schedule electronically, the system may use an alternative approach for submitting the sampling schedule that the EPA approves.
- (3) A system serving less than 10,000 people shall submit its sampling schedules for the initial round of source water monitoring under subsection (a) to the Department.
- (4) Systems shall submit sampling schedules for the second round of source water monitoring under subsection (b) to the Department.
- (5) If the EPA or the Department does not respond to a system regarding its sampling schedule, the system shall sample at the reported schedule.

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

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

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

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

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

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

~~(4)~~ **(k)** *Source water sampling locations.* Systems required to conduct source water monitoring under subsections (a)-~~(h)~~ **(g)** shall collect samples for each plant that treats a surface water or GUDI source. When multiple plants draw water from the same influent, such as the same pipe or intake, the Department may approve one set of monitoring results to be used to satisfy the requirements of subsections (a)-~~(h)~~ **(g)** for all plants.

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

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

~~(o)~~ **(n)** *Bank filtration.*

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

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

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

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

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

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

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

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

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

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

(b) *Procedures for calculating bin classifications.*

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

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

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

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

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

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

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

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

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

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

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

(d) *Cryptosporidium bin concentration recalculation requirements.* Following completion of the second round of source water monitoring required under § 109.1202(b), filtered systems shall recalculate their *Cryptosporidium* bin concentration using the *Cryptosporidium* results reported under § 109.1202(b) and following the procedures in subsection (b)~~[(1)--(4)]~~. Systems shall then redetermine their bin classification using the bin concentrations subsection (c).

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

(1) *Bin 1.* If the system bin classification is Bin 1 ~~{and the system is in full compliance with applicable treatment technique requirements under § 109.202(e)}~~, the system shall provide additional *Cryptosporidium* treatment as follows:

- (i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide no additional treatment.
- (ii) Direct filtration treatment must provide no additional treatment.
- (iii) Alternative filtration technologies must provide no additional treatment.

(2) *Bin 2.* If the system bin classification is Bin 2 ~~{and the system is in full compliance with applicable treatment technique requirements under § 109.202(e) (relating to State MDLs, MDRLs and technique requirements)}~~, the system shall provide additional *Cryptosporidium* treatment as follows:

- (i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide 1-log additional treatment.
- (ii) Direct filtration treatment must provide 1.5 log additional treatment.
- (iii) Alternative filtration technologies must provide additional treatment as determined by the Department such that the total *Cryptosporidium* removal and inactivation is at least 4.0 log.

(3) *Bin 3.* If the system bin classification is Bin 3 ~~{and the system is in full compliance with applicable treatment technique requirements under § 109.202(e)}~~, the system shall provide additional *Cryptosporidium* treatment as follows:

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

- (ii) Direct filtration treatment must provide 2.5 log additional treatment.
  - (iii) Alternative filtration technologies must provide additional treatment as determined by the Department so that the total *Cryptosporidium* removal and inactivation is at least 5.0 log.
- (4) *Bin 4*. If the system bin classification is Bin 4 ~~[and the system is in full compliance with applicable treatment technique requirements under § 109.202(e)]~~, the system shall provide additional *Cryptosporidium* treatment as follows:
- (i) Conventional filtration treatment (including softening), slow sand or diatomaceous earth filtration must provide 2.5-log additional treatment.
  - (ii) Direct filtration treatment must provide 3 log additional treatment.
  - (iii) Alternative filtration technologies must provide additional treatment as determined by the Department so that the total *Cryptosporidium* removal and inactivation is at least 5.5 log.
- (f) *Treatment and management options for filtered systems, microbial toolbox*.
- (1) Filtered systems shall use one or more of the treatment and management options listed in § 109.1204 (relating to requirements for microbial toolbox components), termed the microbial toolbox, to comply with the additional *Cryptosporidium* treatment required in subsection (e).
  - (2) Systems using sources classified in Bin 3 and Bin 4 shall achieve at least 1-log of the additional *Cryptosporidium* treatment required under § 109.1204(a) using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone or UV, as described in § 109.1204(b), (c) and (n)--(q) (relating to requirements for microbial toolbox components).
- (g) *Failure to meet treatment credit*. Failure by a system in any month to achieve treatment credit by meeting criteria in § 109.1204(b), (c) and (n)--(q) for microbial toolbox options that is at least equal to the level of treatment required in subsection (e) is a violation of the treatment technique requirement.
- (h) *Increased watershed contamination*. If the Department determines during a sanitary survey or an equivalent source water assessment that after a system completed the monitoring conducted under § 109.1202(a) or (b), significant changes occurred in the system's watershed that could lead to increased contamination of the source water by *Cryptosporidium*, the system shall take actions specified by the Department to address the contamination. These actions may include additional source water monitoring or implementing microbial toolbox options listed in § 109.1204, or both.
- (i) *Unfiltered systems determination of Cryptosporidium bin level, initial round*. Following completion of the initial source water monitoring required under § 109.1202(a), unfiltered systems shall calculate their bin classification using the methods listed in subsections (b) and (c).
- (j) *Unfiltered systems determination of Cryptosporidium bin level, second round*. Following completion of the second round of source water monitoring required under subsection (b),



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

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

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

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

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

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

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

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

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

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

(o) *Change in Cryptosporidium level for unfiltered system.* If the *Cryptosporidium* **BIN** level for an unfiltered system ~~{changes}~~ **INCREASES** following the second round of monitoring, as determined under subsection (j), ~~{and if}~~ the system shall provide ~~{a different}~~ **THE ADDITIONAL** level of *Cryptosporidium* treatment under ~~{subsections (i) and (j) due to this change, the system shall meet this treatment requirement}~~ **SUBSECTIONS (e)--(h)** on a schedule the Department approves.

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

(a) A system will receive the treatment credits listed Appendix B to Subchapter L. Microbial Toolbox Summary Table: Options, Treatment Credits and Criteria ~~{which is available from the Department at [www.depweb.state.pa.us](http://www.depweb.state.pa.us) (DEP Keyword:~~

**Participation; select "~~Proposals Currently Open for Comment~~" or through the Contact Persons listed in the Preamble**], by meeting the conditions for microbial toolbox components described in subsections (b)--(q). A system shall apply these treatment credits to meet the treatment technique requirements listed in section § 109.1203 (relating to bin classification and treatment technique requirements).

