

<h1>Regulatory Analysis Form</h1> <p>(Completed by Promulgating Agency)</p> <p>(All Comments submitted on this regulation will appear on IRRC's website)</p>		<p><b>INDEPENDENT REGULATORY REVIEW COMMISSION</b></p>	
<p>(1) Agency Department of Environmental Protection</p>		<p>2016 FEB 11 PM 12:44</p>	
<p>(2) Agency Number: Identification Number: 7-520</p>		<p>IRRC Number: 3136</p>	
<p>(3) PA Code Cite: 25 Pa. Code, Chapter 109</p>			
<p>(4) Short Title: Disinfection Requirements Rule</p>			
<p>(5) Agency Contacts (List Telephone Number and Email Address): Primary Contact: Laura Edinger, 717.783.8727, ledinger@pa.gov Secondary Contact: Patrick McDonnell, 717.783.8727, pmcdonnell@pa.gov</p>			
<p>(6) Type of Rulemaking (check applicable box):</p> <p><input checked="" type="checkbox"/> Proposed Regulation <input type="checkbox"/> Final Regulation <input type="checkbox"/> Final Omitted Regulation</p>		<p><input type="checkbox"/> Emergency Certification Regulation; <input type="checkbox"/> Certification by the Governor <input type="checkbox"/> Certification by the Attorney General</p>	
<p>(7) Briefly explain the regulation in clear and nontechnical language. (100 words or less)</p> <p>The proposed amendments will strengthen public water system (PWS) requirements relating to microbial protection and disinfection requirements. The amendments also include minor clarifications to the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 DBPR), the Long Term 2 (LT2) Enhanced Surface Water Treatment Rule, and the Lead and Copper Rule Short-Term Revisions (LCRSTR) in order to obtain or maintain primacy.</p> <p>The amendments will protect public health through a multi-barrier approach designed to guard against microbial contamination by ensuring the adequacy of treatment designed to inactivate microbial pathogens and the integrity of the distribution system. Safe drinking water is vital to maintaining healthy and sustainable communities.</p>			
<p>(8) State the statutory authority for the regulation. Include <u>specific</u> statutory citation.</p> <p>Section 4(a) of the Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.4(a), and section 1920-A of the Administrative Code of 1929, 71 P.S. § 510-20(b).</p>			

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(9) Is the regulation mandated by any federal or state law or court order, or federal regulation? Are there any relevant state or federal court decisions? If yes, cite the specific law, case or regulation as well as, any deadlines for action.

Yes, for the Stage 2 DBPR, LT2, and LCRSTR components.

Section 1413 of the Federal Safe Drinking Water Act, 42 U.S.C. § 300g-2a, requires that, in order for the state to retain primary enforcement authority (primacy), the state must adopt drinking water regulations that are “no less stringent than” the national primary drinking water regulations not later than 2 years after the date on which the regulations are promulgated by the United States Environmental Protection Agency (EPA), or must ask EPA for an extension of up to 2 years. The federal drinking water primacy regulations at 40 CFR § 142.12(a) also require the state to adopt all new and revised national primary drinking water regulations contained in 40 CFR Part 141 in order to retain primary enforcement responsibility. Furthermore, Section 4(a) of the Pennsylvania Safe Drinking Water Act, 35 P.S. § 721.4(a), requires the Environmental Quality Board to adopt maximum contaminant levels and treatment technique requirements no less stringent than those promulgated under the Federal act for all contaminants regulated under the national primary and secondary drinking water regulations. Also Section 5(a) of the state act, 35 P.S. § 721.5(a), requires the Department to adopt and implement a public water supply program which includes those program elements necessary to assume state primary enforcement responsibility under the Federal act.

EPA promulgated the Federal Stage 2 DBPR on January 4, 2006, the Federal LT2 on January 5, 2006, and the Federal LCRSTR on October 10, 2007. Pennsylvania adopted state regulations implementing the Federal rules on December 26, 2009 (Stage 2 DBPR and LT2) and December 18, 2010 (LCRSTR). Minor clarifications are included in this proposed rulemaking, as required by EPA, in order to obtain or maintain primacy for these rules.

Regarding the disinfection requirements, the federal rule mandates CT/log inactivation requirements (CT is the product of residual disinfectant concentration (C) and disinfectant contact time (T)) for surface water and Groundwater Under Direct Influence (of surface water) (GUDI) systems and the maintenance of a detectable disinfectant residual. However, EPA leaves it up to the states to define a “detectable” residual. Currently, the Department’s residual of 0.02 mg/L does not represent a true detectable residual, and is therefore not a viable or enforceable drinking water standard.

(10) State why the regulation is needed. Explain the compelling public interest that justifies the regulation. Describe who will benefit from the regulation. Quantify the benefits as completely as possible and approximate the number of people who will benefit.

*Calculations to Demonstrate 1.0 log Giardia and 3.0 log Virus Inactivation:*

Existing regulations require filter plants to maintain 90% (1-log) inactivation of Giardia cysts and 99.9% (3-log) inactivation of viruses by way of disinfection. When these levels are not achieved, customers may be exposed to pathogenic Giardia cysts and viruses. The only way to determine compliance with this requirement is to perform log inactivation calculations, which is not required by current regulation.

The proposed amendments will require all 353 filter plants (which are operated by 319 water systems) to calculate their log inactivation at least once per day and report to the Department the lowest level achieved each day. This provision will provide a mechanism for the PWSs and the Department to determine compliance with the existing log inactivation requirements.

The proposed amendments to surface water treatment regulations will benefit more than 8 million Pennsylvanians that are supplied water by PWSs utilizing filtration technologies.

*Disinfectant Residuals in the Distribution System:*

The proposed amendments are intended to strengthen the distribution system disinfectant residual requirements by increasing the minimum residual in the distribution system to 0.2 mg/L free or total chlorine. The Department's existing disinfectant residual requirements for the distribution system have not been substantially updated since 1992 and require the maintenance of a detectable residual that is defined as 0.02 mg/L. The Department's existing treatment technique is not protective of public health because a residual of 0.02 mg/L does not represent a true detectable residual and the level is inadequate to protect against microbial growth within the distribution system.

Maintenance of a disinfectant residual in the distribution system is:

- Required under the federal Surface Water Treatment Rule for all systems using surface water and GUDI sources, and under Chapter 109 for all community water systems and those noncommunity water systems that have installed disinfection.
- Designated by EPA as the best available technology (BAT) for compliance with both the Total Coliform Rule and the Revised Total Coliform Rule.
- Considered an important element in a multiple barrier strategy aimed at maintaining the integrity of the distribution system and protecting public health.
- Intended to maintain the integrity of the distribution system by inactivating microorganisms in the distribution system, indicating distribution system upset, and controlling biofilm growth.

As distribution systems age, deterioration can occur due to corrosion, erosion of pipe materials, and external pressures that can lead to breaches in pipes and storage facilities, intrusion, and main breaks. In recent years, deteriorating water infrastructure in many parts of the U.S. has resulted in frequent water main breaks and other situations that can pose intermittent or persistent health risks. Many of these deficiencies create pathways of contamination. Therefore, ensuring the integrity and effective operation of distribution systems is critical for public health protection.

Factors that influence pathogen survival and growth in the distribution system include water chemistry (temperature, pH, etc.), presence of nutrients, system hydraulics, sediment accumulation, and presence (or absence) of disinfectant residual. Of these factors, maintenance of an adequate disinfectant residual throughout the distribution system plays a key role in controlling the growth of pathogens and biofilms and is a treatment technique that serves as one of the final barriers to protect public health. Lack of an adequate residual may increase the likelihood that disease-causing organisms such as *E. coli* and *Legionella* are present.

Based on a review of available studies, reports and data, a regulatory minimum of 0.2 mg/L (free or total chlorine) in the distribution system is necessary to ensure a true detectable (and enforceable) residual and an adequate residual for the control of microbial growth.

This provision will affect and improve public health protection for all 1,982 community water systems (CWS) and 822 noncommunity water systems (NCWS) that have installed disinfection. These 2,804 PWSs serve a total population of 10.6 million people.

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

There are several provisions in this proposal that are more stringent than federal requirements. The Department developed these provisions to better protect public health and to be consistent with existing Pennsylvania drinking water regulations.

- Section 109.202(c)(1)(ii)(B) clarifies the minimum residual disinfectant level at the entry point by adding a zero to the minimum level (0.20 mg/L). This ensures that water suppliers maintain a residual that is equal to or greater than 0.20 mg/L. Currently, levels of 0.15 or higher round up to 0.2 and are in compliance. A level of 0.20 mg/L is necessary due to the importance of meeting CTs and maintaining an adequate disinfectant residual in the water entering the distribution system. Also, this level of sensitivity is consistent with existing requirements for the Groundwater Rule (0.40 mg/L) as specified in § 109.1302(a)(2). Under 40 CFR 141.72(b)(2), the federal rule requires a minimum level of 0.2 mg/L.
- Sections 109.202(c)(4) & (5); 109.301(1)(i)(D), (2)(i)(E) & (13); and 109.710(a) & (b) require compliance with the minimum disinfectant residual level of 0.2 mg/L in the distribution system and strengthens monitoring and reporting requirements to protect public health and ensure equitable water quality for all consumers. Additional justification for these provisions may be found in Question 10. Under 40 CFR 141.72(b)(3), the federal rule requires a “detectable” residual. EPA did not define “detectable” and left the decision to the states.
- Existing regulations at § 109.202(c)(1)(ii)(A) require filter plants to maintain 90% (1-log) inactivation of *Giardia* cysts and 99.9% (3-log) inactivation of viruses using disinfection. When these levels are not achieved, consumers may be exposed to pathogenic *Giardia* cysts and viruses. The only way to determine compliance with this requirement is to perform log inactivation calculations, which is not required by current regulation. Sections 109.301(1)(v) & (vi) and 109.701(a)(2)(i)(C) & (D) were added to require monitoring and reporting of CT calculations to the Department.
- Section 109.710(c) requires one-hour notification to the Department for certain violations related to the disinfectant residual requirements. One-hour reporting is an existing requirement under § 109.701(a)(3), and ensures that the Department and the public are alerted to potential problems as soon as possible so that appropriate investigative and corrective actions can be taken. The federal rule generally requires self-reporting of violations to the state within 24 – 48 hours.
- Section 109.715 was added to require a water system that uses chloramines as a disinfection process to develop and implement a nitrification control plan. This plan is in lieu of requiring a higher residual for systems that chloraminate in order to provide simultaneous control of microbes and nitrification.

(12) How does this regulation compare with those of the other states? How will this affect Pennsylvania’s ability to compete with other states?

Calculations to Demonstrate 1.0 log *Giardia* and 3.0 log Virus Inactivation:

At least fifteen other states require log inactivation to be calculated, recorded and reported on plant Monthly Operating Reports (MORs).

Disinfectant Residuals in the Distribution System:

The Department's existing disinfectant residual requirements, while consistent with the federal rule, have not kept pace with other states. At least 23 states have promulgated more stringent requirements when compared to the Department's current standard of 0.02 mg/L. And 19 states have disinfectant residual requirements that are  $\geq 0.2$  mg/L, which supports the Department's proposed standard of 0.2 mg/L. This proposed amendment will make Pennsylvania more consistent with these other states regarding public health protection.

State	Minimum Distribution System Residual (mg/L)
Alabama*	0.2 (free), 0.5 (total)
Colorado*	0.2 (free or total)
Delaware	0.3 (free)
Florida*	0.2 (free), 0.6 (total)
Georgia	0.2 (free)
Illinois*	0.2 (free), 0.5 (total)
Indiana	0.2 (free), 0.5 (total)
Iowa	0.3 (free), 1.5 (total)
Kansas*	0.2 (free), 1.0 (total)
Kentucky*	0.2 (free), 0.5 (total)
Louisiana*	0.5 (free or total)
Minnesota	0.1 (free or total)
Missouri	0.2 (total)
Nebraska	SW - 0.2 (free), 0.25 or 0.5 (total); GW - 0.1 (free)
Nevada	0.05 (free or total)
New Jersey*	0.05 (free or total)
North Carolina*	0.2 (free), 1.0 (total)
Ohio*	0.2 (free), 1.0 (total)
Oklahoma	0.2 (free), 1.0 (total)
Tennessee*	0.2 (free)
Texas*	0.2 (free), 0.5 (total)
Vermont	0.1 (free)
West Virginia*	0.2 (total)

\*States with mandatory disinfection.

The amendments will not put Pennsylvania at a competitive disadvantage with any other state. Rather the amendments will enhance Pennsylvania's ability to compete with other states by improving public health protection and promoting healthy and sustainable communities.

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

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

(14) Describe the communications with and solicitation of input from the public, any advisory council/group, small businesses and groups representing small businesses in the development and drafting of the regulation. List the specific persons and/or groups who were involved. (“Small business” is defined in Section 3 of the Regulatory Review Act, Act 76 of 2012.)

The pre-draft proposed rulemaking was originally included in the Pre-Draft Proposed Revised Total Coliform Rule (RTCR), which was presented to the Small Water Systems Technical Assistance Center (TAC) Board on June 18 and September 23, 2014 for review and comment. On April 21, 2015, the Environmental Quality Board approved the proposed RTCR with modifications. The modifications included splitting out the “Non-RTCR” provisions for additional stakeholder input. The motion was made with the expectation that the “Non-RTCR” provisions would be revisited in short order. On April 30, 2015, the TAC Board voted to recommend that the Department further split the “Non-RTCR” provisions to focus solely on the disinfection requirements and the minor corrections needed to obtain/maintain primacy.

In order to provide additional opportunity for stakeholder input on the disinfection requirements, TAC meetings were convened on May 18, May 26, June 16 and June 30, 2015. During these meetings, 14 water systems and organizations delivered presentations to help inform the discussion including:

Pennsylvania American  
North Penn Water Authority  
York Water Company  
Centers for Disease Control  
Chester Water Authority  
Lehigh County Authority  
EPA OGWDW  
Western Berks Water Authority  
United Water  
Corona Environmental Consulting  
Philadelphia Water Department  
Columbia Water Company  
Aqua Pennsylvania

These stakeholder presentations and other materials provided by the Department may be found on the Department’s website (select Advisory Committees, then select Small Water System Technical Assistance Center Board)

Two additional meetings were held with large water systems on June 29 and July 16, 2015 to gather additional comments. The following water suppliers and organizations attended these additional meetings:

Chester Water Authority  
York Water Company  
Western Berks Water Authority  
Aqua Pennsylvania  
Superior Water Co./National Association of Water Companies  
PA Municipal Authorities Association  
Corona Environmental  
Philadelphia Water Department

Pennsylvania American  
Columbia Water Company  
Lehigh County Authority  
North Penn Water Authority  
Water Works Operators' Association – TAC Chair  
United Water

As a result of these 6 additional stakeholder meetings, several revisions were made during the pre-draft rulemaking process, including revisions to the minimum required disinfectant residual levels, monitoring and reporting requirements, and compliance determinations. These revisions were made to address concerns about compliance costs and the frequency of public notification. TAC provided a final set of recommendations on July 15, 2015. Many of TAC's recommendations are incorporated into the proposed rulemaking. Other recommendations are incorporated into the preamble as a means to solicit further public comment. Refer to the Preamble for more information about TAC's recommendations.

(15) Identify the types and number of persons, businesses, small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012) and organizations which will be affected by the regulation. How are they affected?

A review of the USA Small Business Size Regulations under 13 CFR Chapter 1, Part 121 provides a standard for determining what constitutes a small business for the NAICS category relating to PWS. A PWS falls within NAICS category 221310, Water Supply and Irrigation Systems, which comprises establishments primarily engaged in operating water treatment plants and/or operating water supply systems. The small size standard for this NAICS category is annual receipts of not more than \$27.5 million.

The SDWA and Chapter 109 regulations do not contain any requirements for the submission of financial records. The Department has no way to estimate annual receipts. The Department and EPA have historically classified system size based on the number of persons served by a water system. Under the federal Safe Drinking Water regulations, there are three classifications: small, medium, and large. Small systems serve 3,300 persons or fewer, medium systems serve 3,301 to 50,000 persons, and large systems serve more than 50,000 persons. See 40 CFR 141.2. Therefore, the Department used the federal definition of a small water system in 40 CFR 141.2, which states that a small water system is "a water system that serves 3,300 persons or fewer". Under this regulatory package, a PWS owned by a private individual or investor serving less than or equal to 3,300 persons was considered to be a small business. Some medium size systems could be classified as small businesses on the basis of revenue. It is believed that the revenues of large systems are generally over \$27.5 million.

- The disinfection requirements apply to all 1,982 CWSs. Of these, 909 are small systems that are owned by a private individual or investor and should be considered as small businesses.
- The disinfection requirements also apply to 822 NCWSs. All of these systems should be considered as small businesses.
- The total number of small businesses affected by this regulation is 1,731.

The persons and communities served by these systems will benefit from increased microbial protection and avoidance of waterborne disease outbreaks.

(16) List the persons, groups or entities, including small businesses, that will be required to comply with the regulation. Approximate the number that will be required to comply.

- The disinfection requirements apply to all 1,982 CWSs. Of these, 909 are small systems that are owned by a private individual or investor and should be considered as small businesses.
- The disinfection requirements also apply to 822 NCWSs. All of these systems should be considered as small businesses.
- The total number of small businesses affected by this regulation is 1,731.

(17) Identify the financial, economic and social impact of the regulation on individuals, small businesses, businesses and labor communities and other public and private organizations. Evaluate the benefits expected as a result of the regulation.

The expected benefits of this regulation are: (1) the avoidance of a full range of health effects from the consumption of contaminated drinking water such as acute and chronic illness, endemic and epidemic disease, waterborne disease outbreaks, and death; and (2) healthy and sustainable communities.

This regulation will provide a positive economic impact to individuals, small businesses and businesses that provide services to the drinking water industry.

The proposed amendments are intended to reduce the public health risks and associated costs related to waterborne pathogens and waterborne disease outbreaks. Costs related to waterborne disease outbreaks are extremely high. For example, the total medical costs and productivity losses associated with the 1993 waterborne outbreak of cryptosporidiosis in Milwaukee, Wisconsin was \$96.2 million: \$31.7 million in medical costs and \$64.6 million in productivity losses. The average total cost per person with mild, moderate, and severe illness was \$116, \$475, and \$7,808, respectively according to the following study:

Cost of illness in the 1993 Waterborne *Cryptosporidium* outbreak, Milwaukee, Wisconsin. Corso PS, Kramer MH, Blair KA, Addiss DG, Davis JP, Haddix AC. Emerg Infect Dis [serial online] 2003 April. Available from: URL: <http://wwwnc.cdc.gov/eid/article/9/4/02-0417>

In 2008, a large *Salmonella* outbreak caused by contamination of a storage tank and distribution system of the municipal drinking water supply occurred in Alamosa, Colorado. The outbreak's estimated total cost to residents and businesses of Alamosa using a Monte Carlo simulation model (10,000 iterations) was approximately \$1.5 million (range: \$196,677–\$6,002,879), and rose to \$2.6 million (range: \$1,123,471–\$7,792,973) with the inclusion of outbreak response costs to local, state and nongovernmental agencies and City of Alamosa healthcare facilities and schools. This investigation documents the significant economic and health impacts associated with waterborne disease outbreaks and highlights the potential for loss of trust in public water systems following such outbreaks. This information can be found in the following study:

Economic and Health Impacts Associated with a *Salmonella* Typhimurium Drinking Water Outbreak—Alamosa, CO, 2008. Available from URL: <http://www.ncbi.nlm.nih.gov/pubmed/23526942>

Disinfectant Residual Monitoring at the Entry Point:

The Department estimates that 114 out of 353 plants (or ~30%) may be using strip chart recorders. Strip chart recorders can record measurements to two decimal places provided the proper scale and resolution is used. In cases where the requisite scale and resolution isn't possible, an upgrade to electronic recording devices would cost approximately \$1,500. The Department estimates that 25% of these systems or 29 systems may need to upgrade to electronic recording devices.

This cost should not be prohibitive for filter plants and the use of electronic devices offers several advantages. Advantages of using electronic recording devices include improved data reliability, faster and more comprehensive data analysis, better data resolution, elimination of the need for interpolating trace values from a chart, cost savings through the elimination of consumables (pens and chart paper), and reductions in errors associated with transferring 'analog' data to a spreadsheet for recordkeeping or reporting purposes.

Disinfectant Residuals in the Distribution System:

It is anticipated that the large majority of water systems will be able to comply with the disinfection residual requirements with little to no capital costs. According to Department records for the last three years (2012 – 2014):

- Based on more than 82,000 monthly average distribution system disinfectant residual values reported by 2,583 different water systems:
  - 95.6% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (free chlorine).
  - Only 4.4% of the average values are below the minimum residual.
- For the 37 systems that chloramine, based on more than 1,200 monthly average values reported:
  - 99.67% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (total chlorine).
  - Only 0.33% of the average values are below the minimum residual.

Systems may need to increase the frequency of or improve the effectiveness of existing operation and maintenance best management practices, such as flushing, storage tank maintenance, cross connection control, leak detection, and effective pipe replacement and repair practices, in order to lower chlorine demand and meet disinfectant residual requirements at all points in the distribution system.

