25 Pa. Code § 109.301

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Pennsylvania Administrative Code > ***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 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 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:

(A) Shall determine and record the turbidity level of representative samples of the system's filtered water as follows:

(I) For systems that operate continuously, at least once every 4 hours that the system is in operation, except as provided in clause (B).

(II) For systems that do not operate continuously, at start-up, at least once every 4 hours that the system is in operation, and also prior to shutting down the plant, except as provided in clause (B).

(B) May substitute continuous turbidity monitoring and recording for grab sample monitoring and manual recording if it validates the continuous measurement for accuracy on a regular basis using a procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least quarterly. For systems using slow sand filtration or filtration treatment other than conventional filtration, direct filtration or diatomaceous earth filtration, the Department may reduce the sampling frequency to once per day.

(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 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 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.

(ii) For a public water supplier serving 3,300 or fewer people, the Department may reduce the ***residual*** ***disinfectant*** concentration monitoring for the water being supplied to the distribution system to a minimum of 2 hours between samples at the grab sampling frequencies prescribed as follows if the historical performance and operation of the system indicate the system can meet the ***residual*** ***disinfectant*** concentration at all times:

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System Size (People)	Samples/Day
< 500	1
500 -- 1,000	2
1,001 -- 2,500	3
2,501 -- 3,300	4

If the Department reduces the monitoring, the supplier shall nevertheless collect and analyze another ***residual*** ***disinfectant*** measurement as soon as possible, but no longer than 4 hours from any measurement which is less than .2 mg/L.

(iii) For a public water supplier serving fewer than 500 people, the Department may reduce the filtered water turbidity monitoring to one grab sample per day, if the historical performance and operation of the system indicate effective turbidity removal is maintained under the range of conditions expected to occur in the system's source water.

(iv) A public water supplier providing conventional filtration treatment or direct filtration and serving 10,000 or more people and using surface water or GUDI sources shall, beginning January 1, 2002, conduct continuous monitoring of turbidity for each individual filter using an approved method under the EPA regulation in 40 CFR 141.74(a) (relating to analytical and monitoring requirements) and record the results at least every 15 minutes. Beginning January 1, 2005, public water suppliers providing conventional or direct filtration and serving fewer than 10,000 people and using surface water or GUDI sources shall conduct continuous monitoring of turbidity for each individual filter using an approved method under the EPA regulation in 40 CFR 141.74(a) and record the results at least every 15 minutes.

(A) The water supplier shall calibrate turbidimeters using the procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least quarterly.

(B) If there is failure in the continuous turbidity monitoring or recording equipment, or both, the system shall conduct grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring or recording.

(C) A public water supplier serving 10,000 or more persons has a maximum of 5 working days following the failure of the equipment to repair or replace the equipment before a violation is incurred.

(D) A public water supplier serving fewer than 10,000 persons has a maximum of 14 days following the failure of the equipment to repair or replace the equipment before a violation is incurred.

(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 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 may be no less than the following:

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

(B) Shall measure the turbidity of a representative grab sample of the source water immediately prior to disinfection as follows:

(I) For systems that operate continuously, at least once every 4 hours that the system is in operation, except as provided in clause (C).

(II) For systems that do not operate continuously, at start-up, at least once every 4 hours that the system is in operation, and also prior to shutting down the plant, except as provided in clause (C).

(C) May substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a procedure specified by the manufacturer. At a minimum, calibration with an EPA-approved primary standard shall be conducted at least quarterly.

(D) Shall continuously monitor and record the ***residual*** ***disinfectant*** concentration required under § 109.202(c)(1)(iii) (relating to State MCLs, MRDLs and treatment technique requirements) of the water being supplied to the distribution system and record the lowest value for each day. 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), substitute grab sampling or manual recording, or both, every 4 hours in lieu of continuous monitoring. Grab sampling or manual recording may not be substituted for continuous monitoring for longer than 5 days after the equipment fails.

(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.