(b) *Watershed control program.* ~~[Systems]~~ **FILTERED SYSTEMS** receive 0.5-log *Cryptosporidium* treatment credit for implementing a watershed control program that meets the requirements of this subsection. This credit may not be used to maintain the additional log removal credits specified in § 109.1203. This credit may only be applied in addition to the toolbox options used to meet the minimum log removal and may apply in lieu of a toolbox option for which credit has been temporarily revoked. **UNFILTERED SYSTEMS ARE NOT ELIGIBLE FOR THIS CREDIT.**

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

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

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

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

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

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

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

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

(i) Submit an annual watershed control program status report to the Department. The annual watershed control program status report must describe the system's

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

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

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

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

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

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

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

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

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

(c) *Alternative source.*

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

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

(3) Alternative source monitoring under paragraph (1) must meet the requirements for source monitoring to determine bin classification, as described in ~~§~~ 109.1202 and ~~§ 109.1205~~ **§ 109.1206 (RELATING TO REPORTING AND RECORDKEEPING REQUIREMENTS)**. Systems shall report the alternative source monitoring results to the Department, along with supporting information documenting the operating conditions under which the samples were collected.

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

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

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

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

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

(i) Demonstrates at least 0.5-log mean reduction of influent turbidity. This reduction must be determined using daily turbidity measurements in the presedimentation process influent and effluent and must be calculated as follows:  $\log_{10}(\text{monthly mean of daily influent turbidity}) - \log_{10}(\text{monthly mean of daily effluent turbidity})$ .

(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 two separate and sequential softening stages prior to filtration. Both softening stages must treat the entire plant flow taken from a surface water or GUDI source.

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

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

(2) Only wells in granular aquifers are eligible for treatment credit. Granular aquifers are those comprised of sand, clay, silt, rock fragments, pebbles or larger particles and

minor cement. A system shall characterize the aquifer at the well site to determine aquifer properties. Systems shall extract a core from the aquifer and demonstrate that in at least 90% of the core length, grains less than 1.0 mm in diameter constitute at least 10% of the core material.

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

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

(5) Systems shall monitor each wellhead for turbidity at least once every 4 hours while the bank filtration process is in operation. If monthly average turbidity levels, based on daily maximum values in the well, exceed 1 NTU, the system shall report this result to the Department and conduct an assessment within 30 days to determine the cause of the high turbidity levels in the well. If the Department determines that microbial removal has been compromised, the Department may revoke treatment credit until the system implements corrective actions approved by the Department to remediate the problem.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

from challenge testing conducted prior to January 5, 2006, if the prior testing was consistent with the criteria specified in paragraphs (2)--(9).

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

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

(4) The maximum feed water concentration that can be used during a challenge test must be based on the detection limit of the challenge particulate in the filtrate (that is, filtrate detection limit) and must be calculated using the following equation:

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

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

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

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

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

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

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

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

lowest to highest. If necessary, the 10th percentile may be calculated using linear interpolation.

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

(k) *Membrane filtration.*

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

- (i) The removal efficiency demonstrated during challenge testing conducted under the conditions in paragraph (2).
- (ii) The maximum removal efficiency that can be verified through direct integrity testing used with the membrane filtration process under the conditions in paragraph (3).

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

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

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

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

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

(iv) Challenge testing must be conducted under representative hydraulic conditions at the maximum design flux and maximum design process recovery specified by the manufacturer for the membrane module. Flux is defined as the throughput of a



pressure driven membrane process expressed as flow per unit of membrane area. Recovery is defined as the volumetric % of feed water that is converted to filtrate over the course of an operating cycle uninterrupted by events such as chemical cleaning or a solids removal process (that is, backwashing).

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

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

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

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

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

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

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

(i) The direct integrity test must be independently applied to each membrane unit in service. A membrane unit is defined as a group of membrane modules that share

common valving that allows the unit to be isolated from the rest of the system for the purpose of integrity testing or other maintenance.

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

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

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

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

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

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

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

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

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

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

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

(4) *Indirect integrity monitoring.* Systems shall conduct continuous indirect integrity monitoring on each membrane unit according to the criteria in subparagraphs (i)--(v).

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

- (i) Unless the Department approves an alternative parameter, continuous indirect integrity monitoring must include continuous filtrate turbidity monitoring.
  - (ii) Continuous monitoring must be conducted at least once every 15 minutes.
  - (iii) Continuous monitoring must be separately conducted on each membrane unit.
  - (iv) If indirect integrity monitoring includes turbidity and if the filtrate turbidity readings are above 0.15 NTU for a period greater than 15 minutes (that is, two consecutive 15-minute readings above 0.15 NTU), direct integrity testing must immediately be performed on the associated membrane unit as specified in paragraph (3)(i)--(v).
  - (v) If indirect integrity monitoring includes a Department-approved alternative parameter and if the alternative parameter exceeds a Department-approved control limit for a period greater than 15 minutes, direct integrity testing shall immediately be performed on the associated membrane units as specified in paragraph (3)(i)--(v).
- (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 (o) or (p) must calculate CT at least once each day, with both C and T measured during peak hourly flow as specified in § 109.304(c) and 40 CFR 141.74(b)(3) (relating to analytical and monitoring requirements).
  - (2) Systems with several disinfection segments in sequence may calculate CT for each segment, where a disinfection segment is defined as a treatment unit process with a

measurable disinfectant residual level and a liquid volume. Under this approach, systems shall add the *Cryptosporidium* CT values in each segment to determine the total CT for the treatment plant.