A select few large water systems with extensive distribution systems may need to install automatic flushing systems or booster chlorination stations in order to achieve a 0.2 mg/L residual at all points in the distribution system. The Department's estimates for these facilities are as follows:

- Costs for automatic flushers: ~ \$2,000
- Costs for booster chlorination stations: \$200,000 - \$250,000

It is estimated that 20% of large systems, or 6 systems, may need to install automatic flushing devices and/or booster chlorination stations.

Costs for small systems are not expected to increase because most small systems are already maintaining adequate disinfectant residuals (0.40 mg/L) as required by the Groundwater Rule.

(18) Explain how the benefits of the regulation outweigh any cost and adverse effects.

The amendments strengthen existing requirements that protect public health through a multi-barrier approach designed to guard against microbial contamination by ensuring the adequacy of treatment designed to inactivate microbial pathogens and the integrity of drinking water distribution systems.

Safe drinking water is vital to maintaining healthy and sustainable communities. Proactively avoiding incidents such as waterborne disease outbreaks can prevent loss of life, reduce the incidents of illness, and reduce health care costs. Proper investment in public water system infrastructure and operations helps ensure a continuous supply of safe drinking water; enables communities to plan and build future capacity for economic growth; and ensures their long-term sustainability for years to come.

(19) Provide a specific estimate of the costs and/or savings to the **regulated community** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

*Disinfectant Residual Monitoring at the Entry Point:*

The Department estimates that 114 out of 352 plants (or ~30%) may be using strip chart recorders. The Department believes that strip chart recorders can record measurements to two decimal places provided the proper scale and resolution is used. In cases where the requisite scale and resolution isn't possible, an upgrade to electronic recording devices would cost approximately \$1,500. The Department estimates that 25% of these systems (or 29 systems) may need to upgrade to electronic recording devices.

- 29 systems x \$1,500 = \$43,500

This cost should not be prohibitive for filter plants and the use of electronic devices offers several advantages. Advantages of using electronic recording devices include improved data reliability, faster and more comprehensive data analysis, better data resolution, elimination of the need for interpolating trace values from a chart, cost savings through the elimination of consumables (pens and chart paper), and reductions in errors associated with transferring 'analog' data to a spreadsheet for recordkeeping or reporting purposes.

*Disinfectant Residuals in the Distribution System:*

It is anticipated that the large majority of water systems will be able to comply with the disinfection residual requirements with little to no capital costs. According to Department records for the last three years (2012 – 2014):

- Based on more than 82,000 monthly average distribution system disinfectant residual values reported by 2,583 different water systems:
  - 95.6% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (free chlorine).
  - Only 4.4% of the average values are below the minimum residual.
- For the 37 systems that chloramine, based on more than 1,200 monthly average values reported:
  - 99.67% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (total chlorine).
  - Only 0.33% of the average values are below the minimum residual.

Systems may need to increase the frequency of or improve the effectiveness of existing operation and maintenance best management practices, such as flushing, storage tank maintenance, cross connection control, leak detection, and effective pipe replacement and repair practices, in order to lower chlorine demand and meet disinfectant residual requirements at all points in the distribution system.

A select few large water systems with extensive distribution systems may need to install automatic flushing systems or booster chlorination stations in order to achieve a 0.2 mg/L residual at all points in the distribution system. The Department's estimates for these facilities are as follows:

- Costs for automatic flushers: ~ \$2,000
- Costs for booster chlorination stations: \$200,000 - \$250,000

It is estimated that 20% of large systems (serving > 50,000), or 6 systems, may need to install automatic flushing devices and/or booster chlorination stations. Three systems may need to install up to 5 automatic flushers for a cost of \$10,000 for each system, or a total of \$30,000. Three systems may need to install a booster chlorination station at \$250,000 for each system, or a total of \$750,000. The total capital costs to the regulated community may be \$780,000.

Costs for small systems are not expected to increase because most small systems are already maintaining adequate disinfectant residuals (0.40 mg/L) as required by the Groundwater Rule.

Total costs for the regulated community are estimated at \$43,500 + \$780,000 = \$823,500.

(20) Provide a specific estimate of the costs and/or savings to the **local governments** associated with compliance, including any legal, accounting or consulting procedures which may be required. Explain how the dollar estimates were derived.

The only costs to local government will be costs incurred by systems that are owned and/or operated by local government. The cost estimates are based on the figures in question 19.

(21) Provide a specific estimate of the costs and/or savings to the **state government** associated with the implementation of the regulation, including any legal, accounting, or consulting procedures which may be required. Explain how the dollar estimates were derived.

The costs to state government will be those incurred by systems that are owned and/or operated by state government and costs associated with implementing and administering the rule. The cost estimates are based on the figures in question 19.

State costs associated with administering these revisions are not expected to substantially increase or decrease. This rulemaking proposes revisions to existing treatment technique requirements.

(22) For each of the groups and entities identified in items (19)-(21) above, submit a statement of legal, accounting or consulting procedures and additional reporting, recordkeeping or other paperwork, including copies of forms or reports, which will be required for implementation of the regulation and an explanation of measures which have been taken to minimize these requirements.

Paperwork requirements include:

- Reporting of log inactivation values on a monthly basis using existing forms.
- Reporting additional disinfectant residual levels measured in the distribution system using existing forms.
- Development of a disinfectant residual sample siting plan.
- Development of a nitrification control plan.

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

	<b>Current FY Year</b>	<b>FY +1 Year</b>	<b>FY +2 Year</b>	<b>FY +3 Year</b>	<b>FY +4 Year</b>	<b>FY +5 Year</b>
<b>SAVINGS:</b>	\$	\$	\$	\$	\$	\$
<b>Regulated Community</b>	0	0	0	0	0	0
<b>Local Government</b>	0	0	0	0	0	0
<b>State Government</b>	0	0	0	0	0	0
<b>Total Savings</b>	0	0	0	0	0	0
<b>COSTS:</b>						
<b>Regulated Community</b>	411,750	411,750	0	0	0	0
<b>Local Government</b>	0	0	0	0	0	0
<b>State Government</b>	0	0	0	0	0	0
<b>Total Costs</b>	411,750	411,750	0	0	0	0
<b>REVENUE LOSSES:</b>						
<b>Regulated Community</b>	0	0	0	0	0	0
<b>Local Government</b>	0	0	0	0	0	0
<b>State Government</b>	0	0	0	0	0	0
<b>Total Revenue Losses</b>	0	0	0	0	0	0

**Note:**

Costs to the regulated community are one-time capital costs split between the first and second year of implementation.

(23a) Provide the past three year expenditure history for programs affected by the regulation.

<b>Program</b>	<b>FY -3 2012/13</b>	<b>FY -2 2013/14</b>	<b>FY -1 2014/15</b>	<b>Current FY 2015/16</b>
Environmental Program Operations	\$7,000,631	\$7,157,348	\$7,178,700	\$2,319,072
Environmental Program Management	\$544,267	\$538,362	\$475,098	\$133,818
General Government Operations	\$0	\$0	\$385	\$0
Safe Drinking Water Act	\$58,480	\$15,439	\$50,927	\$2,959

(24) For any regulation that may have an adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), provide an economic impact statement that includes the following:

(a) An identification and estimate of the number of small businesses subject to the regulation.

The disinfection requirements apply to all 1,982 CWSs. Of these, 909 are small systems that are owned by a private individual or investor and should be considered as small businesses. The disinfection requirements also apply to 822 NCWSs. All of these systems should be considered as small businesses. The total number of small businesses affected by this regulation is 1,731 (as defined in Question 15).

(b) The projected reporting, recordkeeping and other administrative costs required for compliance with the proposed regulation, including the type of professional skills necessary for preparation of the report or record.

Administrative costs associated with these revisions are not expected to substantially increase.

(c) A statement of probable effect on impacted small businesses.

Most small systems are not expected to be impacted by these revisions because they are already maintaining adequate disinfectant residuals (0.40 mg/L) as required by the Groundwater Rule.

(d) A description of any less intrusive or less costly alternative methods of achieving the purpose of the proposed regulation.

No alternative regulatory schemes were considered.

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

The amendments should have no effects on one particular group relative to another since it will apply to most of Pennsylvania's population served by public water systems. However, the Safe Drinking Water Program is prepared to develop special provisions or provide special services to accommodate any such group as the need arises.

(26) Include a description of any alternative regulatory provisions which have been considered and rejected and a statement that the least burdensome acceptable alternative has been selected.

No alternative regulatory schemes were considered.

(27) In conducting a regulatory flexibility analysis, explain whether regulatory methods were considered that will minimize any adverse impact on small businesses (as defined in Section 3 of the Regulatory Review Act, Act 76 of 2012), including:

- a) The establishment of less stringent compliance or reporting requirements for small businesses;

For these provisions, no less stringent compliance or reporting requirements for small businesses were considered.

- b) The establishment of less stringent schedules or deadlines for compliance or reporting requirements for small businesses;

For these provisions, no less stringent schedules or deadlines for small businesses were considered.

- c) The consolidation or simplification of compliance or reporting requirements for small businesses;

For these provisions, neither consolidation nor simplification of compliance or reporting requirements for small businesses was considered.

- d) The establishment of performing standards for small businesses to replace design or operational standards required in the regulation; and

For these provisions, no performing standards for small businesses to replace design or operational standards required in the regulation for small businesses were considered.

- e) The exemption of small businesses from all or any part of the requirements contained in the regulation.

For these provisions, no exemptions for small businesses from all or any part of the requirements contained in the regulation were considered.

Alternative provisions were not considered for small water systems because the customers of water systems classified as small businesses must be afforded the same level of public health protection as customers of large water systems.

(28) If data is the basis for this regulation, please provide a description of the data, explain in detail how the data was obtained, and how it meets the acceptability standard for empirical, replicable and testable data that is supported by documentation, statistics, reports, studies or research. Please submit data or supporting materials with the regulatory package. If the material exceeds 50 pages, please provide it in a searchable electronic format or provide a list of citations and internet links that, where possible, can be accessed in a searchable format in lieu of the actual material. If other data was considered but not used, please explain why that data was determined not to be acceptable.

Substantial studies, reports and data were used to develop this rulemaking, including the following:

1. Berg, G., "The Virus Hazard in Water Supplies," *J. New England Water Works Association*, 1964, Vol. 78, pp. 79.
2. Butterfield, C. T., "Bactericidal Properties of Chloramines and Free Chlorine in Water," *Public Health Reports*, 1948, Vol. 63, pp. 934, *J. American Water Works Association*, 1948, Vol. 40, pp. 1305.
3. Colorado Department of Public Health and Environment, "Draft – Minimum Distribution System Disinfectant Residuals: Chlorine Residual Values Reported from Within Drinking Water Distribution Systems," April 2014.
4. Fair, G. M. et al, *Water and Waste Engineering*, J. Wiley & Sons, Inc., 1968.
5. Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (10 States Standards), "Recommended Standards for Waterworks," 2012 Edition.
6. Hach Company, "Chlorination, Chloramination and Chlorine Measurement," 2013.
7. Hach Company, "Primer on DPD Chlorine Method Detection Limits and Their Use in Compliance Monitoring," June 2015.
8. LeChevallier, M. W., "The Case for Maintaining a Disinfectant Residual," *J. American Water Works Association*, 1999, Vol. 91, Issue 1, pp. 86.
9. LeChevallier, M. W. et al, "Full-Scale Studies of Factors Related to Coliform Regrowth in Drinking Water," *Appl. & Envir. Microbiol.*, 1996, Vol. 62, No. 7, pp. 2201.
10. LeChevallier, M. W., 2007, "Sources of Coliform Bacteria and Causes of Coliform Occurrences in Distribution Systems,"  
[www.waterrf.org/resources/Lists/ProjectPapers/Attachments/3/IssuePapers.pdf](http://www.waterrf.org/resources/Lists/ProjectPapers/Attachments/3/IssuePapers.pdf).
11. LeChevallier, M. W., "Conducting Self-Assessments Under the Revised Total Coliform Rule," *J. American Water Works Association*, September 2014, 106:9, pp. 90.
12. National Research Council, "Public Water Supply Distribution Systems: Assessing and Reducing Risks, First Report," 2005, <http://www.nap.edu/catalog/11262.html> .
13. National Research Council, "Drinking Water Distribution Systems: Assessing and Reducing Risks," 2006, <http://www.nap.edu/catalog/11728.html> .
14. PA DEP, "Pennsylvania Public Water System Compliance Report for 2014."
15. Pressman, J. G. & Wahman, D. G., "Perspectives on the Meaning of Detectable Distribution System Residual and Implications for *N. fowleri* Control," "AWWA Water Quality Technology Conference, November 2014, New Orleans, LA.
16. Wahman, D. G. & Pressman, J. G. , " Distribution System Residuals – Is "Detectable" Still Acceptable for Chloramines", *J. American Water Works Association*, August 2015, 107:8, pp. 53.
17. US DHHS, Centers for Disease Control and Prevention, "Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water and Other Nonrecreational Water – US, 2009-2010, *MMWR*, Weekly, Vol. 62, No. 35, September 2013.

18. US EPA, April 2010, "Final – Priorities of the Distribution System Research and Information Collection Partnership".
19. US EPA, April 2013, "Drinking Water Infrastructure Needs Survey and Assessment, Fifth Report to Congress," EPA 816-R-13-006.
20. US EPA, 2002a, "The Effectiveness of Disinfectant Residuals in the Distribution System," [http://www.epa.gov/safewater/disinfection/tcr/regulation\\_revisions.html](http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html) .
21. US EPA, 2002b, "Health Risks from Microbial Growth and Biofilms in Drinking Water Distribution Systems," [http://www.epa.gov/safewater/disinfection/tcr/regulation\\_revisions.html](http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html) .
22. US EPA, Enforcement and Compliance History Online (ECHO) database.
23. Water Research Foundation, "Criteria for Optimized Distribution Systems," 2010.
24. Water Research Foundation, "State of the Science and Research Needs for Opportunistic Pathogens in Premise Plumbing," 2013.
25. Water Research Foundation, "Strategies for Managing Total Coliform and *E. coli* in Distribution Systems," 2009.

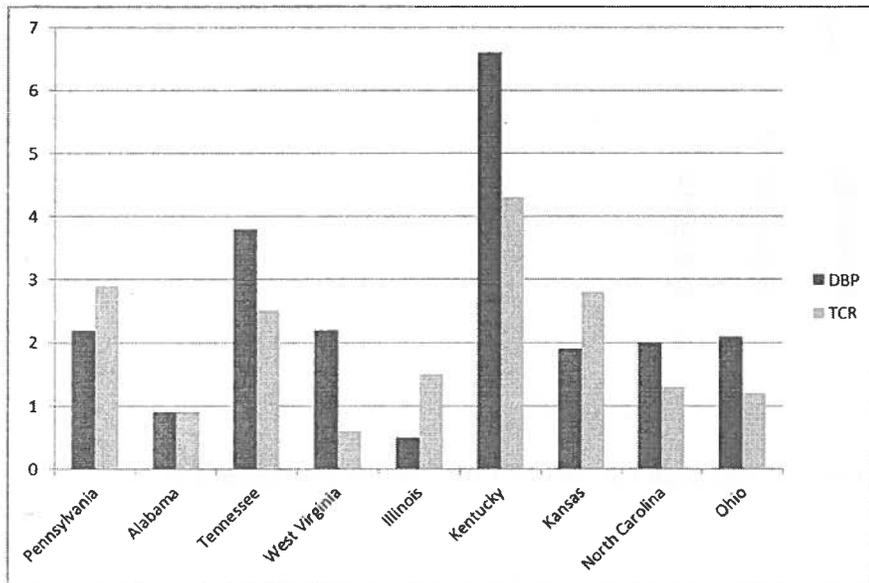
Also copies of other state's regulations were reviewed. 23 states have more stringent requirements.

State	Minimum Distribution System Residual (mg/L)
Alabama*	0.2 (free), 0.5 (total)
Colorado*	0.2 (free or total)
Delaware	0.3 (free)
Florida*	0.2 (free), 0.6 (total)
Georgia	0.2 (free)
Illinois*	0.2 (free), 0.5 (total)
Indiana	0.2 (free), 0.5 (total)
Iowa	0.3 (free), 1.5 (total)
Kansas*	0.2 (free), 1.0 (total)
Kentucky*	0.2 (free), 0.5 (total)
Louisiana*	0.5 (free or total)
Minnesota	0.1 (free or total)
Missouri	0.2 (total)
Nebraska	SW - 0.2 (free), 0.25 or 0.5 (total); GW – 0.1 (free)
Nevada	0.05 (free or total)
New Jersey*	0.05 (free or total)
North Carolina*	0.2 (free), 1.0 (total)
Ohio*	0.2 (free), 1.0 (total)
Oklahoma	0.2 (free), 1.0 (total)
Tennessee*	0.2 (free)
Texas*	0.2 (free), 0.5 (total)
Vermont	0.1 (free)
West Virginia*	0.2 (total)

\*States with mandatory disinfection.

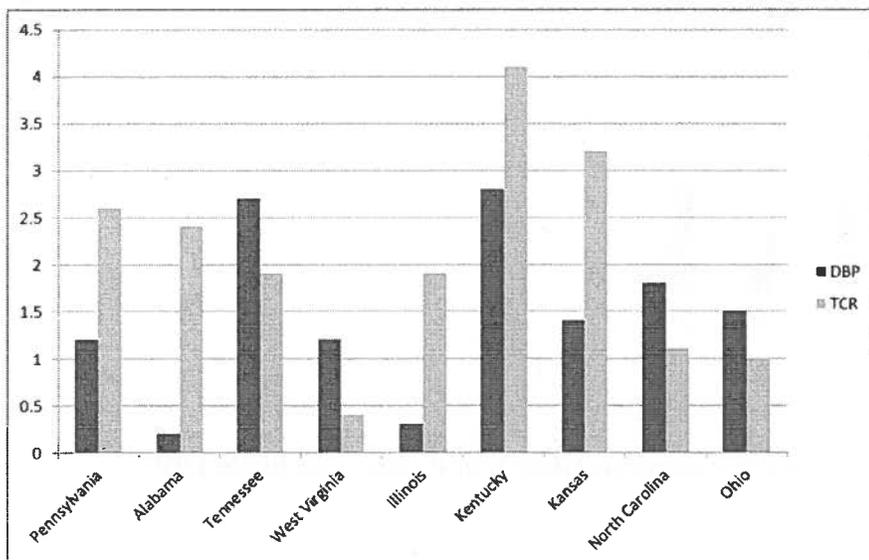
Finally, total coliform rule (TCR) and disinfection by-product (DBP) compliance data from EPA's ECHO website was reviewed to compare other state's compliance rates with Pennsylvania's.

**% CWSs w/ FY2011 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq$  0.2 mg/L**



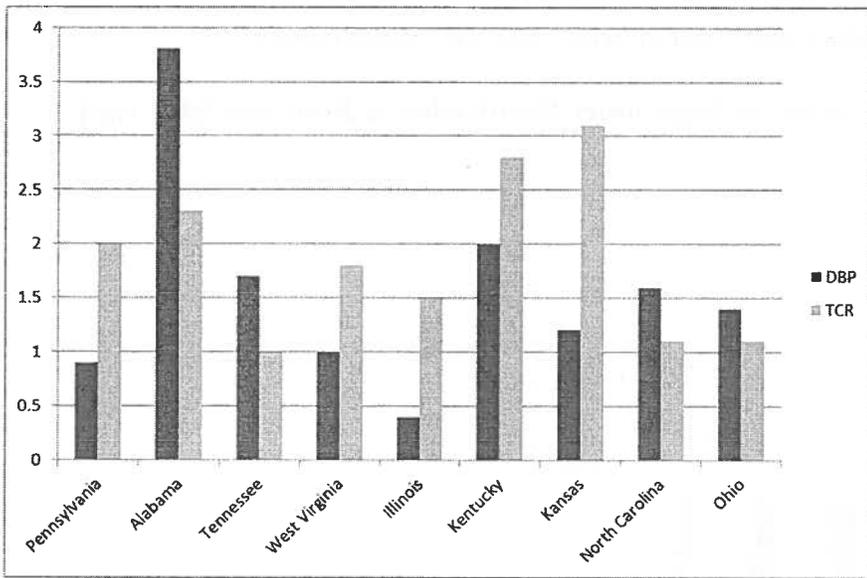
In 2011, 7 of 8 states had better TCR compliance rates than PA, while 6 of 8 states had better DBP compliance rates than PA.