(ii) For a public water supplier serving 3,300 or fewer people, the Department may reduce the ***residual*** ***disinfectant*** concentration monitoring for the water being supplied to the distribution system to a minimum of 2 hours between samples at the grab sampling frequencies prescribed as follows if the historical performance and operation of the system indicate the system can meet the ***residual*** ***disinfectant*** concentration at all times:

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System Size (People)	Samples/Day
< 500	1
500 -- 1,000	2
1,001 -- 2,500	3
2,501 -- 3,300	4

If the Department reduces the monitoring, the supplier shall nevertheless collect and analyze another ***residual*** ***disinfectant*** measurement as soon as possible, but no longer than 4 hours from any measurement which is less than the ***residual*** ***disinfectant*** concentration approved under § 109.202(c)(1)(iii).

(iii) For a public water supplier serving fewer than 500 people, the Department may reduce the source water turbidity monitoring to one grab sample per day, if the historical performance and operation of the system indicate effective disinfection is maintained under the range of conditions expected to occur in the system's source water.

(3) ***Monitoring requirements for coliforms.*** Public water systems shall determine the presence or absence of total coliforms for each routine or check sample; and, the presence or absence of fecal coliforms or E. coli for a total coliform positive sample in accordance with analytical techniques approved by the Department under § 109.304 (relating to analytical

requirements). A system may forego fecal coliform or E. coli testing on a total coliform-positive sample if the system assumes that any total coliform-positive sample is also fecal coliform-positive. A system which chooses to forego fecal coliform or E. coli testing shall, under § 109.701(a)(3), 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).

(i) ***Frequency.*** Public water systems shall collect samples at regular time intervals throughout the monitoring period as specified in the system distribution sample siting plan under § 109.303(a)(2) (relating to sampling requirements). Systems which use groundwater and serve 4,900 persons or fewer, may collect all required samples on a single day if they are from different sampling sites in the distribution system.

(A) Except as provided under § 109.705(b) (relating to sanitary surveys), the number of monthly total coliform samples that community water systems shall take is based on the population served by the system as follows:

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Population Served	Minimum Number of Samples per Month
25 to 1,000	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150

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320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

(B) Except as provided under § 109.705(c), the number of periodic total coliform samples that noncommunity water systems shall take is as follows:

(I) A noncommunity water system using only groundwater and serving 1,000 or fewer persons per day on a permanent basis, January through December each year, shall take one sample each calendar quarter that the system provides water to the public.

(II) A noncommunity water system using surface water (in total or in part) or serving more than 1,000 persons per day during a given month shall take the same number of samples as a community water system serving the same number of persons specified in clause (A) for each month the system provides water to the public, even if the population served is temporarily fewer than 1,000 persons per day. A groundwater system determined to be under the influence of surface water shall begin monitoring at this frequency 6 months after the Department determines that the source water is under the direct influence of surface water.

(C) A public water system that uses either a surface water or a GUDI source and does not practice filtration in compliance with Subchapter B (relating to MCLs, MRDLs or treatment technique requirements) shall collect at least one total coliform sample at the entry point, or an equivalent location as determined by the Department, to the distribution system within 24 hours of each day that the turbidity level in the source water, measured as specified in paragraph (2)(i)(B), exceeds 1.0 NTU. The Department may extend this 24-hour collection limit to a maximum of 72 hours if the system adequately demonstrates a logistical problem outside the system's control in having the sample analyzed within 30 hours of collection. A logistical problem outside the system's control may include a source water turbidity result exceeding 1.0 NTU over a holiday or weekend in which the services of a Department certified laboratory are not available within the prescribed sample holding time. These sample results shall be included in determining compliance with the MCL for total coliforms established under § 109.202(a)(2).

(ii) ***Repeat monitoring.*** A public water system shall collect a set of check samples within 24 hours of being notified of a total coliform-positive routine or check sample. The Department may extend this 24-hour collection limit to a maximum of 72 hours if the system adequately demonstrates a logistical problem outside the system's control in having the check samples analyzed within 30 hours of collection. A logistical problem outside the system's control may include a coliform-positive sample result received over a holiday or weekend in which the services of a Department certified laboratory are not available within the prescribed sample holding time.