(o) *Chlorine dioxide*. Systems are eligible to receive the *Cryptosporidium* treatment credit listed in Table 1, CT Values (mg \* min/L) for *Cryptosporidium* Inactivation by Chlorine Dioxide, contained in Appendix A to Subchapter L [~~which is available from the Department at [www.depweb.state.pa.us](http://www.depweb.state.pa.us) (DEP Keyword: Participation; select "Proposals Currently Open for Comment" or through the Contact Persons listed in the Preamble)~~], 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 [~~which is available from the Department at [www.depweb.state.pa.us](http://www.depweb.state.pa.us) (DEP Keyword: Participation; select "Proposals Currently Open for Comment" or through the Contact Persons listed in the Preamble)~~], 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 [~~which is available from the Department at [www.depweb.state.pa.us](http://www.depweb.state.pa.us) (DEP Keyword: Participation; select "Proposals Currently Open for Comment" or through the Contact Persons listed in the Preamble)~~], as described in paragraph (1). Systems shall validate and monitor UV reactors as described in paragraphs (2) and (3) to demonstrate that they are achieving a particular UV dose value for treatment credit.

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

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

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

- (A) UV absorbance of the water.
- (B) Lamp fouling and aging.
- (C) Measurement uncertainty of on-line sensors.
- (D) UV dose distributions arising from the velocity profiles through the reactor.

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

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

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

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

(3) *Reactor monitoring.*

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

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

**§ 109.1205. GRANDFATHERING PREVIOUSLY COLLECTED DATA.**

**A SYSTEM MAY COMPLY WITH THE INITIAL SOURCE WATER MONITORING REQUIREMENTS OF § 109.1202 (RELATING TO MONITORING REQUIREMENTS) BY GRANDFATHERING PREVIOUSLY COLLECTED DATA. THE SYSTEM SHALL MEET THE GRANDFATHERING REQUIREMENTS ESTABLISHED BY EPA UNDER THE NATIONAL PRIMARY DRINKING WATER REGULATIONS IN 40 CFR 141.707 (RELATING TO GRANDFATHERING PREVIOUSLY COLLECTED DATA) WHICH ARE INCORPORATED BY REFERENCE.**

**§ ~~109.1205~~ 109.1206. Reporting and recordkeeping requirements.**

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

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

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

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

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

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

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

(1) *Cryptosporidium data elements.* Systems shall report data elements in subparagraphs (i)--(vii) for each *Cryptosporidium* analysis. Systems shall report, **IN A FORM ACCEPTABLE TO THE DEPARTMENT**, data elements in subparagraphs (viii)--(x) as applicable.

(i) PWS ID.

(ii) ~~Facility~~ **SOURCE** ID.

(iii) Sample collection date.

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

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

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

(vii) Number of oocysts counted.

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

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

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

(2) *E. coli data elements.* Systems shall report, **IN A FORM ACCEPTABLE TO THE DEPARTMENT**, the following data elements for each *E. coli* analysis:

(i) PWS ID.

(ii) ~~Facility~~ **SOURCE** ID.

(iii) Sample collection date.

(iv) Analytical method number.

(v) Method type.

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

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

(viii) Turbidity, **IF MONITORING IS REQUIRED UNDER § 109.1202.**

(f) [~~Grandfathering data. Grandfathering previously collected data requirements, established by the EPA under the National Primary Drinking Water regulations in 40 CFR 141.707 (relating to grandfathering previously collected data) 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)] **(h)--(j)** and source water monitoring results under subsections (a)--(e) unless they notify the Department that they will not conduct source water monitoring due to meeting the criteria of § 109.1202(d).

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

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

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

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

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

~~(h)~~ **(h)** *Microbial toolbox reporting requirements.* Systems are required to report items specified § 109.1204 (relating to requirements for microbial toolbox components) for all toolbox components for which they are requesting treatment credit. Systems must report to the State in accordance with Appendix C to subchapter L. Microbial Toolbox Reporting Requirements [~~which is available from the Department at [www.depweb.state.pa.us](http://www.depweb.state.pa.us) (DEP Keyword: Participation; select "Proposals Currently Open for Comment" or through the Contact Persons listed in the Preamble)~~] **IN A FORM ACCEPTABLE TO THE DEPARTMENT. [-] SYSTEMS USING TREATMENT OPTIONS OTHER THAN CONVENTIONAL, DIRECT, SLOW SAND OR DIATOMACEOUS EARTH FILTRATION FOR BIN 1 SOURCES SHALL ALSO REPORT, IN A FORM ACCEPTABLE TO THE DEPARTMENT, THE ITEMS SPECIFIED IN § 109.1204 FOR THE TREATMENT OPTIONS USED.**

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

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

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

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

**(Editor's Note: The following subchapter is new. It appears in regular text to enhance readability.)**

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

### **§ 109.1301. Scope.**

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

### **§ 109.1302. Treatment technique requirements.**

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

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

(2) Maintain at each groundwater entry point a residual disinfectant concentration no less than ~~[0.4]~~ **0.40** mg/L expressed as free chlorine or its equivalent as approved by the Department, or other minimum residual ~~[specified]~~ **APPROVED** by the Department **AS DEMONSTRATED UNDER § 109.1306 (RELATING TO INFORMATION DESCRIBING 4-LOG TREATMENT AND COMPLIANCE MONITORING) TO PROVIDE 4-LOG TREATMENT OF VIRUSES.**

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

(i) October 1, 2010, for systems serving more than 500 persons.

(ii) October 1, 2011, for systems serving 100 to 500 persons.