**% CWSs w/ FY2012 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq$  0.2 mg/L**



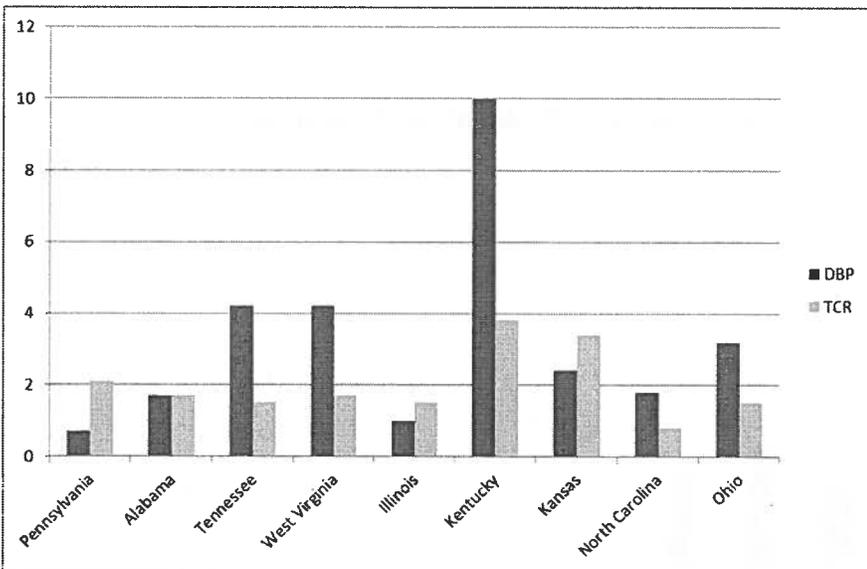
In 2012, 6 of 8 states had better TCR compliance rates than PA, while 3 of 8 states had better DBP compliance rates than PA.

**% CWSs w/ FY2013 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq 0.2$  mg/L**



In 2013, 5 of 8 states had better TCR compliance rates than PA, while 1 of 8 states had better DBP compliance rates than PA.

**% CWSs w/ FY2014 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq 0.2$  mg/L**



In 2014, 6 of 8 states had better TCR compliance rates than PA, while 0 of 8 states had better DBP compliance rates than PA.

In each of the last 4 years, the large majority of states requiring disinfectant residual levels  $\geq 0.2$  mg/L had better TCR compliance rates than Pennsylvania (i.e., had lower percentages of CWSs with TCR MCL violations). Some states were also able to control DBP violations as well.

(29) Include a schedule for review of the regulation including:

- |   |  |
|---|--|
| A. The date by which the agency must receive public comments:                               | <u>April 2016</u>                                      |
| B. The date or dates on which public meetings or hearings will be held:                     | <u>3 Hearings</u><br><u>March 28, April 5, April 7</u> |
| C. The expected date of promulgation of the proposed regulation as a final-form regulation: | <u>December 2016</u>                                   |
| D. The expected effective date of the final-form regulation:                                | <u>December 2016</u>                                   |
| E. The date by which compliance with the final-form regulation will be required:            | <u>July 2017</u>                                       |
| F. The date by which required permits, licenses or other approvals must be obtained:        | <u>December 2017</u>                                   |

(30) Describe the plan developed for evaluating the continuing effectiveness of the regulations after its implementation.

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



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

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

**FEB 02 2016**

DATE OF APPROVAL

Check if applicable  
Copy not approved. Objections attached.

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

DEPARTMENT OF ENVIRONMENTAL  
PROTECTION  
ENVIRONMENTAL QUALITY BOARD

(AGENCY)

DOCUMENT/FISCAL NOTE NO. 7-520

DATE OF ADOPTION NOVEMBER 17, 2015

BY *John Quigley*

TITLE JOHN QUIGLEY  
CHAIRMAN

EXECUTIVE OFFICER CHAIRMAN OR SECRETARY

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

BY

*[Signature]*  
12/24/2015  
DATE OF APPROVAL

(Deputy General Counsel)

~~(Chief Counsel - Independent Agency)~~

(Strike inapplicable title)

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

**NOTICE OF PROPOSED RULEMAKING**

**DEPARTMENT OF ENVIRONMENTAL PROTECTION  
ENVIRONMENTAL QUALITY BOARD**

**Disinfection Requirements Rule**

**25 Pa. Code, Chapter 109**



**PROPOSED RULEMAKING  
ENVIRONMENTAL QUALITY BOARD  
[25 PA. CODE CH. 109]**

**Disinfection Requirements Rule**

The Environmental Quality Board (Board) proposes to amend Chapter 109 (relating to safe drinking water). The amendments will strengthen water system requirements relating to microbial protection and disinfection requirements.

The amendments also include minor clarifications to the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 DBPR), Long Term 2 Enhanced Surface Water Treatment Rule (LT2) and the Lead and Copper Rule Short-Term Revisions (LCRSTR) in order to obtain or maintain primacy. The U. S. Environmental Protection Agency (EPA) promulgated the Federal Stage 2 DBPR on January 4, 2006, the Federal LT2 on January 5, 2006, and the Federal LCRSTR on October 10, 2007. Pennsylvania adopted state regulations implementing the Federal rules on December 26, 2009 (Stage 2 and LT2) and December 18, 2010 (LCRSTR). Minor clarifications are needed in order to obtain or maintain primacy for these rules.

The amendments will protect public health through a multi-barrier approach designed to guard against microbial contamination by ensuring the adequacy of treatment designed to inactivate microbial pathogens and the integrity of drinking water distribution systems.

Safe drinking water is vital to maintaining healthy and sustainable communities. Proactively avoiding incidents such as waterborne disease outbreaks can prevent loss of life, reduce the incidents of illness, and reduce health care costs. Proper investment in public water system infrastructure and operations helps ensure a continuous supply of safe drinking water; enables communities to plan and build future capacity for economic growth; and ensures their long-term sustainability for years to come.

The disinfectant residual requirements in the distribution system will apply to all 1,982 community water systems and those noncommunity water systems that have installed disinfection (822) for a total of 2,804 public water systems. These public water systems serve a total population of 10.6 million people.

The CT/log inactivation monitoring and reporting requirements will apply to all 353 filter plants which are operated by 319 water systems.

This proposal was adopted by the Board at its meeting of November 17, 2015.

*A. Effective Date*

These amendments will go into effect upon publication in the *Pennsylvania Bulletin* as final rulemaking. The submission of a sample siting plan is required six months after promulgation to allow time for development of the plan.

The Board is seeking comment on whether other provisions of the proposed rule should be deferred. For example, some systems may need up to six months to make operational changes and effectively increase disinfectant residuals to 0.2 mg/L throughout the distribution system. If capital improvements are needed, a system-specific compliance schedule may be needed. Please provide comments on the anticipated length of time needed to increase disinfectant residuals and whether capital improvements are anticipated to meet the proposed requirements.

#### *B. Contact Persons*

For further information, contact Lisa D. Daniels, Director, Bureau of Safe Drinking Water, PO Box 8467, Rachel Carson State Office Building, Harrisburg, PA 17105-8467, (717) 787-9633 or William Cumings, Assistant Counsel, Bureau of Regulatory Counsel, P. O. Box 8464, Rachel Carson State Office Building, Harrisburg, PA 17105-8464, (717) 787-7060. Information regarding submitting comments on this proposal appears in Section I of this preamble. Persons with a disability may use the Pennsylvania AT&T Relay Service by calling (800) 654-5984 (TDD users) or (800) 654-5988 (voice users). The proposal is available electronically through the Department of Environmental Protection's (DEP) web site [www.dep.pa.gov](http://www.dep.pa.gov).

#### *C. Statutory Authority*

The proposed rulemaking is being made under the authority of Section 4 of the Pennsylvania Safe Drinking Water Act (SDWA) (35 P. S. § 721.4), which grants the Board the authority to adopt rules and regulations governing the provision of drinking water to the public, and section 1920-A of The Administrative Code of 1929 (71 P. S. § 510-20) which authorizes the Board to promulgate rules and regulations necessary for the performance of the work of the Department.

#### *D. Background and Purpose*

##### *Amendments to Surface Water Treatment Regulations Regarding Monitoring and Reporting:*

The proposed amendments include new monitoring and reporting requirements to ensure compliance with existing treatment techniques regarding log inactivation and CT requirements. Log inactivation is a measure of the amount of viable microorganisms that are rendered nonviable during disinfection processes. CT is the product of residual disinfectant concentration (C) and disinfectant contact time (T). The CT value is used to determine the levels of inactivation under various operating conditions.

Public water systems using surface water or groundwater under the direct influence of surface water (GUDI) sources have long been required to meet log inactivation and CT requirements for the inactivation of *Giardia* cysts and viruses. These existing treatment technique requirements are intended to ensure that water systems provide adequate and continuous disinfection for the inactivation of pathogens.

The Small Water Systems Technical Assistance Center (TAC) Board recommended (by a vote of 7 to 6) that the monitoring requirements for CT calculations should be deleted and deferred to a future Chapter 109 revision because there are many variables for calculating CTs and TAC

believes this would be an additional burden for most systems. This recommendation was not incorporated into this proposed rulemaking because the only way to ensure compliance with the existing treatment techniques is to measure and record the data elements that are needed to calculate CTs (i.e., disinfectant residual, temperature, pH, flow and volume) and report the results. In addition, water suppliers should already be monitoring these data elements because the data is needed to properly operate filtration plants. Costs associated with the new reporting requirements should be minimal due to the availability of EPA's CT Calculator tool and the use of summary forms for reporting data for compliance purposes.

The proposed amendments also clarify the existing minimum residual disinfectant level at the entry point. By adding a zero to the minimum level (0.20 mg/L), water suppliers will be required to maintain a residual that is equal to or greater than 0.20 mg/L. Currently, levels of 0.15 mg/L or higher round up to 0.2 mg/L and are considered in compliance. A level of 0.20 mg/L is necessary due to the importance of meeting CTs and of maintaining an adequate disinfectant residual in the water entering the distribution system. Also, this level of sensitivity is consistent with existing requirements for the Groundwater Rule (0.40 mg/L) as specified in § 109.1302(a)(2). Finally, this level of sensitivity is achievable using current on-line instrumentation for the measurement of disinfectant residuals.

TAC recommended (by a vote of 10 to 3) that the residual remain at 0.2 mg/L because water systems using strip chart recorders may not be able to record data to two decimal places and water systems would be required to upgrade to more costly supervisory control and data acquisition (SCADA) systems. The Department estimates that 114 out of 352 plants (or ~30%) may be using strip chart recorders. Strip chart recorders can record measurements to two decimal places provided the proper scale and resolution is used. In cases where the requisite scale and resolution is not possible, an upgrade to electronic recording devices would cost approximately \$1,500. This cost should not be prohibitive for filter plants and the use of electronic devices offers several advantages. Advantages of using electronic recording devices include improved data reliability, faster and more comprehensive data analysis, better data resolution, elimination of the need for interpolating trace values from a chart, cost savings through the elimination of consumables (pens and chart paper), and reductions in errors associated with transferring 'analog' data to a spreadsheet for recordkeeping or reporting purposes.

Log inactivation and entry point disinfectant residual requirements are existing federal requirements found in 40 CFR 141.72(b).

#### *Amendments to Disinfectant Residual Requirements in the Distribution System:*

The proposed amendments are intended to strengthen the distribution system disinfectant residual requirements by increasing the minimum residual in the distribution system to 0.2 mg/L free or total chlorine. The Department's existing disinfectant residual requirements for distribution systems have not been substantially updated since 1992 and require the maintenance of a detectable residual that is defined as 0.02 mg/L. The Department's existing treatment technique is not protective of public health because a residual of 0.02 mg/L does not represent a

true detectable residual and the level is inadequate to protect against microbial growth within the distribution system.

*Why is it important to maintain a disinfectant residual within the distribution system?*

Maintenance of a disinfectant residual in the distribution system is:

- Required under the federal Surface Water Treatment Rule for all systems using surface water and GUDI sources, and under Chapter 109 for all community water systems and those noncommunity water systems that have installed disinfection.
- Designated by EPA as the best available technology (BAT) for compliance with both the Total Coliform Rule and the Revised Total Coliform Rule.
- Considered an important element in a multiple barrier strategy aimed at maintaining the integrity of the distribution system and protecting public health.
- Intended to maintain the integrity of the distribution system by inactivating microorganisms in the distribution system, indicating distribution system upset, and controlling biofilm growth.

Most regulatory mandates regarding drinking water focus on enforcing water quality standards at the treatment plant and not within the distribution system. There should be no change in the quality of treated water from the time it leaves the treatment plant until the time it is consumed. However, substantial changes can occur to finished water as a result of physical, chemical and biological reactions. Data on waterborne disease outbreaks suggest that distribution systems remain a source of contamination that has yet to be fully addressed (NRC, 2006).

The distribution system is a critical and often under-recognized component of every public water system. Thousands of miles of pipes, pumps, valves, finished water storage tanks and other appurtenances link treated water from plants to consumers' taps. Distribution systems represent the largest majority of physical infrastructure for public water systems and their repair and replacement requires significant financial resources. EPA estimates the 20-year water transmission and distribution needs for Pennsylvania at \$9.3 billion, with finished water storage facility infrastructure needs estimated at an additional \$1.6 billion (EPA Drinking Water Infrastructure Needs Survey, 2013).

As distribution systems age, deterioration can occur due to corrosion, erosion of pipe materials, and external pressures that can lead to breaches in pipes and storage facilities, intrusion, and main breaks. In recent years, deteriorating water infrastructure in many parts of the U.S. has resulted in frequent water main breaks and other situations that can pose intermittent or persistent health risks (EPA, 2010). Many of these deficiencies create pathways of contamination. Therefore, ensuring the integrity and effective operation of distribution systems is critical for public health protection.

Water quality may degrade during water distribution for the following reasons: the way water is treated or not treated before it is distributed, chemical and biological reactions that take place in the water during distribution, reactions between the water and distribution system materials, and

contamination from external sources that occurs because of main breaks, leaks coupled with hydraulic transients, improperly maintained storage facilities, and other factors (NRC, 2005).

Many different microbes have demonstrated the ability to survive in the distribution system, with some possessing the ability to grow and/or produce biofilms. Microbes that may be present include bacteria, viruses and protozoa. Microbial presence in the distribution system can result in colonization of the distribution system infrastructure. Once biofilm development begins, subsequent material, organisms and contamination introduced to the distribution system can become entrained in the biofilm. Contamination and material in the biofilm may subsequently be released into the flowing water under various circumstances. As a result, biofilms can act as a slow-release mechanism for persistent contamination of the water (EPA, 2002b).

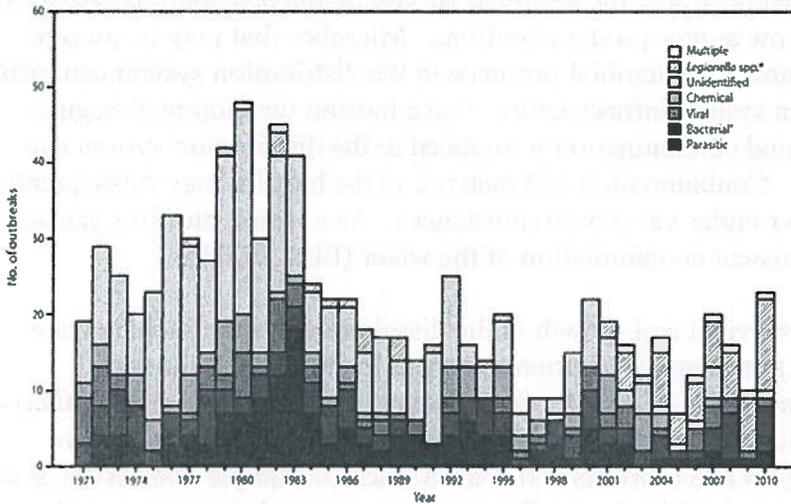
Factors that influence pathogen survival and growth in the distribution system include water chemistry (temperature, pH, etc.), presence of nutrients, system hydraulics, sediment accumulation, and presence (or absence) of disinfectant residual. Of these factors, maintenance of an adequate disinfectant residual throughout the distribution system plays a key role in controlling the growth of pathogens and biofilms and is a treatment technique that serves as one of the final barriers to protect public health. Lack of an adequate residual may increase the likelihood that disease-causing organisms such as *E. coli* and *Legionella* are present.

LeChevallier (1999) reported that two fundamental reasons for adding secondary disinfection are (1) to prevent or limit regrowth of microorganisms in the distribution system and (2) to inactivate any microorganisms that may enter the system through contamination. In addition to controlling regrowth, maintaining a disinfectant residual in the distribution system serves to inactivate microorganisms that may enter the system through cross-connections, main breaks and pressure transients. Although it may be true in some cases (that conventional disinfectant residuals may be ineffective against massive contamination from cross-connections), it is likely that small amounts of contamination occur on a much more frequent basis and that maintenance of an effective disinfectant residual throughout the distribution network acts as an important barrier in these instances.

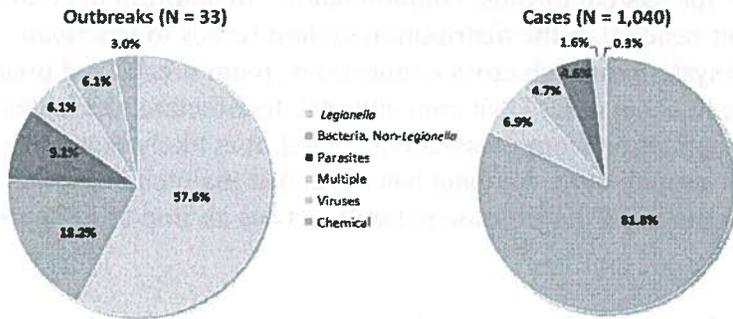
It is increasingly being recognized that water treatment and chemistry factors may play a role in downstream proliferation of opportunistic pathogens and utilities therefore play some role in controlling outbreaks (Water Research Foundation, 2013).

According to the Centers for Disease Control and Prevention (CDC), despite advances in water treatment and management, waterborne disease outbreaks continue to occur in the United States. (Figure 1) The outbreaks reported during 2009 – 2010 highlight several emerging and persisting public health challenges associated with drinking water systems. *Legionella* accounted for 58% of outbreaks and is the most frequently reported etiology among drinking water systems. (Figure 2) In addition, the large proportion (78%) of illnesses observed in outbreaks involved distribution system deficiencies. (Figure 3) This data emphasizes the importance of protecting, maintaining and improving the public drinking water distribution system infrastructure because these deficiencies can lead to widespread illness (CDC, 2013).

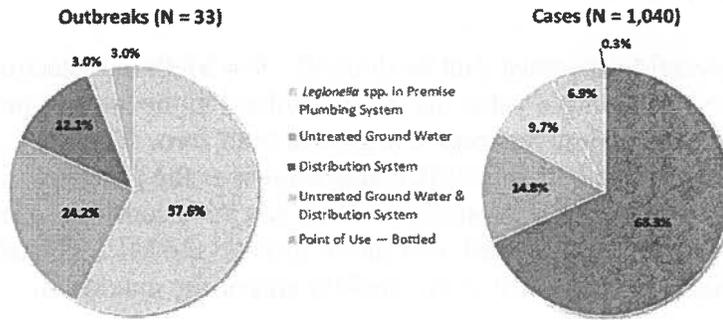
**Figure 1.** Number of waterborne disease outbreaks associated with drinking water (N = 851), by year and etiology – United States, 1971-2010.



**Figure 2.** Etiology of Drinking Water Outbreaks (N = 33) and Outbreak-related Cases (N = 1,040), Waterborne Disease and Outbreak Surveillance System, 2009-2010.

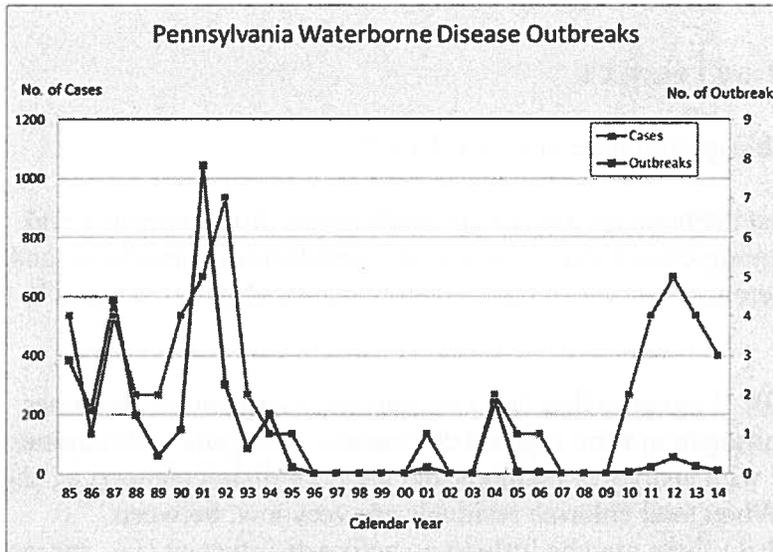


**Figure 3.** Deficiencies Assigned to Drinking Water Outbreaks (N = 33) and Outbreak-related Cases (N = 1,040), Waterborne Disease and Outbreak Surveillance System, 2009-2010.



Waterborne disease outbreaks in Pennsylvania have followed a similar trend in that nearly all outbreaks since 2010 have been associated with *Legionella* and distribution system deficiencies.