(A) A system which collects more than one routine sample per monitoring period shall collect at least three check samples for each total coliform-positive sample found.

(B) A system which collects only one routine sample per monitoring period shall collect at least four check samples for each total coliform-positive sample found.

(C) The system shall collect at least one check sample from the sampling tap where the original total coliform-positive sample was taken, at least one check sample at a tap within five service connections upstream of the original coliform-positive sample and at least one check sample within five service connections downstream of the original sampling site. If a total coliform-positive sample occurs at the end of the distribution system or one service connection away from the end of the distribution system, the water supplier shall collect an additional check sample upstream of the original sample site in lieu of a downstream check sample.

(D) A system shall collect all check samples on the same day, except that a system with a single service connection may collect the required set of check samples all on the same day or consecutively over a 4-day period.

(E) If a check sample is total coliform-positive, the public water system shall collect additional check samples in the manner specified in this subparagraph. The system shall continue to collect check samples until either total coliforms are not detected in check samples, or the system determines that the MCL for total coliforms as established under § 109.202(a)(2) has been exceeded and notifies the Department.

(F) If a system collecting fewer than five routine samples per month has one or more valid total coliform-positive samples, the system shall collect at least five routine samples during the next month the system provides water to the public. The number of routine samples for the month following a total coliform-positive sample may be reduced by the Department to at least one sample the next month if the reason for the total coliform-positive sample is determined and the problem has been corrected or will be corrected before the end of the next month.

(G) Results of all routine and check samples not invalidated by the Department shall be included in determining compliance with the MCL for total coliforms as established under § 109.202(a)(2).

(iii) ***Invalidation of total coliform samples.*** A total coliform sample invalidated under this paragraph does not count towards meeting the minimum monitoring requirements of this section.

(A) The Department may invalidate a total coliform-positive sample if one of the following applies:

(I) The laboratory which performed the analysis establishes that improper sample analysis caused the total coliform-positive result.

(II) A domestic or other nondistribution system plumbing problem exists when a coliform contamination incident occurs that is limited to a specific service connection from which a coliform-positive sample was taken in a public water system with more than one service connection. The Department's determination to invalidate a sample shall be based on a total coliform-positive check sample collected at the same tap as the original total coliform-positive sample and all total coliform-negative check samples collected within five service connections of the original total coliform positive sample. This type of sample invalidation does not apply to public water systems with only one service connection.

(III) A total coliform-positive sample result is due to a circumstance or condition which does not reflect water quality in the distribution system. The Department's decision to invalidate a sample shall be based on evidence that the sample result does not reflect water quality in the distribution system. In this case, the system shall still collect all check samples required under subparagraph (ii) to determine compliance with the MCL for total coliforms as established under § 109.202(a)(2).

(B) A laboratory shall invalidate a total coliform sample if no total coliforms are detected and one of the following occurs:

(I) The sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined.

(II) The sample exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter.

(C) If a laboratory invalidates a sample because of interference as specified in clause (B), the laboratory shall notify the system within 1 business day to collect another sample from the same location as the original sample within

24 hours of being notified of the interference and have it analyzed for the presence of total coliforms. The system shall resample within 24 hours of being notified of interference and continue to resample every 24 hours until it receives a valid result. The Department may extend this 24-hour limit to a maximum of 72 hours if the system adequately demonstrates a logistical problem outside the system's control in having the resamples analyzed within 30 hours. A logistical problem outside the system's control may include a notification of a laboratory sample invalidation, due to interference, which is received over a holiday or weekend in which the services of a Department certified laboratory are not available within the prescribed sample holding time.

(iv) ***Compliance determinations.***

(A) The MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

(I) For a system which collects at least 40 samples per month, if no more than 5.0% of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliforms.

(II) For a system which collects fewer than 40 samples per month, if no more than one sample collected during the month is total coliform-positive, the system is in compliance with the MCL for total coliforms.