- (iii) October 1, 2012, for systems serving less than 100 persons.
- (4) Provide at least 4-log treatment of viruses prior to ~~[each groundwater entry point]~~ **THE FIRST CUSTOMER** when directed by the Department or no later than:
  - (iv) ~~[January]~~ **APRIL** 1, 2011, for systems serving more than 500 persons.
  - (v) ~~[January]~~ **APRIL** 1, 2012, for systems serving 100 to 500 persons.
  - (vi) ~~[January]~~ **APRIL** 1, 2013, for systems serving less than 100 persons.
  - (vii) A Department-approved alternative compliance schedule.
- (5) Conduct compliance monitoring as described in § 109.1305 (relating to compliance monitoring) when directed by the Department following notification of approval by the Department that at least 4-log treatment of viruses has been demonstrated for a groundwater source or sources.
- (6) Provide at least 4-log treatment of viruses for new sources permitted after December 1, 2009, and conduct compliance monitoring as described in § 109.1305 beginning the first day the ~~[entry point]~~ **SOURCE** is put into service.
- (b) *Noncommunity groundwater systems including bottled water and vended water systems, retail water facilities and bulk water hauling systems.*
  - (1) Noncommunity groundwater systems may demonstrate at least 4-log treatment of viruses is provided prior to ~~[a groundwater entry point]~~ **THE FIRST CUSTOMER** by submitting information as required under § 109.1306. Systems demonstrating at least 4-log treatment of viruses under this paragraph shall:
    - (i) ~~[Conduct]~~ **COMPLY WITH** compliance monitoring ~~[as described in]~~ **REQUIREMENTS UNDER** § 109.1305 when directed by the Department following notification of approval by the Department that at least 4-log treatment of viruses has been demonstrated for a groundwater source or sources.
    - (ii) Comply with triggered monitoring requirements under § 109.1303 until beginning compliance monitoring under subparagraph (i).
  - (2) Noncommunity groundwater systems not demonstrating at least 4-log treatment to the Department shall:
    - (i) Comply with triggered monitoring requirements under § 109.1303.
    - (ii) Comply with the requirements of assessment source water monitoring as described in § 109.1304 (relating to assessment source water monitoring) if the Department determines a groundwater source is at risk to fecal contamination. The Department will consider any factors that identify sources at risk to fecal contamination, including one or more of the following:
      - (A) Sensitivity of the source aquifer to fecal contamination.
      - (B) Proximity to sources of fecal contamination.
      - (C) Microbiological sampling history.
- (c) *Groundwater systems with significant deficiencies or source water E. coli contamination.*

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

- (i) Provide an alternative source of water.
- (ii) Eliminate the source of contamination.
- (iii) Submit information required under § 109.1306 and provide treatment that reliably achieves at least 4-log treatment of viruses before ~~for at~~ the first customer for the groundwater source or sources **AND COMPLY WITH COMPLIANCE MONITORING REQUIREMENTS UNDER § 109.1305.**

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

- (i) Written notice from the Department of a significant deficiency.
- (ii) Notification from a laboratory under § 109.810(b) (relating to reporting and notification requirements) that a groundwater source sample collected under § 109.1303(a) or § 109.1304(a) was found to be *E. coli*-positive.
- (iii) Direction from the Department that an *E. coli* positive **SAMPLE** collected under § 109.1303(a) requires corrective action.

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

(4) Within 120 days of receiving initial notification under paragraph (2), or earlier if directed by the Department, the groundwater system shall **CORRECT ALL SIGNIFICANT DEFICIENCIES IF APPLICABLE AND SHALL** either:

- (i) Have completed corrective action in accordance with applicable Department plan review processes or other Department guidance or direction, if any, including Department-specified interim measures.
- (ii) Be in compliance with a Department-approved corrective action plan and schedule subject to the following conditions:

(A) ~~[The Department must also approve]~~ **THE GROUNDWATER SYSTEM SHALL REQUEST AND OBTAIN APPROVAL FROM THE DEPARTMENT FOR** any subsequent modifications to a Department-approved corrective action plan and schedule.

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

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

(a) Groundwater systems not required to conduct compliance monitoring under § 109.1302 (relating to treatment technique requirements), of one or more groundwater sources shall collect a source water sample ~~[for *E. coli*]~~ within 24 hours of notification of a total coliform-positive **ROUTINE** sample collected under § 109.301(3)(I) (relating to general monitoring requirements) **AND HAVE IT ANALYZED FOR THE PRESENCE OF *E. COLI***. The system shall collect a sample from each groundwater source that is not provided with ~~[at least]~~ **DEPARTMENT-APPROVED** 4-log treatment of viruses and is connected to the distribution system from which the total coliform-positive sample was collected.

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

(c) Systems that obtain written approval from the Department **PRIOR TO RECEIVING NOTIFICATION OF A TOTAL COLIFORM-POSITIVE ROUTINE SAMPLE COLLECTED UNDER § 109.301(3)(1)** may conduct monitoring **UNDER SUBSECTION (a)** at one or more sources within the groundwater system that are representative of multiple sources used by that system ~~[and draw water from the same hydrogeologic setting]~~. **THE DEPARTMENT WILL CONSIDER ANY FACTORS THAT IDENTIFY SOURCES AS REPRESENTATIVE OF MULTIPLE SOURCES INCLUDING ONE OR MORE OF THE FOLLOWING:**

**(1) THE SOURCES DRAW WATER FROM THE SAME HYDROGEOLOGIC SETTING.**

**(2) MULTIPLE DISTRIBUTION SYSTEMS WHERE NO INTERCONNECTION EXISTS ARE SUPPLIED BY SEPARATE SOURCES.**

(d) A groundwater source sample **REQUIRED UNDER SUBSECTION (a)** shall be collected at a location prior to any treatment.

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

(f) **PRIOR TO EXPIRATION OF THE 24 HOUR DEADLINE UNDER SUBSECTION (a), SOURCE WATER MONITORING REQUIREMENTS ARE NOT REQUIRED WHEN ONE OF THE FOLLOWING APPLY:**

**(1) THE DEPARTMENT DETERMINES AND NOTIFIES THE PUBLIC WATER SYSTEM THAT A TOTAL COLIFORM-POSITIVE ROUTINE SAMPLE COLLECTED UNDER § 109.301(3)(i) IS CAUSED BY A DISTRIBUTION SYSTEM DEFICIENCY.**

**(2) THE TOTAL COLIFORM-POSITIVE RESULT HAS BEEN INVALIDATED BY THE DEPARTMENT UNDER § 109.301(3)(iii).**

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

- (1) The Department may invalidate an *E. coli*-positive groundwater source sample collected under this section if:
  - (i) The system provides the Department with written notice from the laboratory that improper sample analysis occurred.
  - (ii) The Department determines and documents in writing that there is substantial evidence that the *E. coli*-positive groundwater source sample is not related to source water quality.

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

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

- (1) The Department may require a groundwater system to perform a corrective action as described under § 109.1302(c) (relating to treatment technique requirements).
- (2) If the Department does not require corrective action under § 109.1302(c), the system shall collect five additional source water samples from the same source within 24 hours of being notified of the *E. coli*-positive sample. If one of the additional samples collected under this paragraph is *E. coli*-positive, the groundwater system shall perform a corrective action as described under § 109.1302(c).
- (3) The system shall comply with Tier 1 public notification requirements under § 109.408 (relating to Tier 1 public notice – form, manner and frequency of notice).