**Figure 4.** Waterborne Disease Outbreaks in Pennsylvania Associated with Drinking Water, 1985-2014. (Source: Pennsylvania Public Water System Compliance Report for 2014)



There have been a total of 18 *Legionella* outbreaks in Pennsylvania since 2010. The outbreaks occurred at several types of facilities, including personal care homes, apartment buildings, long term care facilities, hotels, condominiums, correctional facilities, recreational parks and hospitals. The outbreaks resulted in 117 cases of illness, 71 hospitalizations, and 8 deaths.

The distribution system is the remaining component of public water supplies yet to be adequately addressed in national efforts to eradicate waterborne disease. This is evident from data indicating that although the number of waterborne disease outbreaks including those attributable to distribution systems is decreasing, the proportion of outbreaks attributable to distribution systems is increasing (NRC, 2006).

*What is a true detectable residual?*

In order to answer this question, several terms must first be defined. The Method Detection Limit (MDL) is a statistically derived qualitative value that is determined in the lab and provides a 99% confidence that the detected value in a given matrix is greater than zero. The MDL does not represent a quantitative value. The Method Limit (ML), also known as the practical quantitation limit (PQL), is the lowest achievable quantifiable limit at a 95% confidence level and is derived from the MDL. The MDL is multiplied by a factor to yield the ML. The ML is often rounded based on the precision and sensitivity of the method and/or the maximum contaminant level (MCL).

According to Hach Company<sup>©</sup> (Primer, 2015), a leading manufacturer of chlorine residual monitoring devices, the MDL and ML used by EPA to approve Hach's Free and Total Chlorine Residual Methods was 0.02 mg/L Cl and 0.1 mg/L Cl, respectively.

$$\text{MDL} = 0.024, \text{ rounded to } 0.02 \text{ mg/L Cl}$$

$$\text{ML} = \text{MDL} * 3.18$$

$$\text{ML} = 0.02 * 3.18$$

$$\text{ML} = 0.06 \text{ mg/L Cl, rounded to } 0.1 \text{ mg/L Cl}$$

In other words, the lowest achievable quantifiable limit is 0.1 mg/L.

In addition, all chlorine residual test methods are subject to interferences from inorganic and organic constituents such as iron, manganese, other oxidants and disinfection byproducts, and organic chloramines. These interferences can cause false positive results (Hach Company<sup>©</sup>, 2013).

Pressman and Wahman (2014 & 2015) reported that free chlorine and inorganic chloramines may react with dissolved organic nitrogen to form organic chloramines. Organic chloramines are problematic because they interfere with analytical methods and are poor disinfectants (i.e., show little or no bactericidal activity). When total chlorine residuals are very low, between "detectable" and around 0.2 mg Cl<sub>2</sub>/L, there may be little to no active disinfectant (i.e., inorganic monochloramine) actually present.

The Colorado Department of Public Health and Environment conducted a study to determine the detection limit for free chlorine using hand-held DPD devices in a field setting. The study included analyzing data from over 450 samples that were collected from 15 public water systems from across the state. The study findings showed a detection limit of 0.09 mg/L (99% confidence) (CDPHE, 2014).

Based on these studies and reports, and the prevalence of iron, manganese and other constituents of concern in Pennsylvania's raw and finished waters, the Department believes that the true detectable residual is likely somewhere between 0.1 – 0.2 mg/L.

The Board is seeking comments on additional studies and reports related to detection limits for free and total chlorine residual analysis in the field.

*What is an adequate residual for the control of microbial growth?*

This proposed rule includes a regulatory limit of 0.2 mg/L (free or total chlorine) in the distribution system in order to ensure a true detectable residual and a meaningful residual for the control of microbial growth. This position is supported by the following studies, reports and data.

Early studies that were used to support the regulatory limit of 0.2 mg/L at the entry point include the following:

- Fair et al (1968) reported that the contact time needed to achieve a 99% *E. coli* kill at a free chlorine concentration of 0.2 mg/L was six (6) minutes at a temperature of 2-5 °C and a pH of 8.5. Additional data suggests that the bactericidal efficacy increases with decreasing pH.
- Berg (1964) reported kill rates in excess of 99% for *E. coli*, Adenovirus 3, and Poliomyelitis virus 1. These kill rates were achieved at 0.2 mg/L of HOCL and 10 minutes of contact time at 0-6 °C.
- Butterfield (1948) reported to the U.S. Public Health Service that the minimum free chlorine residual to disinfect water at 10 minutes of contact time should be 0.2 mg/L. This recommendation was for a pH range of 6.0-7.0.

LeChevallier et al (1996, 2007 & 2014) conducted an 18-month survey of 31 water systems in North America to determine the factors that contribute to the occurrence of coliform bacteria in drinking water. The study found that systems that maintained dead-end free chlorine levels of < 0.2 mg/L or monochloramine levels of < 0.5 mg/L had substantially more coliform occurrences than systems that maintained higher disinfectant residuals. Research also showed data from a utility in Utah that experienced occurrences of total coliform bacteria and *E. coli* when free chlorine residuals in its distribution system averaged only 0.1 mg/L. Coliform occurrences were controlled by increasing the free chlorine concentration > 0.2 mg/L. The study concludes that the occurrence of coliform bacteria within a distribution system is dependent upon a complex interaction of chemical, physical, operational, and engineering parameters. No one factor could account for all of the coliform occurrences and one must consider all of the parameters in devising a solution to the regrowth problem.

The Colorado Department of Public Health and Environment conducted a study to review total coliform and *E. coli* occurrence data. The study showed a relationship between chlorine residuals and occurrence. There was a higher rate of occurrence of both contaminants as the chlorine residual decreased. Specifically, CDPHE found the following:

<b>Coliform Bacteria and Residual Chlorine Data (7/1/11 – 11/15/2013)</b>			
	<b>Samples Received</b>	<b>Number of TC+</b>	<b>% of Positives</b>
< 0.1 mg/L	3,357	102	3.0%
<0.2 mg/L	7,805	160	2.0%
≥ 0.2 mg/L	83,433	462	0.55%
Totals	91,238	622	0.7%

Regarding *E. coli*, CDPHE found that ~ 48% of all *E. coli* positive results occurred when disinfectant residuals were < 0.2 mg/L. (CDPHE, 2014)

*Industry standards:*

- The 2012 edition of The Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (Ten States Standards) specifies that the minimum free chlorine residual in water distribution systems should be 0.2 mg/L, and the minimum chloramine residual, where chloramination is practiced, should be 1.0 mg/L at distant points in the distribution system.
- The Water Research Foundation recommends a free chlorine residual of 0.20 mg/L and a total chlorine residual of 0.50 mg/L for an optimized distribution system. (Water Research Foundation. 2010. Criteria for Optimized Distribution Systems.)

Both EPA and DEP have developed Area Wide Optimization Programs (AWOP) for Distribution Systems and recommend maintenance of residuals  $\geq$  0.20 mg/L free chlorine at all locations in the distribution system at all times. In addition, EPA recommends maintenance of residuals  $\geq$  1.50 mg/L monochloramine at all locations in the distribution system at all times to provide a disinfection barrier against both microbial contamination and nitrification prevention.

The goal of the Distribution System Optimization Program is to sustain the water quality leaving the plant throughout all points in the distribution system. To further define distribution system optimization, "optimization" refers to improving drinking water quality to enhance public health protection *without significant capital improvements* to the water treatment plant or distribution system infrastructure.

The distribution system is the last "barrier" for protecting public health, meaning the physical and chemical barriers that have been established are necessary to protect the public from intentional or unintentional exposure to contaminants after the water has been treated. Distribution system optimization focuses on two primary health concerns related to water quality within the distribution system:

- Microbial contamination
- Disinfection By-Product (DBP) formation

If implemented, distribution system optimization will lead to increased public health protection through increased monitoring and operational oversight, resulting in improved physical protection and improved water quality for all customers.

*State data:*

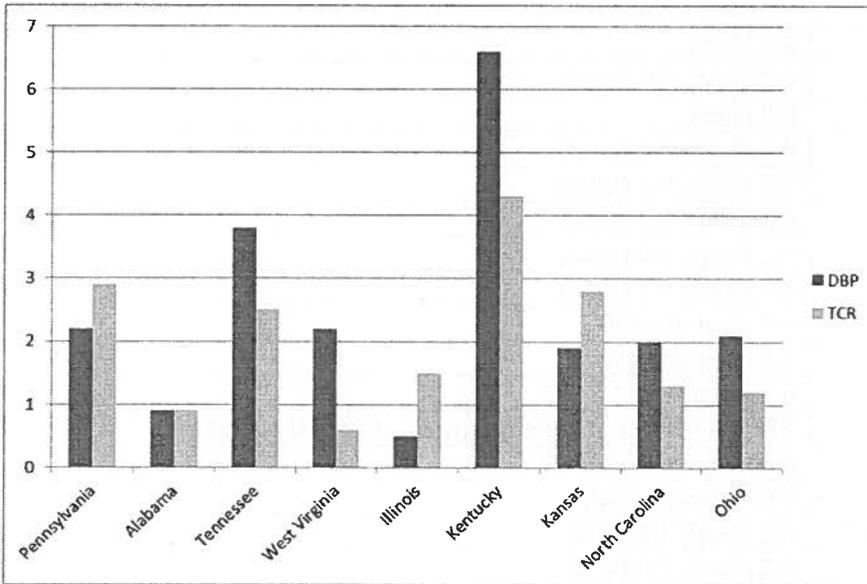
In addition to reviewing numerous studies, the disinfectant residual requirements of other states were also reviewed. At least 23 states have promulgated more stringent requirements when compared to Pennsylvania's current standard of 0.02 mg/L. Nineteen of these states have disinfectant residual requirements that are  $\geq$  0.2 mg/L, which supports the Board's proposed standard of 0.2 mg/L. The table below includes a summary of other state's requirements.

State	Minimum Distribution System Residual (mg/L)
Alabama*	0.2 (free), 0.5 (total)
Colorado*	0.2 (free or total)
Delaware	0.3 (free)
Florida*	0.2 (free), 0.6 (total)
Georgia	0.2 (free)
Illinois*	0.2 (free), 0.5 (total)
Indiana	0.2 (free), 0.5 (total)
Iowa	0.3 (free), 1.5 (total)
Kansas*	0.2 (free), 1.0 (total)
Kentucky*	0.2 (free), 0.5 (total)
Louisiana*	0.5 (free or total)
Minnesota	0.1 (free or total)
Missouri	0.2 (total)
Nebraska	SW - 0.2 (free), 0.25 or 0.5 (total); GW - 0.1 (free)
Nevada	0.05 (free or total)
New Jersey*	0.05 (free or total)
North Carolina*	0.2 (free), 1.0 (total)
Ohio*	0.2 (free), 1.0 (total)
Oklahoma	0.2 (free), 1.0 (total)
Tennessee*	0.2 (free)
Texas*	0.2 (free), 0.5 (total)
Vermont	0.1 (free)
West Virginia*	0.2 (total)

\*States with mandatory disinfection.

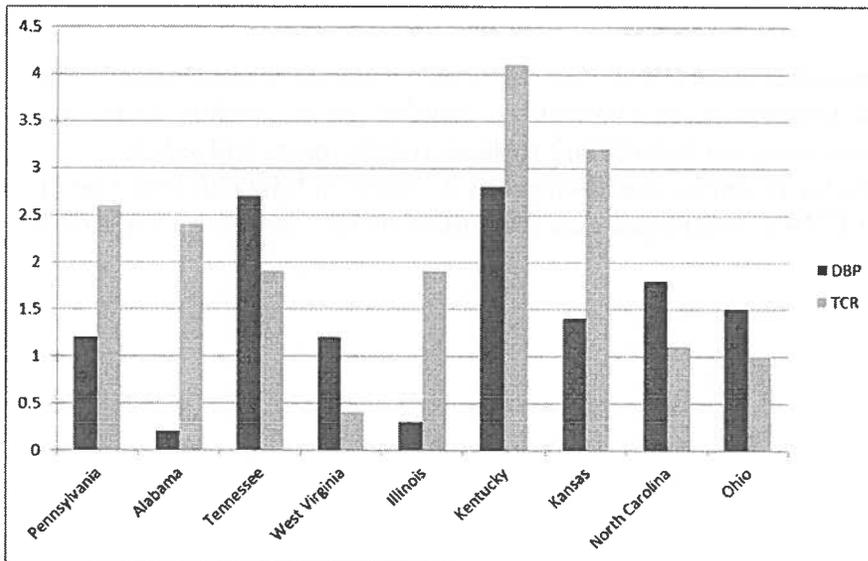
The proposed disinfectant residual requirements aim to strike a balance between improving microbial inactivation while limiting adverse impacts on disinfection by-product formation. Water systems can meet more stringent disinfectant residual requirements and still be in compliance with disinfection by-products as evidenced by a review of total coliform rule (TCR) and disinfection by-product (DBP) compliance data from other states. (Source: EPA's ECHO website)

**% CWSs w/ FY2011 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq 0.2$  mg/L**



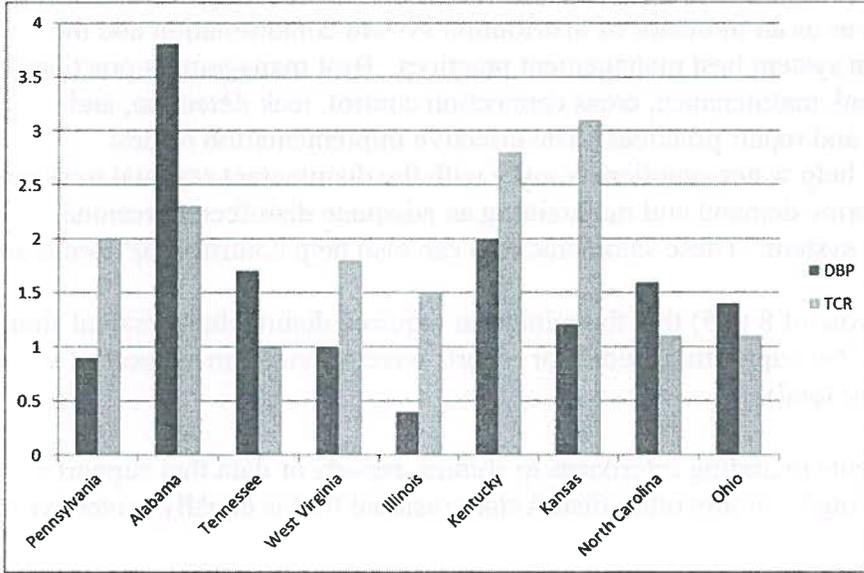
In 2011, 7 of 8 states had better TCR compliance rates than PA, while 6 of 8 states had better DBP compliance rates than PA.

**% CWSs w/ FY2012 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq 0.2$  mg/L**



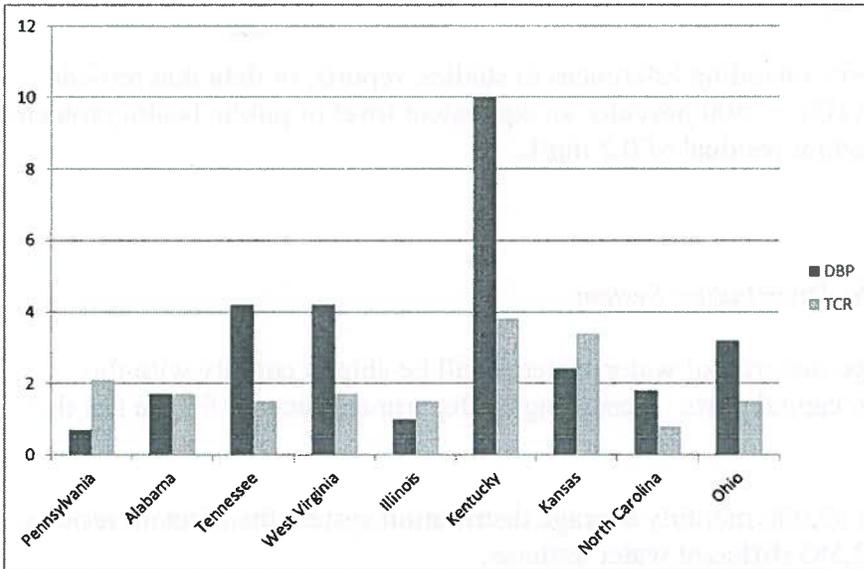
In 2012, 6 of 8 states had better TCR compliance rates than PA, while 3 of 8 states had better DBP compliance rates than PA.

**% CWSs w/ FY2013 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq 0.2$  mg/L**



In 2013, 5 of 8 states had better TCR compliance rates than PA, while 1 of 8 states had better DBP compliance rates than PA.

**% CWSs w/ FY2014 Violations – PA vs. States w/ Mandatory Disinfection & Residuals  $\geq 0.2$  mg/L**



In 2014, 6 of 8 states had better TCR compliance rates than PA, while 0 of 8 states had better DBP compliance rates than PA.

In each of the last four years, the large majority of states requiring disinfectant residual levels  $\geq$  0.2 mg/L had better TCR compliance rates than Pennsylvania (i.e., had lower percentages of CWSs with TCR MCL violations). Some states were also able to control DBP violations as well.

A disinfectant residual serves as an indicator of distribution system contamination and the effectiveness of distribution system best management practices. Best management practices include flushing, storage tank maintenance, cross connection control, leak detection, and effective pipe replacement and repair practices. The effective implementation of best management practices will help water suppliers comply with the disinfectant residual treatment technique by lowering chlorine demand and maintaining an adequate disinfectant residual throughout the distribution system. These same practices can also help control DBP formation.

TAC recommended (by a vote of 8 to 5) that the minimum required disinfectant residual should be 0.1 mg/L (free or total). No supporting studies or reports were provided in support of a residual of 0.1 mg/L (free or total).

The Board requests comments including references to studies, reports or data that support a disinfectant residual of 0.1 mg/L, or any other disinfectant residual that is equally protective of public health.

TAC also recommended (by a vote of 12 to 0 with 1 abstention) that the Board retain the requirement for Heterotrophic Plate Count (HPC) monitoring. It was recommended that HPC should be kept as another tool to demonstrate compliance with the distribution system disinfectant residual requirements. No supporting studies or reports were provided to support that an HPC < 500 provides an equivalent level of public health protection when compared to a disinfectant residual of 0.2 mg/L.

The Board requests comments including references to studies, reports, or data that provide supporting evidence that an HPC < 500 provides an equivalent level of public health protection when compared to a disinfectant residual of 0.2 mg/L.

*Costs:*

*Disinfectant Residuals in the Distribution System:*

It is anticipated that the large majority of water systems will be able to comply with this requirement with little to no capital costs. According to Department records for the last three years (2012 – 2014):

- Based on more than 82,000 monthly average distribution system disinfectant residual values reported by 2,583 different water systems:
  - 95.6% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (free chlorine)
  - Only 4.4% of the average values are below the minimum residual.

- For the 37 systems that chloramine, based on more than 1,200 monthly average values reported:
  - 99.67% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (total chlorine)
  - Only 0.33% of the average values are below the minimum residual.

Systems may need to increase the frequency of or improve the effectiveness of existing operation and maintenance best management practices, such as flushing, storage tank maintenance, cross connection control, leak detection, and effective pipe replacement and repair practices, in order to lower chlorine demand and meet disinfectant residual requirements at all points in the distribution system.

Some systems with very large and extensive distribution systems may need to install automatic flushing systems or booster chlorination stations in order to achieve a 0.2 mg/L residual at all points in the distribution system. The estimates for these facilities are as follows:

- Costs for automatic flushers: ~ \$2,000
- Costs for booster chlorination stations: \$200,000 - \$250,000

The Department estimates that 20% of large systems (serving > 50,000), or six systems, may need to install automatic flushing devices and/or booster chlorination stations. Three systems may need to install up to five automatic flushers for a cost of \$10,000 for each system, or a total of \$30,000. Three systems may need to install a booster chlorination station at \$250,000 for each system, or a total of \$750,000. The total capital costs to the regulated community may be \$780,000.

Costs for small systems are not expected to increase because most small systems are already maintaining adequate disinfectant residuals (0.40 mg/L) as required by the Groundwater Rule.

The Board requests comments on anticipated costs to comply with the proposed disinfectant residual requirements.

The Board is also seeking comments on whether a deferred effective date of six months after final promulgation is warranted in order to provide water systems with additional time to make any necessary operational changes. If capital improvements are needed, a system-specific compliance schedule may be needed. Please provide comments on the anticipated length of time needed to increase disinfectant residuals and whether capital improvements are anticipated to meet the proposed requirements.

*References:*

1. Berg, G., "The Virus Hazard in Water Supplies," *J. New England Water Works Association*, 1964, Vol. 78, pp. 79.
2. Butterfield, C. T., "Bactericidal Properties of Chloramines and Free Chlorine in Water," *Public Health Reports*, 1948, Vol. 63, pp. 934, *J. American Water Works Association*, 1948, Vol. 40, pp 1305.