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

#### § 109.1304. Assessment source water monitoring.

(a) To enable the Department to determine if a groundwater system is using ~~A [fecally-contaminated]~~ groundwater source **WITH FECAL CONTAMINATION**, the Department may require a groundwater system to conduct monitoring for *E. coli*. If directed by the Department **TO CONDUCT MONITORING UNDER THIS SECTION**, a water supplier shall:

- (1) Collect a total of 12 samples from each groundwater source~~[, unless the system obtains written approval from the Department to conduct monitoring at one or more sources within the groundwater system that are representative of multiple sources used by that system and draw water from the same hydrogeologic setting].~~

**(i) THE SYSTEM MAY OBTAIN WRITTEN APPROVAL FROM THE DEPARTMENT TO CONDUCT MONITORING AT ONE OR MORE SOURCES WITHIN THE GROUNDWATER SYSTEM THAT ARE**

**REPRESENTATIVE OF MULTIPLE SOURCES USED BY THE SYSTEM.  
THE DEPARTMENT WILL CONSIDER ANY FACTORS THAT IDENTIFY  
SOURCES AS REPRESENTATIVE OF MULTIPLE SOURCES DRAWING  
WATER FROM THE SAME HYDROGEOLOGIC SETTING.**

~~{(i)}~~ **(ii)** For sources providing water to the public 12 months out of the year, groundwater systems shall collect one sample during each month.

~~{(ii)}~~ **(iii)** For sources providing water to the public for less than 12 months out of the year, groundwater systems shall collect 12 samples evenly distributed over the operational period.

~~{(iii)}~~ **(iv)** samples collected under § 109.1303(3)(a) (relating to triggered monitoring requirement for groundwater sources) may be used to satisfy the requirements of this subsection, **IF APPROVED BY THE DEPARTMENT.**

~~{(iv)}~~ **(v)** If a groundwater system obtains an *E. coli*-positive groundwater source sample, the groundwater system shall perform a corrective action as described under § 109.1302(c) (relating to treatment technique requirements).

~~{(v)}~~ **(vi)** The groundwater system may discontinue assessment source water monitoring if the system demonstrates they provide at least 4-log treatment of viruses under § 109.1302(b)(1) or if directed by the Department.

(2) Collect groundwater source samples at a location prior to any treatment of the groundwater source.

~~**{(3) Collect a replacement groundwater source sample within 24 hours of being notified by the Department of its decision to invalidate a sample as established under § 109.301(3)(vi) (relating to general monitoring requirements) and have the replacement sample analyzed for *E. coli*.}**~~

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

(1) A groundwater system may obtain a Department invalidation of an *E. coli*-positive groundwater source sample collected under this section as follows:

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

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

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

§ 109.1305. Compliance monitoring.

(a) *Chemical disinfection.* Groundwater systems demonstrating at least 4-log treatment of viruses using chemical disinfection shall monitor for and maintain the Department-~~[determined]~~ **APPROVED** residual disinfection concentration every day the system serves the public from the groundwater source.

(1) A groundwater system serving greater than 3,300 **PEOPLE** shall:

(i) Continuously monitor the residual disinfectant concentration at the entry point or other location approved by the Department and record the results at least every 15 minutes each day that water from the groundwater source is served to the public.

(ii) Maintain the Department-~~[determined]~~ **APPROVED** minimum residual disinfectant concentration every day the public water system serves water from the groundwater source to the public.

(iii) Conduct grab sampling every 4 hours until the continuous monitoring equipment is returned to service if there is a failure in the continuous monitoring equipment. The system shall resume continuous residual disinfectant monitoring within 14 days.

(2) A groundwater system serving 3,300 or fewer people shall comply with one of the following subparagraphs:

(i) The groundwater system shall maintain the Department-~~[determined]~~ **APPROVED** minimum residual disinfectant concentration every day the public water system serves water from the groundwater source to the public. The groundwater system shall take a daily grab sample at the entry point **OR OTHER LOCATION APPROVED BY THE DEPARTMENT** during the hour of peak flow or at any other time specified by the Department. If any daily grab sample measurement falls below the Department-~~[determined]~~ **APPROVED** minimum residual disinfectant concentration, the groundwater system shall take follow up samples every 4 hours until the residual disinfectant concentration is restored to the Department-~~[determined]~~ **APPROVED** minimum level.

(ii) Monitor the disinfectant residual concentration continuously and meet the requirements of paragraph (1).

~~(b) *Membrane filtration.* Groundwater systems demonstrating at least 4-log treatment of viruses using membrane filtration shall monitor the membrane filtration process in accordance with all Department-specified monitoring requirements and operate the membrane filtration in accordance with all Department-specified compliance requirements. A groundwater system that uses membrane filtration is in compliance with the requirement to achieve at least 4-log removal of viruses when the following conditions are met:~~

~~(1) The membrane has an absolute molecular weight cut-off (MWCO), or an alternate parameter that describes the exclusion characteristics of the membrane, that can reliably achieve at least 4-log removal of viruses.~~

~~(2) The membrane process is operated in accordance with Department-specified compliance requirements.~~

~~(3) The integrity of the membrane is intact.~~

~~(e)~~ *Alternative treatment.* Groundwater systems demonstrating at least 4-log treatment of viruses using a Department-approved alternative treatment method, including a combination of treatment methods shall:

- (1) Monitor the alternative treatment in accordance with all Department-approved monitoring requirements.
- (2) Operate the alternative treatment in accordance with all compliance requirements that the Department determines to be necessary to achieve at least 4-log treatment of viruses.

**§ 109.1306. Information describing 4-log treatment and compliance monitoring.**

**(a) COMMUNITY WATER SYSTEMS, NONCOMMUNITY WATER SYSTEMS WHICH HOLD A VALID OPERATION PERMIT UNDER § 109.504 (RELATING TO PUBLIC WATER SYSTEM OPERATION PERMITS) AND BOTTLED WATER AND VENDED WATER SYSTEMS, RETAIL WATER FACILITIES AND BULK WATER HAULING SYSTEMS WHICH HOLD A VALID PERMIT UNDER § 109.1005 (RELATING TO PERMIT REQUIREMENTS)** ~~{Systems}~~ demonstrating at least 4-log treatment of viruses under § 109.1302 (relating to treatment technique requirements) shall submit information in writing on forms provided by the Department and may include plans, specifications, engineer's report, water quality analyses and other data, information or documentation reasonably necessary to enable the Department to evaluate:

- (1) Treatment effectiveness.
- (2) The methodology the system will use to comply with § 109.1305 (relating to compliance monitoring).

**(b) A NONCOMMUNITY WATER SYSTEM NOT COVERED UNDER SUBSECTION (a) DEMONSTRATING AT LEAST 4-LOG TREATMENT OF VIRUSES UNDER § 109.1302 (RELATING TO TREATMENT TECHNIQUE REQUIREMENTS) SHALL:**

**(1) FILE AN AMENDMENT TO THE SYSTEM DESCRIPTION AS DESCRIBED UNDER § 109.505(a)(2)(ii) (RELATING TO REQUIREMENTS FOR NONCOMMUNITY WATER SYSTEMS).**

**(2) SUBMIT AN APPLICATION FOR A NONCOMMUNITY WATER SYSTEM 4-LOG TREATMENT OF GROUNDWATER SOURCES PERMIT. THE APPLICATION SHALL BE SUBMITTED IN WRITING ON FORMS PROVIDED BY THE DEPARTMENT.**

**(3) SUBMIT PLANS, SPECIFICATIONS, ENGINEER'S REPORT, WATER QUALITY ANALYSES AND OTHER DATA, INFORMATION OR DOCUMENTATION REASONABLY NECESSARY TO ENABLE THE DEPARTMENT TO DETERMINE COMPLIANCE WITH THE ACT AND THIS CHAPTER. THE DEPARTMENT WILL MAKE AVAILABLE TO THE APPLICANT THE "PUBLIC WATER SUPPLY MANUAL", AVAILBALE FROM THE BUREAU OF WATER STANDARDS AND FACILITY REGULATION, POST OFFICE BOX 8774, HARRISBURG, PENNSYLVANIA 17105 WHICH**

**CONTAINS ACCEPTABLE DESIGN STANDARDS AND TECHNICAL GUIDANCE. WATER QUALITY ANALYSES SHALL BE CONDUCTED BY A LABORATORY ACCREDITED UNDER THIS CHAPTER.**

~~[(b)]~~ (c) ~~[Plans, specifications and engineer's report.]~~ Plans, specifications and engineer's reports ~~[shall]~~ **MUST** comply with the following:

(1) The drawings, specifications and engineer's report shall be prepared by or under the supervision of a professional engineer registered to practice in this Commonwealth or in the state in which the public water system is located.

(2) The front cover or flyleaf of each set of drawings, of each copy of the engineer's report, and of each copy of specifications ~~[shall]~~ **MUST** bear the signature and imprint of the seal of the registered engineer. Drawings must bear an imprint or a legible facsimile of the seal.

**§ 109.1307. System management responsibilities.**

(a) *Reporting.* Groundwater systems shall comply with the following requirements and otherwise comply with § 109.701 (relating to reporting and recordkeeping):

(1) A groundwater system conducting compliance monitoring under § 109.1305 (relating to compliance monitoring):

(i) Shall report to the Department, for each entry point **OR OTHER DEPARTMENT-APPROVED MONITORING LOCATION:**

(A) The date, time and lowest ~~[residual disinfectant concentration]~~ **VALUE** each day **THE RESIDUAL DISINFECTANT CONCENTRATION REMAINS EQUAL TO OR GREATER THAN THE DEPARTMENT-REQUIRED MINIMUM VALUE ESTABLISHED UNDER § 109.1306 (RELATING TO INFORMATION DESCRIBING 4-LOG TREATMENT AND COMPLIANCE MONITORING).**

(B) The **INITIAL** date, **TIME AND VALUE FOR EACH OCCURRENCE THAT THE RESIDUAL DISINFECTANT CONCENTRATION IS LESS THAN THE DEPARTMENT-REQUIRED MINIMUM, AND THE SUBSEQUENT DATE, TIME AND VALUE THAT THE RESIDUAL DISINFECTANT CONCENTRATION IS EQUAL TO OR GREATER THAN THE REQUIRED MINIMUM** ~~[duration and number of periods each day when the residual disinfectant concentration is less than the Department established minimum for more than 4 hours].~~

**(C) EACH DATE THE ENTRY POINT IS NOT IN OPERATION.**

(ii) That experiences a breakdown in treatment shall notify the Department within 1 hour after the water system learns of the violation or the situation and provide public notice in accordance with § 109.408 (relating to Tier 1 public notice—categories, timing and delivery). A breakdown in treatment occurs whenever the system fails to meet, for greater than 4 continuous hours, any Department-specified requirements relating to:

(A) Minimum residual disinfectant concentration.



(B) ~~[Membrane operating criteria or membrane integrity.~~

~~(C)]~~ Alternative treatment operating criteria, if operation in accordance with the criteria or requirements is not restored within 4 hours.

(2) After completing any corrective action under § 109.1302(c) (relating to treatment technique requirements), a groundwater system shall notify the Department within 30 days of completion of the corrective action.

(b) *Recordkeeping.* Groundwater systems shall comply with § 109.701 and maintain the following information in its records:

(1) *Corrective actions.* Documentation shall be kept for at least 10 years.

(2) *Notice to the public as required under Subchapter D (relating to public notification).* Documentation shall be kept for at least 3 years.

(3) *Records of invalidation of E. coli-positive groundwater source samples under §§ 109.1303 (f) and 109.1304 (b).* Documentation shall be kept for at least 5 years.

(4) *Records of notification to other public water systems.* For a public water system obtaining groundwater from another public water system, documentation of notification to the supplier of total-coliform positive samples that are not invalidated under § 109.301(3)(iii) (relating to general monitoring requirements). Documentation shall be kept for at least 5 years.

(5) *Compliance monitoring.* For systems, including suppliers providing water to another public water system, that are required to perform compliance monitoring under § 109.1305 (relating to compliance monitoring):

(i) Documentation of the records of the Department-specified minimum disinfectant residual shall be kept for at least 10 years.