3. Colorado Department of Public Health and Environment, "Draft – Minimum Distribution System Disinfectant Residuals: Chlorine Residual Values Reported from Within Drinking Water Distribution Systems," April 2014.
4. Fair, G. M. et al, *Water and Waste Engineering*, J. Wiley & Sons, Inc., 1968.
5. Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers (10 States Standards), "Recommended Standards for Waterworks," 2012 Edition.
6. Hach Company, "Chlorination, Chloramination and Chlorine Measurement," 2013.
7. Hach Company, "Primer on DPD Chlorine Method Detection Limits and Their Use in Compliance Monitoring," June 2015.
8. LeChevallier, M. W., "The Case for Maintaining a Disinfectant Residual," *J. American Water Works Association*, 1999, Vol. 91, Issue 1, pp. 86.
9. LeChevallier, M. W. et al, "Full-Scale Studies of Factors Related to Coliform Regrowth in Drinking Water," *Appl. & Envir. Microbiol.*, 1996, Vol. 62, No. 7, pp. 2201.
10. LeChevallier, M. W., 2007, "Sources of Coliform Bacteria and Causes of Coliform Occurrences in Distribution Systems,"  
[www.waterrf.org/resources/Lists/ProjectPapers/Attachments/3/IssuePapers.pdf](http://www.waterrf.org/resources/Lists/ProjectPapers/Attachments/3/IssuePapers.pdf).
11. LeChevallier, M. W., "Conducting Self-Assessments Under the Revised Total Coliform Rule," *J. American Water Works Association*, September 2014, 106:9, pp. 90.
12. National Research Council, "Public Water Supply Distribution Systems: Assessing and Reducing Risks, First Report," 2005, <http://www.nap.edu/catalog/11262.html> .
13. National Research Council, "Drinking Water Distribution Systems: Assessing and Reducing Risks," 2006, <http://www.nap.edu/catalog/11728.html> .
14. PA DEP, "Pennsylvania Public Water System Compliance Report for 2014."
15. Pressman, J. G. & Wahman, D. G., "Perspectives on the Meaning of Detectable Distribution System Residual and Implications for *N. fowleri* Control," "AWWA Water Quality Technology Conference, November 2014, New Orleans, LA.
16. Wahman, D. G. & Pressman, J. G., "Distribution System Residuals – Is "Detectable" Still Acceptable for Chloramines", *J. American Water Works Association*, August 2015, 107:8, pp. 53.
17. US DHHS, Centers for Disease Control and Prevention, "Surveillance for Waterborne Disease Outbreaks Associated with Drinking Water and Other Nonrecreational Water – US, 2009-2010, *MMWR*, Weekly, Vol. 62, No. 35, September 2013.
18. US EPA, April 2010, "Final – Priorities of the Distribution System Research and Information Collection Partnership".
19. US EPA, April 2013, "Drinking Water Infrastructure Needs Survey and Assessment, Fifth Report to Congress," EPA 816-R-13-006.
20. US EPA, 2002a, "The Effectiveness of Disinfectant Residuals in the Distribution System," [http://www.epa.gov/safewater/disinfection/tcr/regulation\\_revisions.html](http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html) .
21. US EPA, 2002b, "Health Risks from Microbial Growth and Biofilms in Drinking Water Distribution Systems,"  
[http://www.epa.gov/safewater/disinfection/tcr/regulation\\_revisions.html](http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html) .
22. US EPA, Enforcement and Compliance History Online (ECHO) database.
23. Water Research Foundation, "Criteria for Optimized Distribution Systems," 2010.
24. Water Research Foundation, "State of the Science and Research Needs for Opportunistic Pathogens in Premise Plumbing," 2013.

25. Water Research Foundation, “Strategies for Managing Total Coliform and *E. coli* in Distribution Systems,” 2009.

*History of pre-draft proposed rulemaking for disinfection requirements:*

The pre-draft proposed rulemaking was originally included in the Pre-Draft Proposed Revised Total Coliform Rule (RTCR), which was presented to TAC on June 18 and September 23, 2014 for review and comment. On April 21, 2015, the Environmental Quality Board approved the proposed RTCR with modifications. The modifications included splitting out the “Non-RTCR” provisions for additional stakeholder input. The motion was made with the expectation that the “Non-RTCR” provisions would be revisited promptly. On April 30, 2015, the TAC Board voted to recommend that the regulation be split further; with the “Non-RTCR” rulemaking to focus solely on the disinfection requirements and the minor corrections needed to obtain/maintain primacy.

In order to provide additional opportunity for stakeholder input on the disinfection requirements, TAC meetings were convened on May 18, May 26, June 16 and June 30, 2015. During these meetings, 14 water systems and organizations delivered presentations to help inform the discussion. These stakeholder presentations and other materials provided by the Department may be found on the Department’s website. Two additional meetings were held with large water systems on June 29 and July 16, 2015 to gather additional comments. As a result of these six additional stakeholder meetings, several revisions were made during the pre-draft rulemaking process, including revisions to the minimum required disinfectant residual levels, monitoring and reporting requirements, and compliance determinations. These revisions were made to address concerns about compliance costs and the frequency of public notification. TAC provided a final set of recommendations on July 15, 2015. Many of TAC’s recommendations are incorporated into the proposed rulemaking. Other recommendations are incorporated into this preamble as a means to solicit further public comment. Refer to Section E for more information about TAC’s recommendations.

*E. Summary of Regulatory Requirements*

*§ 109.1. Definitions.*

The existing definition for “Consecutive water system” was amended to clarify that a system which obtains all of its water from another public water system and provides treatment to meet a primary MCL, **MRDL or treatment technique** is a consecutive water system.

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

The title of § 109.202(a) was amended to “*Primary MCLs, **MRDLs, and treatment technique requirements**” to be consistent with the title of Subchapter B. “MCLs, MRDLs or Treatment Technique Requirements.”*

Sections 109.202(a)(1) and (2) were amended to add the language “**MRDLs, and treatment technique requirements**” following any mention of “MCLs”. These revisions were made to be

consistent with the title of Subchapter B. which is “MCLs, MRDLs or Treatment Technique Requirements.”

Section 109.202(c)(1)(ii) was separated into two clauses, (A) and (B), to improve readability and to clarify disinfection requirements within filtration plants.

Section 109.202(c)(1)(ii)(A) was amended to clarify that monitoring is required to ensure compliance with existing log inactivation requirements. Refer to Section D for more information.

Section 109.202(c)(1)(ii)(B) was amended to clarify the minimum residual disinfectant level at the entry point. By adding a zero to the minimum level (***0.20 mg/L***), water suppliers will be required to maintain a residual that is equal to or greater than 0.20 mg/L. Currently, levels of 0.15 or higher round up to 0.2 and are in compliance. A level of 0.20 mg/L is necessary due to the importance of meeting CTs and maintaining an adequate disinfectant residual in the water entering the distribution system. Also, this level of sensitivity is consistent with existing requirements for the Groundwater Rule (0.40 mg/L) as specified in § 109.1302(a)(2). Refer to Section D for more information.

Log inactivation and entry point disinfectant residual requirements are existing federal requirements found in 40 CFR 141.72(b).

Section 109.202(c)(4) was added to clarify that disinfectant residual requirements specified in 109.710 apply to community water systems using a chemical disinfectant or that deliver water that has been treated with a chemical disinfectant (i.e., a consecutive water system).

Section 109.202(c)(5) was added to clarify that nontransient noncommunity water systems that have installed chemical disinfection and transient noncommunity water systems that have installed chemical disinfection under §§ 109.202(c)(1) or 109.1302(b) must comply with the disinfectant residual requirements specified in § 109.710.

The misspelled word “community” was corrected in the first line of § 109.202(g).

#### *§ 109.301. General monitoring requirements.*

Section 109.301(1) was amended to remove an unnecessary reference to the federal drinking water regulations.

Section 109.301(1)(i)(C) was amended to clarify that a public water supplier shall record the number of periods each day when the residual disinfectant concentration at the entry point is less than ***0.20*** mg/L for more than 4 hours to be consistent with revised language in § 109.202(c)(1)(ii). This section was also amended to clarify that the length of time that grab sampling or manual recording can be substituted for continuous monitoring or recording is 5 ***working*** days after the equipment fails which is consistent with federal requirements found in 40 CFR 141.74(c)(2).

Section 109.301(1)(i)(D) was amended to incorporate new monitoring requirements for the residual disinfectant concentration in the distribution system for filtered surface water and GUDI systems. Public water suppliers shall monitor in accordance with a sample siting plan.

Sections 109.301(1)(i)(D)(I) and (II) were added to clarify that public water suppliers shall monitor the residual disinfectant concentration at the same time and from the same location as total coliform samples, and shall ensure that the disinfectant residual is measured at least once per week. Disinfectant residual monitoring conducted at total coliform sample sites can be used to meet the weekly monitoring requirement. For any week that a total coliform sample is not collected, the water supplier shall measure the disinfectant residual at a representative location within the distribution system as per its sample siting plan. TAC recommended (by a unanimous vote) that water suppliers be required to measure the distribution system disinfectant residual at least once per week, instead of once per day as initially proposed. This recommendation was incorporated into this proposed rulemaking.

Section 109.301(1)(i)(D)(III) was added to ensure equitable water quality for all consumers by requiring public water suppliers to include sample sites (that do not meet the minimum level) in the monitoring conducted the following month. The expectation is that sample sites that were out of compliance should be returned to compliance by the next month. This ensures that areas of the distribution system with chronically low disinfectant residuals receive additional monitoring and operational oversight.

Section 109.301(1)(i)(D)(IV) was added to cross reference the compliance determination requirements found in § 109.710.

Sections 109.301(1)(v) and (vi) were added to require new monitoring requirements to ensure compliance with existing treatment technique requirements specified in § 109.202(c)(1)(ii)(A). Refer to Section D for more information.

Section 109.301(2)(i) was amended to change “fecal coliform” to “*E. coli*” to be consistent with the federal MCL specified under 40 CFR 141.63(c).

Section 109.301(2)(i)(E) was amended to incorporate new monitoring requirements for the residual disinfectant concentration in the distribution system for unfiltered surface water and GUDI systems. Public water suppliers shall monitor in accordance with a sample siting plan. This language is consistent with the proposed amendments in § 109.301(1)(i)(D).

Sections 109.301(5)(iii)(B) and 109.301(6)(ii)(B) were amended to clarify monitoring requirements after the initial detection of a VOC or SOC. These amendments are consistent with federal requirements found in 40 CFR 141.24.

Section 109.301(6)(vii) was amended to include a cross reference relating to submission requirements for waiver requests and renewals set forth in clause (D).

Section 109.301(6)(vii)(A) was amended to clarify that dioxin and PCBs are included in the waiver process. Section 109.301(6)(vii)(E) was deleted. These amendments reflect federal requirements found in 40 CFR 141.24.

Section 109.301(7)(i)(A) was deleted to reflect federal requirements found in 40 CFR 141.23.

Existing § 109.301(7)(i)(B) was renumbered as § 109.301(7)(i)(A) and was retitled to reflect the federal requirements found in 40 CFR 141.23.

A new § 109.301(7)(i)(B) was added to clarify sampling point location requirements for asbestos monitoring. This addition reflects federal requirements found in 40 CFR 141.23.

Section 109.301(7)(i)(C) was amended to include a cross reference to the new waiver language found in § 109.301(7)(i)(F).

Section 109.301(7)(i)(F) was added to clarify asbestos monitoring waiver requirements. This addition reflects federal requirements found in 40 CFR 141.23.

Section 109.301(7)(iii)(C)(II) was amended to clarify repeat monitoring requirements for inorganic chemical (IOC) monitoring.

Section 109.301(12)(iv)(B)(II) was amended to reflect federal analytical requirements for bromate found in 40 CFR 141.132(b)(3)(ii)(B).

Section 109.301(13) was rewritten for clarity and amended to also require transient noncommunity water systems with 4-log treatment under Subchapter M to conduct disinfectant residual monitoring consistent with requirements of this paragraph and § 109.710.

#### *§ 109.303. Sampling requirements*

Section 109.303(e) was amended to correct a federal citation relating to monitoring requirements for unregulated contaminants and to remove another federal citation which no longer exists.

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

Section 109.408(a)(2) was amended to correct a Chapter 109 cross-reference.

Section 109.408(a)(6) was amended to clarify that Tier 1 public notice is required for a failure to meet log inactivation requirements for more than 4 hours or a failure to maintain minimum entry point disinfectant residuals for more than 4 hours when the log inactivation value was not calculated.

#### *§ 109.701. Reporting and recordkeeping.*

Section 109.701(a)(2) was amended to clarify that water systems must follow reporting requirements under § 109.701(a)(1) in addition to the requirements specified under § 109.701(a)(2).

Section 109.701(a)(2)(i)(C) was amended to require new reporting requirements for log inactivation values for Giardia to ensure compliance with *existing* treatment technique requirements specified in § 109.202(c)(1)(ii)(A). The existing reporting requirements that are in addition to the reporting requirements specified in § 109.701(a)(1) are no longer necessary and are being deleted.

Section 109.701(a)(2)(i)(D) was amended to require new reporting requirements for log inactivation values for viruses to ensure compliance with *existing* treatment technique requirements specified in § 109.202(c)(1)(ii)(A). The existing reporting requirements that are in addition to the reporting requirements specified in § 109.701(a)(1) are no longer necessary and are being deleted.

Existing § 109.701(a)(2)(ii)(D) was renumbered as § 109.701(a)(2)(ii)(C). The existing language in § 109.701(a)(2)(ii)(C) was deleted because this additional reporting requirement is no longer necessary. The distribution residual reporting requirements are specified in existing language in § 109.701(a)(1).

Section 109.701(a)(2)(iv) was deleted because the requirement to collect Heterotrophic Plate Count measurements is being deleted from § 109.710(b). This provision is no longer necessary due to the changes to residual disinfectant requirements specified in § 109.710.

Section 109.701(a)(8) was revised to require a sample siting plan for distribution system disinfectant residual monitoring. The existing reporting requirements that are in addition to the reporting requirements specified in § 109.701(a)(1) are no longer necessary and are being deleted.

*§ 109.710. Disinfectant residual in the distribution system.*

Sections 109.710(a) and (b) were amended to strengthen minimum distribution system disinfectant residual requirements for community water systems, nontransient noncommunity water systems with chemical disinfection and any transient noncommunity water system with filtration or 4-log treatment of viruses. These amendments will assist water systems to maintain compliance with the requirement of § 109.4(2) that treatment is adequate to protect the public health. Refer to Section D for more information.

Section 109.710(c) was renumbered as § 109.710(d).

Section 109.710(c) was added to clarify that a treatment technique violation occurs when the minimum disinfectant residual is not maintained in the distribution system and defines the water system's obligation to respond to this situation. This section also retains the requirement for a water system to investigate the cause and corrective action(s) whenever the minimum residual is not maintained; however, this investigation is only required if the minimum residual is not maintained at the same sample location in 2 or more consecutive months.

TAC recommended (by a vote of 8 to 5) that compliance should be required 95% of the time. While this compliance requirement is reasonable for large water systems that collect more than 40 TCR samples per month, it may not be feasible to calculate a 95<sup>th</sup> percentile for smaller systems that only collect one or two samples per month. In lieu of a 95% compliance determination for small systems, the proposed monitoring frequency was increased to 4 samples per month (one per week) with systems remaining in compliance if no more than one sample per month is below the limit.

The Board requests comments on the compliance determinations, especially for small systems.

*§ 109.715. Nitrification control plan.*

Section 109.715 is being added to require a water system that uses chloramines as a disinfection process to develop and implement a nitrification control plan. This plan is in lieu of requiring a higher residual for systems that chloraminate in order to provide simultaneous control of microbes and nitrification. TAC recommended (by a vote of 8 to 5) that nitrification control plans should be system-specific. This recommendation was incorporated into this proposed rule.

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

Section 109.1002(a) was amended to clarify that disinfection profiling and benchmarking requirements in § 109.204 apply to bottled, vended, retail and bulk water haulers (BVRB). These changes were made in response to EPA comments and are required to obtain primacy for LT2.

Section 109.1002(c) was amended to correct the name of subchapter L in the relating to language to make it consistent with the actual name of subchapter L which is the “Long-term 2 enhanced surface water treatment rule”.

*§ 109.1003. Monitoring requirements.*

Section 109.1003(a) was amended in response to EPA comments to obtain primacy for LT2.

Section 109.1003(a)(1)(ix) was amended to clarify that samples for disinfection byproduct monitoring must be collected during the peak historical month and that systems on a quarterly frequency must ensure the samples are evenly spaced. These revisions are necessary to be consistent with existing language in §109.301(12) and the federal Stage 2 Disinfection Byproducts Rule and are in response to EPA comments to obtain primacy for the Stage 2 DBPR.

Section 109.1003(a)(1)(xi) was amended to clarify chlorine dioxide monitoring requirements for bottled, vended, bulk and retail water systems. These revisions are in response to EPA comments to obtain primacy for the Stage 2 DBPR.

Section 109.1003(a)(1)(xi) was renumbered as § 109.1003(a)(1)(xii) due to the new language added to the paragraph above.

Section 109.1003(a)(1)(xiii) was added to clarify that bottled, vended, bulk and retail water systems with filtration for surface water or GUDI sources must meet minimum disinfection residual requirements. These revisions are in response to EPA comments to obtain primacy for LT2.

Section 109.1003(a)(1)(xiv) was added to require that bottled, bulk and retail water systems that use or purchase water from a system that uses surface water or GUDI sources must also meet the minimum distribution system disinfection residual requirements. These revisions are in response to EPA comments to obtain primacy for LT2. The provision allowing HPC less than 500 in lieu of a disinfectant residual is included because these systems are purchasing finished water that has already been treated with an appropriate level of disinfection, and these systems often remove the chlorine from the water prior to their entry point and add an alternate secondary disinfectant such as ultraviolet light (UV).

Section 109.1003(a)(2)(iv) was added to require that vended water systems that purchase water from a system that uses surface water or GUDI sources must also meet the minimum distribution system disinfection residual requirements. These revisions are in response to EPA comments to obtain primacy for LT2.

Section 109.1003(b)(2) was amended to change “certified” to “accredited” in reference to the type of laboratory acceptable to the Department. This amendment reflects the revised terminology in 25 Pa. Code Chapter 252 (relating to environmental laboratory accreditation).

Section 109.1003(b)(6) was added to clarify sampling and analysis requirements in order to be consistent with § 109.304(a). These amendments were made in response to EPA comments and are required in order to maintain primacy.

Section 109.1003(e) was amended to require retail water facilities to follow the requirements set forth in that subsection. This amendment was made in response to EPA comments and is required in order to maintain primacy.

Section 109.1003(h) was moved from § 109.1003(a) for clarification of compliance determinations. This change was in response to EPA comments and is necessary to maintain primacy.

Section 109.1003(i) was added to be consistent with existing language in § 109.302.

*§ 109.1004. Public notification.*

Section 109.1004(a) was amended to correct terminology for bottled, vended, retail and bulk public water systems in response to EPA comments in order to maintain primacy.

*§ 109.1008. System management responsibilities.*

Section 109.1008(b) was amended to correct the Department’s Drinking Water Bureau name.

Section 109.1008(g) was added to require bottled, vended, retail, and bulk hauling water systems to comply with the significant deficiencies requirements specified in § 109.705.

Section 109.1008(h) was added to clarify Stage 2 DBPR monitoring plan and operational evaluation level requirements. These amendments were made in response to EPA comments and are required in order to maintain primacy.

*§ 109.1103. Monitoring requirements.*

Section 109.1103(c)(1)(ii) was amended to clarify the period within which a small or medium water system that exceeded an action level is required to conduct additional lead and copper monitoring. This amendment was made to be consistent with federal requirements found in 40 CFR 141.86.

Section 109.1103(d) was amended to clarify lead service line replacement requirements. This amendment reflects federal requirements found in 40 CFR 141.84.

Section 109.1103(e)(3)(i)(C) was amended to clarify that the requirements specified in that clause relate to a water system that exceeded the action level for either lead or copper. This amendment was made to be consistent with existing language in § 109.1103(e)(3).

Section 109.1103(g)(2)(v) was amended to clarify the original intent of the subparagraph, which is to require that 50% of the total samples being collected for lead and copper shall be taken from sites served by a lead service line.

Section 109.1103(k)(6)(ii) was amended to clarify that a system must monitor in accordance with all of the requirements specified in subsection (e), including the frequency and timing of such monitoring, not just the number of sample sites.

*§ 109.1107. System management responsibilities.*

Section 109.1107(d)(4) was amended to clarify that a water system is not required to pay for replacement of privately owned lead service lines.

*§ 109.1202. Monitoring requirements.*

Sections 109.1202(a)(4)(i) and (ii) were amended to change the annual mean *E. coli* concentration triggers for monitoring to be greater than 100 *E. coli*/100 mL. These amendments were made to be consistent with federal guidance.

Section 109.1202(i) was amended to correct a Chapter 109 citation.

*§ 109.1302. Treatment technique requirements.*

Section 109.1302(a) was amended to correct a citation relating to state MCLs, MRDLs and treatment technique requirements.

## *F. Benefits, Costs and Compliance*

### *Benefits*

The proposed amendments will affect all 1,982 community water systems and those noncommunity water systems that have installed disinfection (822) for a total of 2,804 public water systems. These public water systems serve a total population of 10.6 million people.