(ii) Documentation of the records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the Department-prescribed minimum residual disinfectant concentration for more than 4 hours, shall be kept for at least 5 years.

(iii) Documentation of the records of the Department-specified compliance requirements ~~[for membrane filtration and of parameters]~~ specified by the Department for Department-approved alternative treatment and records of the date and duration of any failure to meet ~~[the membrane operating, membrane integrity or]~~ alternative treatment operating requirements for more than 4 hours, shall be kept for at least 5 years.

## Appendix A to Subpart L. Long Term 2 Enhanced Surface Water Treatment Rule.

Table 1. CT VALUES (MG•MIN/L) FOR *Cryptosporidium* INACTIVATION BY CHLORINE DIOXIDE <sup>1</sup>

Log Credit	Water Temperature, °C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25 .....	159	153	140	128	107	90	69	45	29	19	12
(ii) 0.5 .....	319	305	279	256	214	180	138	89	58	38	24
(iii) 1.0 .....	637	610	558	511	429	360	277	179	116	75	49
(iv) 1.5 .....	956	915	838	767	643	539	415	268	174	113	73
(v) 2.0 .....	1275	1220	1117	1023	858	719	553	357	232	150	98
(vi) 2.5 .....	1594	1525	1396	1278	1072	899	691	447	289	188	122
(vii) 3.0 .....	1912	1830	1675	1534	1286	1079	830	536	347	226	147

<sup>1</sup> Systems may use the equation to determine log credit between the indicated values:  $\text{Log credit} = (0.001506 \times (1.09116)^{\text{Temp}}) \times \text{CT}$ .

Table 2. CT VALUES (MG•MIN/L) FOR *Cryptosporidium* INACTIVATION BY OZONE <sup>1</sup>

Log Credit	Water Temperature, °C										
	<=0.5	1	2	3	5	7	10	15	20	25	30
(i) 0.25 .....	6.0	5.8	5.2	4.8	4.0	3.3	2.5	1.6	1.0	0.6	0.39
(ii) 0.5 .....	12	12	10	9.5	7.9	6.5	4.9	3.1	2.0	1.2	0.78
(iii) 1.0 .....	24	23	21	19	16	13	9.9	6.2	3.9	2.5	1.6
(iv) 1.5 .....	36	35	31	29	24	20	15	9.3	5.9	3.7	2.4
(v) 2.0 .....	48	46	42	38	32	26	20	12	7.8	4.9	3.1
(vi) 2.5 .....	60	58	52	48	40	33	25	16	9.8	6.2	3.9
(vii) 3.0 .....	72	69	63	57	47	39	30	19	12	7.4	4.7

<sup>1</sup> Systems may use the equation to determine log credit between the indicated values:  $\text{Log credit} = (0.0397 \times (1.09757)^{\text{Temp}}) \times \text{CT}$ .

Table 3. UV DOSE TABLE FOR *Cryptosporidium*, *Giardia lamblia*, AND VIRUS INACTIVATION CREDIT

Log Credit	<i>Cryptosporidium</i> UV dose (mJ/cm <sup>2</sup> )	<i>Giardia lamblia</i> UV dose (mJ/cm <sup>2</sup> )	Virus UV dose (mJ/cm <sup>2</sup> )
(i) 0.5 .....	1.6	1.5	39
(ii) 1.0 .....	2.5	2.1	58
(iii) 1.5 .....	3.9	3.0	79
(iv) 2.0 .....	5.8	5.2	100
(v) 2.5 .....	8.5	7.7	121
(vi) 3.0 .....	12	11	143
(vii) 3.5 .....	15	15	163
(viii) 4.0 .....	22	22	186

**Appendix B to Subpart L. Long Term 2 Enhanced Surface Water Treatment Rule.**

MICROBIAL TOOLBOX SUMMARY TABLE: OPTIONS, TREATMENT CREDITS AND CRITERIA

Toolbox Option	<i>Cryptosporidium</i> treatment credit with design and implementation criteria
<b>Source Protection and Management Toolbox Options</b>	
(1) Watershed control program .....	0.5-log credit for State-approved program comprising required elements, annual program status report to State, and regular watershed survey. Unfiltered systems are not eligible for credit. Specific criteria are in § 109.1204(b).
(2) Alternative source/intake management .....	No prescribed credit. Systems may conduct simultaneous monitoring for treatment bin classification at alternative intake locations or under alternative intake management strategies. Specific criteria are in § 109.1204 <del>(b)</del> (c).
<b>Pre Filtration Toolbox Options</b>	
(3) Presedimentation basin with coagulation .....	0.5-log credit during any month that presedimentation basins achieve a monthly mean reduction of 0.5-log or greater in turbidity or alternative State-approved performance criteria. To be eligible, basins must be operated continuously with coagulant addition and all plant flow must pass through basins. Specific criteria are in § 109.1204(d).
(4) Two-stage lime softening.....	0.5-log credit for two-stage softening where chemical addition and hardness precipitation occur in both stages. All plant flow must pass through both stages. Single-stage softening is credited as equivalent to conventional treatment. Specific criteria are in § 109.1204(e).
(5) Bank filtration .....	0.5-log credit for 25-foot setback; 1.0-log credit for 50-foot setback; aquifer must be unconsolidated sand containing at least 10 percent fines; average turbidity in wells must be less than 1 NTU. Systems using wells followed by filtration when conducting source water monitoring must sample the well to determine bin classification and are not eligible for additional credit. Specific criteria are in § 109.1204(f).
<b>Treatment Performance Toolbox Options</b>	
(6) Combined filter performance .....	0.5-log credit for combined filter effluent turbidity less than or equal to 0.15 NTU in at least 95 percent of measurements each month. Specific criteria are in § 109.1204(g).
(7) Individual filter performance .....	0.5-log credit (in addition to 0.5-log combined filter performance credit) if individual filter effluent turbidity is less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter and is never greater than 0.3 NTU in two consecutive measurements in any filter. Specific criteria are in § 109.1204(h).
(8) Demonstration of performance.....	Credit awarded to unit process or treatment train based on a demonstration to the State with a State- approved protocol. Specific criteria are in § 109.1204(i).
<b>Additional Filtration Toolbox Options</b>	
(9) Bag or cartridge filters (individual filters) .....	Up to 2-log credit based on the removal efficiency demonstrated during challenge testing with a 1.0-log factor of safety. Specific criteria are in § 109.1204(j).
(10) Bag or cartridge filters (in series) .....	Up to 2.5-log credit based on the removal efficiency demonstrated during challenge testing with a 0.5-log factor of safety. Specific criteria are in § 109.1204(j).
(11) Membrane filtration .....	Log credit equivalent to removal efficiency demonstrated in challenge test for device if supported by direct integrity testing. Specific criteria are in § 109.1204(k).
(12) Second stage filtration .....	0.5-log credit for second separate granular media filtration stage if treatment train includes coagulation prior to first filter. Specific criteria are in § 109.1204(l).
(13) Slow sand filters.....	2.5-log credit as a secondary filtration step; 3.0-log credit as a primary filtration process. No prior chlorination for either option. Specific criteria are in 109.1204(m).
<b>Inactivation Toolbox Options</b>	
(14) Chlorine dioxide.....	Log credit based on measured CT in relation to CT table. Specific criteria in §109.1204(o).
(15) Ozone.....	Log credit based on measured CT in relation to CT table. Specific criteria in §109.1204(p).
(16) UV .....	Log credit based on validated UV dose in relation to UV dose table; reactor validation testing required to establish UV dose and associated operating conditions. Specific criteria in §109.1204(q).

**Appendix C to Subpart L. Long Term 2 Enhanced Surface Water Treatment Rule.**

**MICROBIAL TOOLBOX REPORTING REQUIREMENTS**

Toolbox option	Systems must submit the following information	On the following schedule
(1) Watershed control program (WCP).	(i) Notice of intention to develop a new or continue an existing watershed control program. (ii) Watershed control plan .....  (iii) Annual watershed control program status report .....  (iv) Watershed sanitary survey report .....	No later than two years before the applicable treatment compliance date in § 109.1203 No later than one year before the applicable treatment compliance date in § 109.1203 Every 12 months, beginning one year after the applicable treatment compliance date in § 109.1203 For community water systems, every three years beginning three years after the applicable treatment compliance date in § 109.1203. For noncommunity water systems, every five years beginning five years after the applicable treatment compliance date in § 109.1203.
(2) Alternative source/intake management.	Verification that system has relocated the intake or adopted the intake withdrawal procedure reflected in monitoring results.	No later than the applicable treatment compliance date in § 109.1203.
(3) Presedimentation .....	Monthly verification of the following: (i) Continuous basin operation (ii) Treatment of 100% of the flow (iii) Continuous addition of a coagulant (iv) At least 0.5-log mean reduction of influent turbidity or compliance with alternative State-approved performance criteria.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(4) Two-stage lime softening	Monthly verification of the following: (i) Chemical addition and hardness precipitation occurred in two separate and sequential softening stages prior to filtration (ii) Both stages treated 100% of the plant flow.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(5) Bank filtration .....	(i) Initial demonstration of the following: (A) Unconsolidated, predominantly sandy aquifer (B) Setback distance of at least 25 ft. (0.5-log credit) or 50 ft. (1.0-log credit). (ii) If monthly average of daily max turbidity is greater than 1 NTU then system must report result and submit an assessment of the cause.	No later than the applicable treatment compliance date in § 109.1203.  Report within 30 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(6) Combined filter performance.	Monthly verification of combined filter effluent (CFE) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of the 4 hour CFE measurements taken each month.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(7) Individual filter performance.	Monthly verification of the following: (i) Individual filter effluent (IFE ) turbidity levels less than or equal to 0.15 NTU in at least 95 percent of samples each month in each filter (ii) No individual filter greater than 0.3 NTU in two consecutive readings 15 minutes apart.	Monthly reporting within 10 days following the month in which the monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(8) Demonstration of performance.	(i) Results from testing following a State approved protocol. (ii) As required by the State, monthly verification of operation within conditions of State approval for demonstration of performance credit.	No later than the applicable treatment compliance date in § 109.1203. Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(9) Bag filters and cartridge filters.	(i) Demonstration that the following criteria are met: (A) Process meets the definition of bag or cartridge filtration; (B) Removal efficiency established through challenge testing that meets criteria in this subpart. (ii) Monthly verification that 100% of plant flow was filtered.	No later than the applicable treatment compliance date in § 109.1203.  Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.

**Appendix C to Subpart L. Long Term 2 Enhanced Surface Water Treatment Rule.**

MICROBIAL TOOLBOX REPORTING REQUIREMENTS — Continued

Toolbox option	Systems must submit the following information	On the following schedule
(10) Membrane filtration.....	(i) Results of verification testing demonstrating the following: (A) Removal efficiency established through challenge testing that meets criteria in this subpart; (B) Integrity test method and parameters, including resolution, sensitivity, test frequency, control limits, and associated baseline. (ii) Monthly report summarizing the following: (A) All direct integrity tests above the control limit; (B) If applicable, any turbidity or alternative state-approved indirect integrity monitoring results triggering direct integrity testing and the corrective action that was taken.	No later than the applicable treatment compliance date in § 109.1203.  Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(11) Second stage filtration ..	Monthly verification that 100% of flow was filtered through both stages and that first stage was preceded by coagulation step.	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(12) Slow sand filtration (as secondary filter).	Monthly verification that both a slow sand filter and a preceding separate stage of filtration treated 100% of flow from subpart H sources..	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(13) Chlorine dioxide .....	Summary of CT values for each day as described in §141.720. <del>f-h</del>	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(14) Ozone .....	Summary of CT values for each day as described in §141.720. <del>f-h</del>	Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.
(15) UV.....	(i) Validation test results demonstrating operating conditions that achieve required UV dose. (ii) Monthly report summarizing the percentage of water entering the distribution system that was not treated by UV reactors operating within validated conditions for the required dose as specified in 141.720(d). <del>g-h</del>	No later than the applicable treatment compliance date in § 109.1203.  Within 10 days following the month in which monitoring was conducted, beginning on the applicable treatment compliance date in § 109.1203.