The proposed amendments are intended to reduce the public health risks and associated costs related to waterborne pathogens and waterborne disease outbreaks. Costs related to waterborne disease outbreaks are extremely high. For example, the total medical costs and productivity losses associated with the 1993 waterborne outbreak of cryptosporidiosis in Milwaukee, Wisconsin was \$96.2 million: \$31.7 million in medical costs and \$64.6 million in productivity losses. The average total cost per person with mild, moderate, and severe illness was \$116, \$475, and \$7,808, respectively according to the following study:

Cost of illness in the 1993 Waterborne Cryptosporidium outbreak, Milwaukee, Wisconsin. Corso PS, Kramer MH, Blair KA, Addiss DG, Davis JP, Haddix AC. *Emerg Infect Dis* [serial online] 2003 April. Available from: URL: <http://wwwnc.cdc.gov/eid/article/9/4/02-0417> .

In 2008, a large Salmonella outbreak caused by contamination of a storage tank and distribution system of the municipal drinking water supply occurred in Alamosa, Colorado. The outbreak's estimated total cost to residents and businesses of Alamosa using a Monte Carlo simulation model (10,000 iterations) was approximately \$1.5 million (range: \$196,677–\$6,002,879), and rose to \$2.6 million (range: \$1,123,471–\$7,792,973) with the inclusion of outbreak response costs to local, state and nongovernmental agencies and City of Alamosa healthcare facilities and schools. This investigation documents the significant economic and health impacts associated with waterborne disease outbreaks and highlights the potential for loss of trust in public water systems following such outbreaks. This information can be found in the following study:

Economic and Health Impacts Associated with a Salmonella Typhimurium Drinking Water Outbreak—Alamosa, CO, 2008. Available from URL: <http://www.ncbi.nlm.nih.gov/pubmed/23526942> .

Communities within the Commonwealth will benefit from: (1) the avoidance of a full range of health effects from the consumption of contaminated drinking water such as, acute and chronic illness, endemic and epidemic disease, waterborne disease outbreaks, and death; (2) the continuity of a safe and adequate supply of potable water; and (3) the ability to plan and build future capacity for economic growth and ensure long-term sustainability for years to come.

### *Compliance Costs*

#### *Disinfectant Residual Monitoring at the Entry Point:*

It is estimated that 114 out of 352 plants (or ~30%) may be using strip chart recorders. Strip chart recorders can record measurements to two decimal places provided the proper scale and

resolution is used. In cases where the requisite scale and resolution is not possible, an upgrade to electronic recording devices would cost approximately \$1,500. It is estimated that 25% of these systems or 29 systems may need to upgrade to electronic recording devices.

- 29 systems x \$1,500 = \$43,500

This cost should not be prohibitive for filter plants, and the use of electronic devices offers several advantages. Advantages of using electronic recording devices include improved data reliability, faster and more comprehensive data analysis, better data resolution, elimination of the need for interpolating trace values from a chart, cost savings through the elimination of consumables (pens and chart paper), and reductions in errors associated with transferring 'analog' data to a spreadsheet for recordkeeping or reporting purposes.

#### *Disinfectant Residuals in the Distribution System:*

It is anticipated that the large majority of water systems will be able to comply with this requirement with little to no capital costs. According to Department records for the last three years (2012 – 2014):

- Based on more than 82,000 monthly average distribution system disinfectant residual values reported by 2,583 different water systems:
  - 95.6% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (free chlorine)
  - Only 4.4% of the average values are below the minimum residual.
- For the 37 systems that chloramine, based on more than 1,200 monthly average values reported:
  - 99.67% of the average values already meet or exceed the increased minimum residual of 0.2 mg/L (total chlorine)
  - Only 0.33% of the average values are below the minimum residual.

Systems may need to increase the frequency of or improve the effectiveness of existing operation and maintenance best management practices, such as flushing, storage tank maintenance, cross connection control, leak detection, and effective pipe replacement and repair practices, in order to lower chlorine demand and meet disinfectant residual requirements at all points in the distribution system.

Some systems with very large and extensive distribution systems may need to install automatic flushing systems or booster chlorination stations in order to achieve a 0.2 mg/L at all points in the distribution system. The Department's estimates for these facilities are as follows:

- Costs for automatic flushers: ~ \$2,000
- Costs for booster chlorination stations: \$200,000 - \$250,000

It is estimated that 20% of large systems (serving > 50,000), or six systems, may need to install automatic flushing devices and/or booster chlorination stations. Three systems may need to

install up to five automatic flushers for a cost of \$10,000 for each system, or a total of \$30,000. Three systems may need to install a booster chlorination station at \$250,000 for each system, or a total of \$750,000. The total capital costs to the regulated community may be \$780,000.

Costs for small systems are not expected to increase because most small systems are already maintaining adequate disinfectant residuals (0.40 mg/L) as required by the Groundwater Rule.

Total costs for the regulated community are estimated at  $\$43,500 + \$780,000 = \$823,500$ .

The Board requests comments on anticipated costs to comply with the proposed disinfectant residual requirements.

### *Compliance Assistance Plan*

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

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

In addition to this network of training staff, the Bureau of Safe Drinking Water has staff dedicated to providing both training and outreach support services to PWS operators. The DEP website also provides timely and useful information for treatment plant operators.

Finally, the Department also provides various tools and technical assistance to water systems through the Distribution System Optimization Program. The goal of distribution optimization is to sustain the water quality leaving the plant throughout all points in the distribution system. To further define distribution system optimization, "optimization" refers to improving drinking water quality to enhance public health protection without significant capital improvements to the water treatment plant or distribution system infrastructure.

The distribution system is the last "barrier" for protecting public health, meaning the physical and chemical barriers that have been established are necessary to protect the public from intentional or unintentional exposure to contaminants after the water has been treated. Distribution system optimization focuses on two primary health concerns related to water quality within the distribution system:

- Microbial contamination
- Disinfection By-Product (DBP) formation

If implemented, distribution system optimization will lead to increased public health protection through increased monitoring and operational oversight, resulting in improved physical protection and improved water quality for all customers.

## *Paperwork Requirements*

Paperwork requirements include:

- Reporting of log inactivation values on a monthly basis using existing forms.
- Reporting additional disinfectant residual levels measured in the distribution system using existing forms.
- Development of a disinfectant residual sample siting plan.
- Development of a nitrification control plan.

## *G. Sunset Review*

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

## *H. Regulatory Review*

Under section 5(a) of the Regulatory Review Act (71 P. S. § 745.5(a)), on February 11, 2016, the Department submitted a copy of these proposed amendments to the Independent Regulatory Review Commission (IRRC) and the Chairpersons of the House and Senate Environmental Resources and Energy Committees (Committees). In addition to submitting the proposed amendments, the Department has provided IRRC and the Committees with a copy of a detailed Regulatory Analysis Form prepared by the Department. A copy of this material is available to the public upon request.

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

## *I. Public Comments*

Interested persons are invited to submit written comments, suggestions or objections regarding the proposed rulemaking to the Environmental Quality Board. Comments, suggestions or objections must be received by the Board by April 19, 2016. In addition to the submission of comments, interested persons may also submit a summary of their comments to the Board. The summary may not exceed one page in length and must also be received by the Board by April 19, 2016. The one-page summary will be distributed to the Board and available publicly prior to the meeting when the final-form rulemaking will be considered.

Comments including the submission of a one-page summary of comments may be submitted to the Board online, by e-mail, by mail or express mail as follows. If an acknowledgement of

comments submitted online or by e-mail is not received by the sender within 2 working days, the comments should be retransmitted to the Board to ensure receipt. Comments submitted by facsimile will not be accepted.

Comments may be submitted to the Board by accessing eComment at <http://www.ahs.dep.pa.gov/eComment>. Comments may be submitted to the Board by e-mail at [RegComments@pa.gov](mailto:RegComments@pa.gov). A subject heading of the proposed rulemaking and a return name and address must be included in each transmission.

Written comments should be mailed to the Environmental Quality Board, P. O. Box 8477, Harrisburg, PA 17105-8477. Express mail should be sent to the Environmental Quality Board, Rachel Carson State Office Building, 16th Floor, 400 Market Street, Harrisburg, PA 17101-2301.

#### *J. Public Hearings*

The Board will hold three public hearings for the purpose of accepting comments on this proposed rulemaking. The hearings will be held at 1 p.m. on the following dates:

March 28, 2016      Department of Environmental Protection  
South-Central Regional Office  
Susquehanna Room  
909 Elmerton Avenue  
Harrisburg, PA 17110

April 5, 2016      Department of Environmental Protection  
Southeast Regional Office  
Delaware and Schuylkill Conference Rooms  
2 East Main Street  
Norristown, PA 19401

April 7, 2016      Department of Environmental Protection  
Southwest Regional Office  
Building 500  
Waterfront Conference Rooms A&B  
400 Waterfront Drive  
Pittsburgh, PA 15222

Persons wishing to present testimony at a hearing are requested to contact the Environmental Quality Board, P.O. Box 8477, Harrisburg, PA 17105-8477, (717) 787-4526 at least 1 week in advance of the hearing to reserve a time to present testimony. Oral testimony is limited to 5 minutes for each witness. Witnesses are requested to submit three written copies of their oral testimony to the hearing chairperson at the hearing. Organizations are limited to designating one witness to present testimony on their behalf at each hearing.

Persons in need of accommodations as provided for in the Americans with Disabilities Act of 1990 should contact the Board at (717) 787-4526 or through the Pennsylvania AT&T Relay Service at (800) 654-5984 (TDD) or (800) 654-5988 (voice users) to discuss how the Board may accommodate their needs.

**JOHN QUIGLEY,**  
Chairperson



**pennsylvania**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

July 15, 2015

Ms. Lisa Daniels, Director  
Bureau of Safe Drinking Water  
P.O. Box 8467  
Harrisburg, PA 17105-8467

**Re: Comments on the Pre-Draft Proposed Disinfectant Residual Requirements Rule  
(Chapter 109 – Safe Drinking Water)**

Dear Ms. Daniels:

The Small Water Systems Technical Assistance Center (TAC) Advisory Board met on April 30, May 18 & 26, and June 16 & 30 to continue discussions regarding the Pre-Draft Proposed Disinfectant Residual Requirements Rule. These requirements were originally included in the Pre-Draft Proposed Revised Total Coliform Rule (RTCR), which was presented to and discussed with the TAC Board on June 18 and September 23, 2014. However, on April 21, 2015, the Environmental Quality Board (EQB) approved the proposed RTCR with modifications. The modifications included splitting out the “Non-RTCR” provisions for additional stakeholder input. The motion was made with the expectation that the “Non-RTCR” provisions would be revisited in short order.

On April 30, 2015, the TAC Board voted to recommend that the Department further split the “Non-RTCR” provisions to focus solely on the disinfectant residual requirements and the minor corrections needed to obtain primacy. The May and June meetings provided focused input from stakeholders and additional discussion on the disinfectant residual requirements.

The TAC Board approved the following comments at its June 30, 2015 meeting:

1. **§§109.202(c)(1)(ii)(B) & 109.301(1)(i)(C)**: The revision to the entry point disinfectant residual level from 0.2 mg/L to 0.20 mg/L should be deleted; the entry point disinfectant residual level should remain at 0.2 mg/L. Strip chart recorders cannot record measurements to two decimal places, and water systems would be required to upgrade to more costly SCADA systems in order to meet the proposed requirement. The motion passed by a vote of 10 to 3.
2. **§§109.301(1)(i)(D) & 109.301(2)(i)(E)** should be revised as follows:
  - Subclause (II) should state “A public water system shall monitor the disinfectant residual at representative locations in the distribution system at least once per week.”
  - Subclause (III) should be deleted.

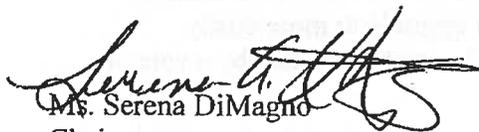
Additionally, clauses (B) and (C) in **§109.301(13)(i)** should be revised to match this language.

Daily monitoring of disinfectant residuals in the distribution system is too costly and burdensome. The RTCR should result in more representative and evenly spaced monitoring throughout the month which will ensure that samples are collected on multiple days within each week. The motion passed by a unanimous vote.

3. **§109.301(1)(v)**: The monitoring requirements for CT calculations for *Giardia* and viruses should be deleted and deferred to a future Chapter 109 revision. There are too many variables for calculating CTs and this would be an additional burden for most systems. The motion passed by a vote of 7 to 6.
4. **§109.701(a)(2)(i)(C) & (D)**: The reporting requirements for CT calculations for *Giardia* and viruses should be deleted and deferred to a future Chapter 109 revision. There are too many variables for calculating CTs and this would be an additional reporting burden for most systems. The motion passed by a vote of 7 to 6.
5. **§109.701(a)(2)(iv)**: This section should not be deleted. HPC should be kept as another tool to demonstrate compliance with the distribution system disinfectant residual treatment technique. The motion passed by a vote of 12 to 0, with 1 abstention.
6. **§109.710**: This section should be revised to change the minimum required disinfectant residual from 0.20 mg/L to 0.1 mg/L for both free and total chlorine, 95% of the time. The motion passed by a vote of 8 to 5.
7. **§109.715(a)(1)**: This section should be revised as follows "A monitoring plan that may include monitoring and recording of the following parameters" because the nitrification control plan should be system-specific, and not all water systems will need to monitor for all parameters listed. The motion passed by a vote of 8 to 5.

Thank you for the opportunity to comment.

Sincerely,

  
Ms. Serena DiMaggio  
Chairperson

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.

\* \* \* \* \*

*Consecutive water system*—A public water system which obtains all of its water from another public water system and resells the water to a person, provides treatment to meet a primary MCL, MRDL or treatment technique or provides drinking water to an interstate carrier. The term does not include bottled water and bulk water systems.

\* \* \* \* \*

Subchapter B. MCLs, MRDLs OR TREATMENT  
TECHNIQUE REQUIREMENTS

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

(a) *Primary MCLs, MRDLs and treatment technique requirements.*

(1) A public water system shall supply drinking water that complies with the primary MCLs, MRDLs and treatment technique requirements adopted by the EQB under the act.

(2) This subchapter incorporates by reference the primary MCLs, MRDLs and treatment technique requirements in the National Primary Drinking Water Regulations, at 40 CFR Part 141[, Subparts B and G (relating to maximum contaminant levels)] (relating to the National Primary Drinking Water Regulations) as State MCLs, MRDLs and treatment techniques under authority of section 4 of the act (35 P. S. § 721.4), unless other MCLs, MRDLs and treatment technique requirements are established by regulations of the Department. The primary MCLs, MRDLs and treatment technique requirements which are incorporated by reference are effective on the date established by the Federal regulations.

\* \* \* \* \*

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

(1) A public water supplier shall provide, as a minimum, continuous filtration and disinfection for surface water and GUDI sources. The treatment technique must provide at least 99.9% removal and inactivation of *Giardia lamblia* cysts, and at least 99.99% removal and inactivation of enteric viruses.

Beginning January 1, 2002, public water suppliers serving 10,000 or more people shall provide at least 99% removal of Cryptosporidium oocysts. Beginning January 1, 2005, public water suppliers serving fewer than 10,000 people shall provide at least 99% removal of Cryptosporidium oocysts. The Department, depending on source water quality conditions, may require additional treatment as necessary to meet the requirements of this chapter and to protect the public health.

\* \* \* \* \*

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

**(A) Achieve at least 1.0-log inactivation of Giardia cysts and 3.0-log inactivation of viruses as demonstrated by measurements taken under § 109.301(1). Failure to maintain the minimum log inactivation for more than 4 hours of operation constitutes a breakdown in treatment.**

**(B) Provide a minimum residual disinfectant concentration of 0.20 mg/L at the entry point as demonstrated by measurements taken under § 109.301(1). Failure to maintain the minimum entry point disinfectant residual for more than 4 hours of operation is a treatment technique violation.**

\* \* \* \* \*

**(4) Community water systems using a chemical disinfectant or that deliver water that has been treated with a chemical disinfectant shall comply with the minimum disinfectant residual specified in § 109.710 (relating to disinfectant residual in the distribution system).**

**(5) Nontransient noncommunity water systems that have installed chemical disinfection and transient noncommunity water systems that have installed chemical disinfection in accordance with paragraph (1) or § 109.1302(b) (relating to treatment technique requirements) shall comply with the minimum disinfectant residual specified in § 109.710.**

\* \* \* \* \*

(g) *Treatment technique requirements for disinfection byproduct precursors.* [Community] **Community** water systems and nontransient noncommunity water systems that use either surface water or GUDI sources and that use conventional filtration treatment shall provide adequate treatment to reliably control disinfection byproduct precursors in the source water. Enhanced coagulation and enhanced softening are deemed by the Department to be treatment techniques for the control of disinfection byproduct precursors in drinking water treatment and distribution systems. This subchapter incorporates by reference the treatment technique in 40 CFR 141.135 (relating to treatment technique for control of disinfection byproduct (DBP) precursors). Coagulants approved by the Department are deemed to be

acceptable for the purpose of this treatment technique. This treatment technique is effective on the date established by the Federal regulations.

\* \* \* \* \*

### 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:

(1) *Performance monitoring for filtration and disinfection.* A public water supplier providing filtration and disinfection of surface water or GUDI sources shall conduct the **following** performance monitoring requirements [established by the EPA under the National Primary Drinking Water Regulations], unless increased monitoring is required by the Department under § 109.302.

(i) Except as provided under subparagraphs (ii) and (iii) a public water supplier:

\* \* \* \* \*

(C) Shall continuously monitor and record the residual disinfectant concentration of the water being supplied to the distribution system and record both the lowest value for each day and the number of periods each day when the value is less than [.2] **0.20** mg/L for more than 4 hours. If a public water system's continuous monitoring or recording equipment fails, the public water supplier may, upon notification of the Department under § 109.701(a)(3) (relating to reporting and recordkeeping), substitute grab sampling or manual recording every 4 hours in lieu of continuous monitoring. Grab sampling or manual recording may not be substituted for continuous monitoring or recording for longer than 5 **working** days after the equipment fails.

(D) Shall measure and record the residual disinfectant concentration at representative points in the distribution system [no less frequently than the frequency required for total coliform sampling for compliance with the MCL for microbiological contaminants.] **in accordance with a sample siting plan as specified in § 109.701(a)(8) (relating to reporting and recordkeeping) and as follows:**

**(I) A public water supplier shall monitor the residual disinfectant concentration at the same time and from the same location that a total coliform sample is collected as specified in paragraph 3(i) and (ii). Measurements taken under this subclause may be used to meet the requirements under subclause (II).**

**(II) A public water supplier shall monitor the disinfectant residual at representative locations in the distribution system at least once per week.**

**(III) A public water supplier that does not maintain the minimum disinfectant residual specified in § 109.710 at one or more sample sites shall include those sample sites in the monitoring conducted the following month.**

**(IV) Compliance with the minimum disinfectant residual shall be determined in accordance with § 109.710.**

\* \* \* \* \*

**(v) A public water supplier shall calculate the log inactivation of Giardia, using measurement methods established by the EPA, at least once per day during peak hourly flow. The log inactivation for Giardia must also be calculated whenever the residual disinfectant concentration at the entry point falls below the minimum value specified in § 109.202(c) and continue to be calculated every 4 hours until the residual disinfectant concentration at the entry point is at or above the minimum value specified in § 109.202(c). Records of log inactivation calculations must be reported to the Department in accordance with § 109.701(a)(2).**

**(vi) In addition to the requirements specified in subparagraph (v), a public water supplier that uses a disinfectant other than chlorine to achieve log inactivation shall calculate the log inactivation of viruses at least once per day during peak hourly flow. The log inactivation for viruses must also be calculated whenever the residual disinfectant concentration at the entry point falls below the minimum value specified in § 109.202(c) and continue to be calculated every 4 hours until the residual disinfectant concentration at the entry point is at or above the minimum value specified in § 109.202(c). Records of log inactivation calculations must be reported to the Department in accordance with § 109.701(a).**

(2) *Performance monitoring for unfiltered surface water and GUDI.* A public water supplier using unfiltered surface water or GUDI sources shall conduct the following source water and performance monitoring requirements on an interim basis until filtration is provided, unless increased monitoring is required by the Department under § 109.302:

(i) Except as provided under subparagraphs (ii) and (iii), a public water supplier:

(A) Shall perform [fecal coliform] *E. coli* or total coliform density determinations on samples of the source water immediately prior to disinfection. Regardless of source water turbidity, the minimum frequency of sampling for [fecal or] total coliform [determination] or *E. coli* determinations may be no less than the following:

<i>System Size (People)</i>	<i>Samples/Week</i>
<500	1
500—3,299	2
3,300—10,000	3
10,001—25,000	4
25,001 or more	5

\* \* \* \* \*

(E) Shall measure the residual disinfectant concentration at representative points in the distribution system [no less frequently than the frequency required for total coliform sampling for compliance with the MCL for microbiological contaminants.] in accordance

with a sample siting plan as specified in § 109.701(a)(8) (relating to reporting and recordkeeping) and as follows:

(I) A public water supplier shall monitor the residual disinfectant concentration at the same time and from the same location that a total coliform sample is collected as specified in paragraph 3(i) and (ii). Measurements taken under this subclause may be used to meet the requirements under subclause (II).

(II) A public water supplier shall monitor the disinfectant residual at representative locations in the distribution system at least once per week.

(III) A public water supplier that does not maintain the minimum disinfectant residual specified in § 109.710 at one or more sample sites shall include those sample sites in the monitoring conducted the following month.

(IV) Compliance with the minimum disinfectant residual shall be determined in accordance with § 109.710.

\* \* \* \* \*

(5) *Monitoring requirements for VOCs.* Community water systems and nontransient noncommunity water systems shall monitor for compliance with the MCLs for VOCs established by the EPA under 40 CFR 141.61(a) (relating to MCLs for organic contaminants). The monitoring shall be conducted according to the requirements established by the EPA under 40 CFR 141.24(f) (relating to organic chemicals sampling and analytical requirements), incorporated herein by reference, except as modified by this chapter. Initial or first year monitoring mentioned in this paragraph refers to VOC monitoring conducted on or after January 1, 1993.

\* \* \* \* \*

(iii) *Repeat monitoring for entry points at which a VOC is detected.* For entry points at which a VOC is detected at a level equal to or greater than 0.0005 mg/L, then:

\* \* \* \* \*

(B) The Department may decrease the quarterly monitoring requirement specified in clause (A) provided it has determined that the system is reliably and consistently below the MCL. **[The Department will not make this determination unless a groundwater or GUDI system takes a minimum of 2 quarterly samples and a surface water system takes a minimum of 4 quarterly samples.] For an initial detection of a VOC, the Department will not make this determination until the water system obtains results from a minimum of 4 consecutive quarterly samples that are reliably and consistently below the MCL.**

\* \* \* \* \*

(6) *Monitoring requirements for SOCs (pesticides and PCBs).* Community water systems and nontransient noncommunity water systems shall monitor for compliance with the MCLs for SOCs established by the EPA under 40 CFR 141.61(c). The monitoring shall be conducted according to the requirements established by the EPA under 40 CFR 141.24(h), incorporated herein by reference except as modified by this chapter.

\* \* \* \* \*

(ii) *Repeat monitoring for SOCs that are detected.* If an SOC is detected (as defined by the EPA under 40 CFR Part 141.24(h)(18) or by the Department), then:

\* \* \* \* \*

(B) The Department may decrease the quarterly monitoring requirement specified in clause (A) provided it has determined that the system is reliably and consistently below the MCL. **[The Department will not make this determination unless a groundwater or GUDI system takes a minimum of 2 quarterly samples and a surface water system takes a minimum of 4 quarterly samples.] For an initial detection of a SOC, the Department will not make this determination until the water system obtains results from a minimum of 4 consecutive quarterly samples that are reliably and consistently below the MCL.**

\* \* \* \* \*

(vii) *Waivers.* A waiver will be granted to a public water supplier from conducting the initial compliance monitoring or repeat monitoring, or both, for an SOC based on documentation provided by the public water supplier and a determination by the Department that the criteria in clause (B), (C) or (D) has been met. A waiver is effective for one compliance period and may be renewed in each subsequent compliance period. If the Department has not granted a use waiver in accordance with clause (B), the public water supplier is responsible for submitting a waiver application and renewal application to the Department for review in accordance with clause (B), **[or] (C) or (D)** for specific entry points. Waiver applications will be evaluated relative to the vulnerability assessment area described in clause (A) and the criteria in clause (B), **[or] (C) or (D)**. Entry points at which treatment has been installed to remove an SOC are not eligible for a monitoring waiver for the SOCs for which treatment has been installed.

(A) *Vulnerability assessment area for SOCs [except] including dioxin and PCBs.*

\* \* \* \* \*

**[(E) *Waivers for dioxin and PCBs.* A system is granted a waiver from monitoring for dioxin and PCBs unless the Department determines that there is a source of dioxin or PCB contamination which poses a threat to a drinking water source.]**

\* \* \* \* \*

(7) *Monitoring requirements for IOCs.* Community water systems and nontransient noncommunity water systems shall monitor for compliance with the MCLs for IOCs established by the EPA under 40 CFR 141.62 (relating to maximum contaminant levels (MCLs) for inorganic contaminants). Transient noncommunity water suppliers shall monitor for compliance with the MCLs for nitrate and nitrite. The monitoring shall be conducted according to the requirements established by the EPA under 40 CFR 141.23 (relating to inorganic chemical sampling and analytical requirements). The requirements are incorporated by reference except as modified by this chapter.

(i) *Monitoring requirements for asbestos.*

(A) **[*Waivers for asbestos monitoring.* A system is granted a waiver from asbestos monitoring unless the Department determines that the system's distribution system contains asbestos cement pipe and the system has not implemented optimum corrosion control measures, or the Department determines that the system's source water is vulnerable to asbestos contamination.]**

**[(B) Initial monitoring schedule] Monitoring Frequency.** Community water systems and nontransient noncommunity water systems not granted a waiver under clause [(A)] **(F)** shall monitor for compliance with the MCL for asbestos by taking one sample at each vulnerable sampling point during the first 3-year compliance period of each 9-year compliance cycle, with the initial compliance monitoring beginning not later than the calendar year beginning January 1, 1995.

**(B) Sampling points. A system shall monitor at the following locations:**

**(I) Each entry point to the distribution system.**

**(II) At least one representative location within the distribution system identified in a written sample site plan that includes a materials evaluation of the distribution system.**

**The written sample site plan must be maintained on record and submitted to the Department prior to conducting initial monitoring or upon request.**

**(C) *Monitoring of new entry points.*** New entry points which begin operation after December 31, 1995, shall conduct initial monitoring during the first compliance period of the first compliance cycle after the entry point begins serving the public, if the Department determines that a waiver cannot be granted in accordance with clause [(A)] **(F)**.

**(D) *Repeat monitoring for systems that exceed the asbestos MCL.*** If a sample exceeds the MCL for asbestos, the monitoring at that sampling point shall be continued quarterly beginning in the quarter following the MCL **[violation] exceedance**. After 4 consecutive quarterly samples with results reliably and consistently below the MCL at that entry point, the required monitoring is reduced to one sample at that entry point during the first 3-year compliance period of each subsequent 9-year compliance cycle, if treatment has not been installed to remove asbestos from the source water. Compliance monitoring at entry points at which treatment has been installed to remove asbestos from source water shall be conducted at least annually, and performance monitoring shall be conducted quarterly.

**(E) *Confirmation samples.*** For asbestos sample results in excess of the MCL during annual or less frequent compliance monitoring, the water supplier shall take a confirmation sample within 2 weeks of notification by the accredited laboratory performing the analysis. The average of the results of the original and the confirmation sample will be used to determine compliance. Monitoring shall be completed by the deadline specified for asbestos compliance monitoring.

**(F) *Waivers for asbestos monitoring.* A waiver will be granted to a public water supplier from conducting compliance monitoring for asbestos based on documentation provided by the public water supplier and a determination by the Department that the criteria in this clause have been met. A waiver is effective for one compliance period and may be renewed in each subsequent compliance period. Entry points at which treatment has been installed to remove asbestos are not eligible for a monitoring waiver.**

**(I) A waiver for entry point compliance monitoring may be granted if the sources supplying the entry point are not vulnerable to asbestos contamination.**

**(II) A waiver for distribution system monitoring may be granted if the distribution system does not contain asbestos cement pipe as indicated in the materials evaluation or if the water system has optimized corrosion control as specified in Subchapter K.**

**(III) Waiver requests and renewals shall be submitted to the Department, on forms provided by the Department, for review and approval prior to the end of the applicable monitoring period. Until the waiver request or renewal is approved, the public water system is responsible for conducting all required monitoring.**

\* \* \* \* \*

(iii) *Monitoring requirements for antimony, arsenic, barium, beryllium, cadmium, cyanide, chromium, fluoride, mercury, nickel, selenium and thallium.*

\* \* \* \* \*

(C) *Repeat monitoring for entry points at which an IOC MCL is exceeded.*

\* \* \* \* \*

(II) After analyses of 4 consecutive quarterly samples [**at an entry point where treatment has not been installed to comply with an IOC MCL**] indicate that contaminant levels are reliably and consistently below the MCLs, the required monitoring **at an entry point where treatment has not been installed to comply with an IOC MCL** for each IOC that is reliably and consistently below the MCL is reduced to the frequencies stated in clause (A). This reduced monitoring option does not apply to entry points at which treatment has been installed for IOC removal. Compliance monitoring for IOCs for which treatment has been installed to comply with an MCL shall be conducted at least annually, and performance monitoring shall be conducted quarterly.

\* \* \* \* \*

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

\* \* \* \* \*

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

\* \* \* \* \*

(B) *Reduced monitoring*.

\* \* \* \* \*

(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) **analyzed using methods specified in 40 CFR 141.132(b)(3)(ii)(B)** 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 **analyzed using methods specified in 40 CFR 141.132(b)(3)(ii)(B)** 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).

\* \* \* \* \*

(13) *Monitoring requirements for disinfectant residuals*. Community water systems and nontransient noncommunity water systems that use either chlorine[,] or chloramines or [chlorine dioxide] that obtain finished water from another public water system that uses either chlorine or chloramines, and transient noncommunity water systems that install chemical disinfection treatment in accordance with § 109.1302(b) (relating to treatment technique requirements) shall monitor for disinfectant residuals in accordance with this paragraph. Community water systems, [and] nontransient noncommunity water systems and transient noncommunity water systems [that obtain finished water from another public water system] that [uses either chlorine or] use chlorine dioxide to treat the finished water shall monitor for chlorine [residual] dioxide in accordance with this paragraph. [Community water systems and nontransient noncommunity water systems that obtain finished water from another public water system that uses chloramines to treat the finished water shall monitor for chloramine residual in accordance with this paragraph. Transient noncommunity water systems that use chlorine dioxide as either a disinfectant or oxidant shall monitor for chlorine dioxide residual 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 disinfectant residuals shall take all samples during normal operating conditions. Compliance with the MRDLs and monitoring requirements for chlorine, chloramines and chlorine dioxide (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. **Compliance with the minimum disinfectant residual shall be determined in accordance with § 109.710.**

(i) *Chlorine and chloramines*. Systems shall measure the residual disinfectant level [at the same points in the distribution system and at the same time that total coliforms are sampled, as specified in paragraph (3). Systems that used either surface water or GUDI sources may use the results of residual disinfectant concentration sampling conducted under paragraph (1) or

**(2) in lieu of taking separate samples.] in accordance with a sample siting plan as specified in § 109.701(a)(8) (relating to reporting and recordkeeping) and as follows:**

**(A) Public water systems shall monitor the residual disinfectant concentration at the same time and from the same location that a total coliform sample is collected as specified in paragraph 3(i) and (ii). Systems that use either surface water or GUDI sources may use the results of residual disinfectant concentration sampling conducted under paragraph (1) or (2) in lieu of taking separate samples. Measurements taken under this clause may be used to meet the requirements under clause (B).**

**(B) Public water systems shall monitor the disinfectant residual at representative locations in the distribution system at least once per week.**

**(C) A public water system that does not maintain the minimum disinfectant residual specified in § 109.710 at one or more sample sites shall include those sample sites in the monitoring conducted the following month.**

\* \* \* \* \*

**§ 109.303. Sampling requirements.**

\* \* \* \* \*

(e) Compliance monitoring samples for the contaminants listed under 40 CFR [141.40(n)] **141.40(a)**, 141.61(a) and (c), 141.62 and 141.88 may be composited in accordance with 40 CFR 141.23(a)(4), 141.24(f)(14), [(g)(7)] and (h)(10) and 141.88(a)(1)(iv) (relating to inorganic chemical sampling and analytical requirements; organic chemicals other than total trihalomethanes, sampling and analytical requirements; and monitoring requirements for lead and copper in source water) except:

\* \* \* \* \*

**Subchapter D. PUBLIC NOTIFICATION**

**§ 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:

\* \* \* \* \*

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

\* \* \* \* \*

(6) Violation of a treatment technique requirement for pathogenic bacteria, viruses and protozoan cysts as defined in § 109.202(c), resulting from:

**(i)** A single exceedance of the maximum allowable turbidity limit.

(ii) A failure to meet the minimum log inactivation for more than 4 hours.

(iii) A failure to maintain the minimum entry point disinfectant residual for more than 4 hours and a failure to calculate the log inactivation in accordance with § 109.301(1)(v) and (vi).

\* \* \* \* \*

### 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:

\* \* \* \* \*

(2) *Monthly reporting requirements for performance monitoring.* **In addition to the reporting requirements specified in paragraph (1), public water systems shall report performance monitoring data as follows:**

(i) The test results of performance monitoring required under § 109.301(1) (relating to general monitoring requirements) for public water suppliers providing filtration and disinfection of surface water or GUDI sources must include the following at a minimum:

\* \* \* \* \*

(C) [For performance monitoring of the residual disinfectant concentration at representative points in the distribution system report the following:

(I) The number of monthly routine samples required.

(II) The number of monthly routine samples collected and analyzed.

(III) The number of samples in which the residual disinfectant concentration was less than 0.02 mg/L.

(IV) For samples in which the residual disinfectant concentration was less than 0.02 mg/L: the date, time and value of each sample.]**For performance monitoring of the log inactivation for Giardia, public water systems shall report as follows:**

**(I) The date, time and lowest log inactivation value for each day the value remains equal to or greater than the required minimum.**

**(II) The initial date, time and value for each occurrence that the log inactivation is less than the required minimum, and the subsequent date, time and value that the log inactivation is equal to or greater than the required minimum.**

**(III) The date the entry point is not in operation.**

**(D) For performance monitoring of the log inactivation for viruses, public water systems using a disinfectant other than chlorine to achieve log inactivation of viruses shall report as follows:**

**(I) The date, time and lowest log inactivation value for each day the value remains equal to or greater than the required minimum.**

**(II) The initial date, time and value for each occurrence that the log inactivation is less than the required minimum, and the subsequent date, time and value that the log inactivation is equal to or greater than the required minimum.**

**(III) The date the entry point is not in operation.**

(ii) The test results of performance monitoring required under § 109.301(2) for public water suppliers using unfiltered surface water or GUDI sources shall include the following, at a minimum:

\* \* \* \* \*

**(C) [For performance monitoring of the residual disinfectant concentration at representative points in the distribution system, report the following:**

**(I) The number of monthly routine samples required.**

**(II) The number of monthly routine samples collected and analyzed.**

**(III) The number of samples in which the residual disinfectant concentration was less than 0.02 mg/L.**

**(IV) For samples in which the residual disinfectant concentration was less than 0.02 mg/L: the date, time and value of each sample.**

**(D)] For performance monitoring of the [fecal coliform] *E. coli* or total coliform density determinations on samples of the source water immediately prior to disinfection: the date, time and value of each sample.**

**[(iv) The test results of heterotrophic plate count measurements taken under § 109.710(b) (relating to disinfectant residual in the distribution system) shall include the date, time and value of each sample.]**

\* \* \* \* \*

**(8) Reporting requirements for disinfectant residuals.** In addition to the reporting requirements specified in paragraph (1), public water systems **monitoring for disinfectant residuals under § 109.301** shall **[report MRDL monitoring data as follows:] submit to the Department a written sample siting plan by \_\_\_\_\_.** *(Editor's Note: The blank refers to 6 months after the effective date of adoption of this proposed rulemaking.)* **A public water system that begins operation after \_\_\_\_\_** *(Editor's Note: The blank refers to the effective date of adoption of this proposed rulemaking.)* **shall submit the sample siting plan prior to serving water to the public. At a minimum, the sample siting plan must include the following:**

**(i) [Systems monitoring for chlorine dioxide under § 109.301(13) shall report the number of days chlorine dioxide was used at each entry point during the last month.] A list of representative sample site locations in the distribution system to be used for disinfectant residual monitoring. Representative locations include, but are not limited to, the following:**

**(A) Dead ends.**

**(B) First service connection.**

**(C) Finished water storage facilities.**

**(D) Interconnections with other public water systems.**

**(E) Areas of high water age.**

**(F) Areas with previous coliform detections.**

**(ii) [Systems monitoring for either chlorine or chloramines under § 109.301(13) shall report the following:] Whether the sample site location is also used as a coliform, disinfection byproducts or lead and copper sampling location.**

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

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

**(iii) A water supplier shall revise and resubmit its sample siting plan within 30 days of notification by the Department that a sample siting plan fails to meet the criteria in subparagraphs (i) and (ii).**

**(iv) The water supplier shall notify the Department of subsequent revisions to a sample siting plan as they occur. Revisions to a sample siting plan shall be submitted in written form to the Department within 30 days of notifying the Department of the revisions.**

\* \* \* \* \*

**§ 109.710 Disinfectant residual in the distribution system.**

**(a) A community water system using a chemical disinfectant or that delivers water that has been treated with a chemical disinfectant shall maintain a minimum disinfectant residual [acceptable to the Department shall be maintained] throughout the distribution system [of the community water system] sufficient to assure compliance with the microbiological MCLs and the treatment technique requirements specified in § 109.202 (relating to State MCLs, MRDLs and treatment technique requirements). [The Department will determine the acceptable residual of the disinfectant considering factors such as type and form of disinfectant, temperature and pH of the water, and other characteristics of the water system.] The minimum disinfectant residual shall be 0.2 mg/L measured as free chlorine for systems using chlorine, 0.2 mg/L measured as total chlorine for systems using chloramines, or another level approved by the Department for systems using an alternate oxidizing disinfection treatment.**

**(b) [A public water system that uses surface water or GUDI sources or obtains finished water from another permitted public water system using surface water or GUDI sources shall comply with the following requirements:] A nontransient noncommunity water system that has installed chemical disinfection or a transient noncommunity water system that has installed chemical disinfection in accordance with §§ 109.202(c)(1) or 109.1302(b) (relating to treatment technique requirements) shall maintain a minimum disinfectant residual throughout the distribution system sufficient to assure compliance with the microbiological MCLs and the treatment technique requirements specified in § 109.202. The minimum disinfectant residual shall be 0.2 mg/L measured as free chlorine for systems using chlorine, 0.2 mg/L measured as total chlorine for systems using chloramines, or another level approved by the Department for systems using an alternate oxidizing disinfection treatment.**

**[(1) As a minimum, a detectable residual disinfectant concentration of 0.02 mg/L measured as total chlorine, combined chlorine or chlorine dioxide shall be maintained throughout the distribution system as demonstrated by monitoring conducted under § 109.301(1) and (2) or (8)(v) (relating to general monitoring requirements).**

**(2) Sampling points with nondetectable disinfectant residuals which have heterotrophic plate count (HPC) measurements of less than 500/ml are deemed to be in compliance with paragraph (1).**

(3) When the requirements of paragraph (1) or (2) cannot be achieved, the supplier shall initiate an investigation under the Department's direction to determine the cause, potential health risks and appropriate remedial measures.]

**(c) Compliance with the disinfectant residual treatment technique shall be based on samples collected as specified in the system distribution sample siting plan submitted to the Department under § 109.701(a)(8) (relating to reporting and recordkeeping). Compliance shall be determined as follows:**

**(1) For a public water system that serves 33,000 or fewer persons, if no more than one sample collected per month is less than the minimum level specified in subsection (a) or (b) for 2 consecutive months, the system is in compliance with the treatment technique.**

**(2) For a public water system that serves more than 33,000 persons, if no more than 5 percent of the samples collected per month are less than the minimum level specified in subsection (a) or (b) for 2 consecutive months, the system is in compliance with the treatment technique.**

**(3) A public water system that experiences a treatment technique violation shall notify the Department within 1 hour of discovery of the violation in accordance with § 109.701(a)(3) (relating to reporting and recordkeeping) and issue a Tier 2 public notice in accordance with § 109.409 (relating to Tier 2 public notice—categories, timing and delivery of notice).**

**(4) In addition to the requirements in paragraphs (1) - (3), a public water system that fails to meet the minimum level specified in subsection (a) or (b) at any sample location for 2 or more consecutive months shall conduct an investigation to determine the cause and appropriate corrective actions and shall submit a written report to the Department within 60 days.**

**(d) Public water systems may increase residual chlorine or chloramine, but not chlorine dioxide, disinfectant levels in the distribution system to a level that exceeds the MRDL for that disinfectant and for a time necessary to protect public health or to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm runoff events, source water contamination events or cross-connection events.**

\* \* \* \* \*

#### **§ 109.715. Nitrification control plan.**

**(a) A public water system that uses chloramines or purchases water that contains chloramines shall develop a nitrification control plan. The plan shall conform to the guidelines contained in industry standards such as the American Water Works Association's M56 Manual on Nitrification and contain at least the following information:**

**(1) A system-specific monitoring plan that includes, at a minimum:**

**(i) The list of parameters that will be monitored such as pH, free ammonia, total chlorine, monochloramine, HPC, nitrite and nitrate.**

**(ii) The monitoring locations.**

**(iii) The monitoring schedule.**

**(2) A response plan with expected water quality ranges and action levels.**

**(b) The public water system shall implement the nitrification control plan in accordance with accepted practices of the water supply industry.**

(c) The public water system shall review and update the plan as necessary.

(d) The plan shall be retained on-site and shall be made available to the Department upon request.

\* \* \* \* \*

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

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

(a) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall supply drinking water that complies with the MCLs, MRDLs and treatment technique requirements under § § 109.202 and 109.203 (relating to State MCLs, MRDLs and treatment technique requirements; and unregulated contaminants). **Bottled water systems, vended water systems, retail water facilities and bulk water hauling systems using surface water or GUDI sources shall comply with the requirements specified in § 109.204 (relating to disinfection profiling and benchmarking).** Bottled water systems, vended water systems, retail water facilities and bulk water hauling systems shall provide continuous disinfection for groundwater sources. Water for bottling labeled as mineral water, under § 109.1007 (relating to labeling requirements for bottled water systems, vended water systems and retail water facilities) shall comply with the MCLs except that mineral water may exceed the MCL for total dissolved solids.

\* \* \* \* \*

(c) Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with the treatment technique requirements under Subchapter L **[(relating to bin classification and treatment technique rule)] (relating to long-term 2 enhanced surface water treatment rule).**

\* \* \* \* \*

**§ 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 and treatment techniques [in accordance with § 109.301 (relating to general monitoring requirements) and shall comply with § 109.302 (relating to special monitoring requirements). The monitoring requirements shall be applied]** as follows, except that systems which have installed treatment to comply with a primary MCL shall conduct quarterly operational monitoring for the contaminant which the **[facility] treatment** is designed to remove:

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

\* \* \* \* \*

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

(A) *Routine monitoring.* Systems shall take at least one dual sample set per year per entry point during the **peak historical** 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 (**every 90 days**) per entry point. The system shall return to the sampling frequency of one dual sample set per year per entry point if, after at least 1 year of monitoring, each TTHM sample result is no greater than 0.060 mg/L and each HAA5 sample result is no greater than 0.045 mg/L.

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

(xi) **Beginning** *(Editor's Note: The blank refers to the effective date of adoption of this proposed rulemaking.)*, a system using chlorine dioxide shall take one sample per day at each entry point. If any daily sample exceeds the MRDL, the system shall collect chlorine dioxide check samples as follows:

**(A) A bottled water system shall take at least one sample from the same lot or batch and a bulk water hauler shall take at least one sample from the same tanker load.**

**(B) A vended or retail water system shall take at least one sample as soon as possible but within 24 hours.**

**(C) A violation of the chlorine dioxide MCL occurs when any check sample result exceeds the chlorine dioxide MCL following a routine sample result that exceeds the MCL.**

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

(xiii) **Beginning** *(Editor's Note: The blank refers to the effective date of adoption of this proposed rulemaking.)*, a system that provides filtration of surface water or GUDI sources shall comply with the following:

**(A) Maintain a residual at the entry point as specified in § 109.202(c)(1)(ii) (relating to state MCLs, MRDLs, and treatment technique requirements).**

**(B) Monitor disinfectant residual at the entry point in accordance with § 109.301(1)(i)(C) (relating to general monitoring requirements).**

**(C) Report the results in accordance with § 109.701(a)(2) (relating to reporting and recordkeeping).**

(xiv) **Beginning** *(Editor's Note: The blank refers to the effective date of adoption of this proposed rulemaking.)*, a system that uses or obtains finished water from another permitted public water system using surface water or GUDI sources shall comply with the following requirements:

**(A) As a minimum, a detectable residual disinfectant concentration of 0.2 mg/L measured as total chlorine, combined chlorine, chlorine dioxide or another level approved by the Department for systems using an alternate oxidizing disinfection treatment shall be maintained at the entry point as demonstrated by monitoring**

conducted under § 109.301(1) and (2) or (8)(v) (relating to general monitoring requirements).

(B) Sampling points with nondetectable disinfectant residuals which have heterotrophic plate count (HPC) measurements of less than 500/ml are deemed to be in compliance with clause (A).

(C) When the requirements of clause (A) or (B) cannot be achieved, the supplier shall initiate an investigation under the Department's direction to determine the cause, potential health risks and appropriate remedial measures.

\* \* \* \* \*

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

\* \* \* \* \*

(iv) Beginning \_\_\_\_\_ (Editor's Note: The blank refers to the effective date of adoption of this proposed rulemaking.), a system that obtains finished water from another permitted public water system using surface water or GUDI sources shall also monitor in accordance with subparagraph (a)(1)(xiv).

(b) *Sampling requirements.*

\* \* \* \* \*

(2) For the purpose of determining compliance with the monitoring and analytical requirements established under this subchapter, the Department will consider only those samples analyzed by a laboratory [certified] accredited by the Department, except that measurements of turbidity, fluoridation operation, residual disinfection concentration, temperature and pH may be performed by a person meeting the requirements of § 109.1008(c) (relating to system management responsibilities).

\* \* \* \* \*

(6) 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.

\* \* \* \* \*

(e) *A bulk water hauling system, [or] vended water system or retail water facility that serves at least 25 of the same persons over 6 months per year. A bulk water hauling system, [or] vended water system or retail water facility that is determined by the Department to serve at least 25 of the same persons over 6 months per year shall comply with the monitoring requirements for nontransient noncommunity water systems in accordance with § 109.301.*

\* \* \* \* \*

(h) Compliance determinations. Compliance with MCLs, MRDL, and treatment techniques shall be determined in accordance with §§ 109.202 and 109.301.

**(i) Special monitoring requirements. Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with § 109.302 (relating to special monitoring requirements).**

**§ 109.1004. Public notification.**

(a) *General public notification requirements.* A bottled water [or retail water] supplier shall give public notification in accordance with this section. A bulk water **hauler**, [or] vended water supplier **or retail water supplier** shall give public notification in accordance with Subchapter D (relating to public notification requirements). For the purpose of establishing a bulk **hauling [water or]**, vended **or retail** water supplier's responsibilities under Subchapter D, a bulk water supplier shall comply with the public notification requirements specified for a community water system and a vended **or retail** water supplier shall comply with the public notification requirements specified for a noncommunity water system.

(1) A bottled water [or retail water] supplier who knows that a primary MCL or an MRDL has been exceeded or treatment technique performance standard has been violated or has reason to believe that circumstances exist which may adversely affect the quality of drinking water, including, but not limited to, source contamination, spills, accidents, natural disasters or breakdowns in treatment, shall report the circumstances to the Department within 1 hour of discovery of the problem.

(2) If the Department determines, based upon information provided by the bottled water [or retail water] supplier or other information available to the Department, that the circumstances present an imminent hazard to the public health, the water supplier shall issue a water supply warning approved by the Department and, if applicable, initiate a program for product recall approved by the Department under this subsection. The water supplier shall be responsible for disseminating the notice in a manner designed to inform users who may be affected by the problem.

\* \* \* \* \*

**§ 109.1008. System management responsibilities.**

\* \* \* \* \*

(b) *Operation and maintenance plan requirements.* Bottled water, vended water, retail water and bulk water suppliers shall develop an operation and maintenance plan for each system. The operation and maintenance plan shall conform to the guidelines contained in Part III of the Department's *Public Water Supply Manual* which is available from the Bureau of [Water Standards and Facility Regulation] **Safe Drinking Water**, Post Office Box 8467, Harrisburg, Pennsylvania 17105-8467. The water supplier shall implement the operation and maintenance plan in accordance with this chapter, and if appropriate in accordance with accepted practices of the bottled water, vended water, retail water facility or bulk water hauling industry. The plan shall be reviewed and updated as necessary to reflect changes in the operation or maintenance of the water system. The plan shall be bound and placed in locations which are readily accessible to the water system's personnel, and shall be presented upon request to the Department.

\* \* \* \* \*

**(g) Significant Deficiencies. Bottled water and vended water systems, retail water facilities and bulk water hauling systems shall comply with the requirements of § 109.705(d) and (e) (relating to sanitary surveys).**

**(h) Stage 2 DBPR Monitoring Plan and Operational Evaluation Levels. A bulk water hauling system, vended water system or retail water facility that is determined by the Department to meet the definition of a community or nontransient noncommunity public water system and that uses a chemical disinfectant or that obtains finished water from another public water system that uses a chemical disinfectant or oxidant shall comply with the requirements of § 109.701(g)(2).**

\* \* \* \* \*

## Subchapter K. LEAD AND COPPER

### § 109.1103. Monitoring requirements.

\* \* \* \* \*

(c) *Follow-up monitoring after construction or modification of corrosion control treatment facilities.* A system which completes construction or modification of corrosion control treatment facilities in accordance with § 109.1102(b)(2) shall conduct the applicable monitoring specified in this subsection. A system which exceeds the lead action level after construction or modification of corrosion control treatment facilities shall begin lead service line replacement in accordance with § 109.1107(d) (relating to system management responsibilities).

(1) *Lead and copper tap monitoring.* A system shall monitor for lead and copper at the tap during each specified monitoring period at the number of sample sites specified in subsection (a)(1)(v).

\* \* \* \* \*

(ii) A small or medium water system shall monitor during each of two consecutive 6-month monitoring periods beginning no later than 60 months from the **[date an action level was exceeded] end of the monitoring period in which the action level was exceeded.** The water supplier shall submit within 30 days of the end of the second monitoring period a request for the Department to designate optimal corrosion control treatment performance requirements for the system. Upon approval of the request, the Department will designate water quality parameter performance requirements in accordance with § 109.1102(b)(5) or source water treatment performance requirements in accordance with § 109.1102(b)(4). A small or medium water system that does not exceed the lead and copper action levels during each of two consecutive 6-month monitoring periods may reduce the number of sample sites and reduce the frequency of sampling to once per year in accordance with subsection (e)(1)(i). Systems not eligible for reduced monitoring under subsection (e)(1) shall monitor in accordance with subsection (d)(1).

\* \* \* \* \*

(d) *Monitoring after performance requirements are established.* A system shall conduct the applicable monitoring under this subsection beginning no later than the next 6-month monitoring period that begins on January 1 or July 1 following the Department's designation of optimal corrosion control treatment water quality parameter performance requirements under § 109.1102 (b)(5) or source water performance requirements under § 109.1102(b)(4). **A system which exceeds the lead action level after construction or modification of corrosion control treatment facilities shall begin lead service line replacement in accordance with § 109.1107(d).**

\* \* \* \* \*

(e) *Reduced monitoring.*

\* \* \* \* \*

(3) *Reduced monitoring revocation.*

(i) *Reduced monitoring revocation for large water systems.* A large water system authorized to conduct reduced monitoring under this subsection that fails to meet the lead or copper action level during any 4-month monitoring period or that fails to operate within the range of performance requirements for the water quality parameters specified by the Department under § 109.1102(b)(5) on more than any 9 days in a 6-month period shall comply with the following:

\* \* \* \* \*

(C) [The] **If either the lead or copper action level is exceeded, the** water supplier shall conduct source water monitoring in accordance with subsection (d)(3). Monitoring is required only for the parameter for which the action level was exceeded. For systems on annual or less frequent monitoring, the end of the monitoring period is September 30 of the calendar year in which sampling occurs, or, if the Department has designated an alternate monitoring period, the end of the monitoring period is the last day of the 4-month period in which sampling occurs.

\* \* \* \* \*

(g) *Sample site location plan.* The water supplier shall complete a sample site location plan which includes a materials evaluation of the distribution system, lead and copper tap sample site locations, water quality parameter sample site locations, and certification that proper sampling procedures are used. The water supplier shall complete the steps in paragraphs (1)—(3) by the applicable date for commencement of lead and copper tap monitoring under subsection (a)(1) and the step in paragraph (4) following completion of the monitoring. The water supplier shall keep the sample site location plan on record and submit the plan to the Department in accordance with § 109.1107(a)(1)

\* \* \* \* \*

(2) *Lead and copper tap sample site selection.* Lead and copper tap sampling sites are classified as tier 1, tier 2 or tier 3. Tier 1 sites are the highest priority sample sites.

\* \* \* \* \*

(v) *Sample sites with lead service lines.* A system that has a distribution system containing lead service lines shall draw 50% of the samples it collects during each monitoring period from sites that contain lead pipes or copper pipes with lead solder, and 50% of **[those] the samples it collects during each monitoring period** from sites served by a lead service line. If a water system cannot identify a sufficient number of sampling sites served by a lead service line, the system shall collect first draw samples from each site identified as being served by a lead service line.

\* \* \* \* \*

(k) *Monitoring waivers for small systems.* A small system that meets the criteria of this subsection may apply to the Department to reduce the frequency of monitoring for lead and copper under this section to

once every 9 years if it meets all of the materials criteria specified in paragraph (1) and all of the monitoring criteria specified in paragraph (2). A system that meets the criteria in paragraphs (1) and (2) only for lead, or only for copper, may apply to the Department for a waiver to reduce the frequency of tap water monitoring to once every 9 years for that contaminant only.

\* \* \* \* \*

(6) *Requirements following waiver revocation.* A water system whose waiver has been revoked is subject to the corrosion control treatment, and lead and copper tap water monitoring requirements as follows:

\* \* \* \* \*

(ii) If the system meets both the lead and copper action levels, the system shall monitor for lead and copper at the tap no less frequently than once every 3 years **in accordance with the frequency, timing and [using]** the reduced number of sample sites specified in subsection (e).

\* \* \* \* \*

**§ 109.1107. System management responsibilities.**

\* \* \* \* \*

(d) *Lead service line replacement.*

\* \* \* \* \*

(4) *Conditions of replacement.* The water supplier shall replace the portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that the system owns and shall offer to replace the owner's portion of the line. A system is not required to **bear the cost of replacing the privately-owned portion of the line or to replace the privately-owned portion of the line** if the owner refuses to pay for the cost of replacement of the privately owned portion of the line, or if any laws prohibit this replacement. A system that does not replace the entire length of service line shall complete the following tasks:

\* \* \* \* \*

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

**§ 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):

\* \* \* \* \*

(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] 100 *E. coli*/100 mL.

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

\* \* \* \* \*

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

\* \* \* \* \*

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

**§ 109.1302. Treatment technique requirements.**

(a) *Community groundwater systems.* Community groundwater systems are required to provide continuous disinfection under [§ 109.202(c)(2)] § 109.202(c)(3) (relating to state MCLs, MRDLs and treatment technique requirements) and in addition shall:

\* \* \* \* \*

February 11, 2016

David Sumner  
Executive Director  
Independent Regulatory Review Commission  
333 Market Street, 14th Floor  
Harrisburg, PA 17120

Re: Proposed Rulemaking: Disinfection Requirements Rule (#7-520)

Dear Mr. Sumner:

Pursuant to Section 5(a) of the Regulatory Review Act, please find enclosed a copy of a proposed regulation for review and comment by the Independent Regulatory Review Commission (Commission). This proposal is scheduled for publication in the *Pennsylvania Bulletin* on February 20, 2016 with a 60-day public comment period. The Environmental Quality Board (EQB) adopted this proposal on November 17, 2015.

The enclosed rulemaking proposes to amend the Department of Environmental Protection's (DEP or the Department) Safe Drinking Water regulations to revise the minimum disinfectant residual level maintained in public water distribution systems and related monitoring and reporting requirements. This rulemaking also proposes to clarify other existing provisions to obtain or maintain primary enforcement authority (primacy) for the federal Long Term 2 (LT2) Enhanced Surface Water Treatment Rule, the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 DBPR), and the Lead and Copper Rule Short-Term Revisions (LCRSTR).

The Pennsylvania Safe Drinking Water Act (SDWA) obligates DEP to maintain primacy for the Safe Drinking Water program. The U. S. Environmental Protection Agency (EPA) promulgated the Federal Stage 2 DBPR on January 4, 2006, the Federal LT2 on January 5, 2006, and the Federal LCRSTR on October 10, 2007. Pennsylvania adopted state regulations implementing the Federal rules on December 26, 2009 (Stage 2 and LT2) and December 18, 2010 (LCRSTR). Minor clarifications are needed in order to obtain or maintain primacy for these rules.

New monitoring and reporting requirements are included to ensure compliance with existing treatment techniques regarding log inactivation and CT requirements. Log inactivation is a measure of the amount of viable microorganisms that are rendered nonviable during disinfection processes. CT is the product of residual disinfectant concentration (C) and disinfectant contact time (T). The CT value is used to determine the levels of inactivation under various operating conditions. Without this data, there is no way to determine compliance with the existing requirement. Additionally, the proposal would increase the minimum disinfectant residual requirements in the distribution system to 0.2 mg/L free or total chlorine. The Department of Environmental Protection's (DEP) existing disinfectant residual requirements for the distribution



system have not been substantially updated since 1992. They require the maintenance of a detectable residual that is defined as 0.02 mg/L, which does not represent a true detectable residual and is inadequate to protect against microbial growth within the distribution system.

This proposed rulemaking will apply to all 1,982 community water systems. Of these, 909 are small systems that are owned by a private individual or investor and should be considered small businesses. The disinfection requirements proposal also would apply to 822 non-community water systems (NCWSs). All of these NCWSs should be considered small businesses. The total number of small businesses affected by this regulation is 1,731.

The proposed amendments are intended to protect public health through a multi-barrier approach designed to guard against microbial contamination by ensuring the adequacy of treatment designed to inactivate microbial pathogens and ensuring the integrity of drinking water distribution systems. This regulation will also have a positive economic impact to individuals, small businesses and businesses that provide services to the drinking water industry. Safe drinking water is vital to maintaining healthy and sustainable communities. Proactively avoiding incidents such as waterborne disease outbreaks can prevent loss of life, reduce the incidents of illness, and reduce health care costs. Proper investment in public water system infrastructure and operations helps ensure a continuous supply of safe drinking water, which enables communities to effectively serve existing residential, business and commercial customers; attract new customers; and ensure their long-term sustainability for years to come.

This proposed rulemaking was initially included in a two-part proposal that was submitted to the EQB for consideration at its meeting on April 21, 2015. One part contained regulations necessary to assume primacy with respect to the federal Revised Total Coliform Rule (RTCR) and the other part of the proposal included amendments to various other portions of Chapter 109. In response to a motion made at that meeting, the EQB voted to approve the portion of the proposed rulemaking relating to the RTCR, but to split the other proposed amendments into a separate rulemaking to provide an opportunity for further consideration by the Small Water Systems Technical Advisory Center Advisory Board (TAC) and other interested parties. On April 30, 2015, TAC met and voted to recommend that DEP further split the non-RTCR provisions to focus solely on the disinfection requirements and the minor corrections needed to obtain/maintain primacy. In order to provide additional opportunity for stakeholder input on the disinfection requirements, TAC meetings were convened on May 18, May 26, June 16 and June 30, 2015. During these meetings, 14 water systems and organizations delivered presentations to help inform the discussion. Two additional meetings were held with large water systems on June 29 and July 16, 2015, to gather further comments.

As a result of these six additional stakeholder meetings, several revisions were made to the rulemaking, including revisions to the minimum required disinfectant residual levels, monitoring and reporting requirements, and compliance determinations. These revisions were made to address concerns about compliance costs and the frequency of public notification. TAC provided a final set of recommendations on July 15, 2015. Many of TAC's recommendations are incorporated into the proposed rulemaking. Other recommendations are incorporated into the preamble as a means to solicit further public comment.



A significant remaining issue is the residual number. The science and analytical method limitations support a residual of 0.2 mg/L (free or total) in the distribution system. (Note: With rounding, a residual of 0.15 mg/L or higher would round up to 0.2 mg/L for compliance purposes.) The large water systems proposed a residual 0.1 mg/L, but did not provide scientific evidence to support that number. Given the lack of supporting science coupled with ongoing concerns about interferences at low levels, DEP retained the level of 0.2 mg/L in the proposed rulemaking, but is specifically seeking wider public comment on the issue.

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

Please contact me by e-mail at [ledinger@pa.gov](mailto:ledinger@pa.gov) or by telephone at 717.783.8727 if you have any questions or need additional information.

Sincerely,

A handwritten signature in cursive script, appearing to read "Laura Edinger".

Laura Edinger  
Regulatory Coordinator

Enclosures





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

I.D. NUMBER: 7-520 Disinfection Requirements Rule  
SUBJECT:  
AGENCY: DEPARTMENT OF ENVIRONMENTAL PROTECTION

**TYPE OF REGULATION**

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

2016 FEB 11 PM 12:45

RECEIVED  
IRRC

**FILING OF REGULATION**

DATE	SIGNATURE	DESIGNATION
2/11/16	Shelly Weaver	Majority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Representative John Maher
2/10/16	James Rauter	Minority Chair, HOUSE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Representative Greg Vitali
2/11/16	Giulite Helm	Majority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Senator Gene Yaw
2/11/16	Robert [Signature]	Minority Chair, SENATE COMMITTEE ON ENVIRONMENTAL RESOURCES & ENERGY Senator John Yudichak
2/11/16	K Cooper	INDEPENDENT REGULATORY REVIEW COMMISSION David Sumner
		ATTORNEY GENERAL (for Final Omitted only)
2/11/16	Courne Mant	LEGISLATIVE REFERENCE BUREAU (for Proposed only)