(B) Any fecal coliform-positive repeat sample or *E. coli* -- positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or *E. coli* -- positive routine sample constitutes a violation of the MCL for total coliforms.

(C) A public water system shall determine compliance with the MCL for total coliforms in clauses (A) and (B) for each month in which it is required to monitor for total coliforms.

(v) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement or repair, may not be used to determine compliance with the MCL for total coliform. Check samples taken under subparagraph (ii) are not considered special purpose samples, and shall be used to determine compliance with the monitoring and MCL requirements for total coliforms established under this paragraph and § 109.202(a)(2).

(4) ***Exception.*** For a water system which complies with the performance monitoring requirements under paragraph (2), the monitoring requirements for compliance with the turbidity MCL do not apply.

(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.

(i) ***Vinyl chloride.*** Monitoring for compliance with the MCL for vinyl chloride is required for groundwater entry points at which one or more of the following two-carbon organic compounds have been detected: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene or 1,1-dichloroethylene and shall consist of quarterly samples. If the results of the first analysis do not detect vinyl chloride, monitoring shall be reduced to one sample during each compliance period. Surface water entry points shall monitor for vinyl chloride as specified by the Department.

(ii) ***Initial monitoring.*** Initial monitoring shall consist of 4 consecutive quarterly samples at each entry point in accordance with the following monitoring schedule during the compliance period beginning January 1, 1993, except for systems which are granted reduced initial monitoring in accordance with clauses (E) and (F). A system which monitors during the initial monitoring period, but begins monitoring before its scheduled initial monitoring year specified in this subparagraph, shall begin monitoring every entry point during the first calendar quarter of the year it begins monitoring, except as provided in clause (E).

(A) Systems serving more than 10,000 persons shall begin monitoring during the quarter beginning January 1, 1994.

(B) Systems serving 3,301 persons to 10,000 persons shall begin monitoring during the quarter beginning January 1, 1995.

(C) Systems serving 500 to 3,300 persons shall begin monitoring during the quarter beginning January 1, 1993.

(D) Systems serving fewer than 500 persons shall begin monitoring during the quarter beginning January 1, 1994.

(E) For systems serving 3,300 or fewer people which monitor at least one quarter prior to October 1, 1993, and do not detect VOCs at an entry point during the first quarterly sample, the required initial monitoring is reduced to one sample at that entry point. For systems serving 500 to 3,300 people to qualify for this reduced monitoring, the initial monitoring shall have been conducted during the quarter beginning January 1, 1993.

(F) For systems serving more than 3,300 people, which were in existence prior to January 1, 1993, initial monitoring for compliance with the MCLs for VOCs established by the EPA under 40 CFR 141.61(a) is reduced to one sample for each entry point which meets the following conditions:

(I) VOC monitoring required by the Department between January 1, 1988, and December 31, 1992, has been conducted and no VOCs regulated under 40 CFR 141.61(a) were detected.

(II) The first quarter monitoring required by this paragraph has been conducted during the first quarter of the system's scheduled monitoring year under this paragraph, with no detection of a VOC.

(G) Systems with new entry points associated with new sources which are permitted under Subchapter E (relating to permit requirements) to begin operation after December 31, 1992, shall conduct initial monitoring as follows. New entry points shall be monitored quarterly, beginning the first full quarter the entry point begins serving the public.

(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:

(A) Monitoring shall be repeated quarterly beginning the quarter following the detection for VOCs for which the EPA has established MCLs under 40 CFR 141.61(a), except for vinyl chloride as provided in subparagraph (i), until reduced monitoring is granted in accordance with this subparagraph.

(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.

(C) If the Department determines that the system is reliably and consistently below the MCL, the Department may allow the system to monitor annually. Systems which monitor annually shall monitor during the quarter that previously yielded the highest analytical result, or as specified by the Department.

(iv) ***Repeat monitoring for entry points at which no VOC is detected.***

(A) For entry points at which VOCs are not detected during the first year of quarterly monitoring, or annual monitoring if only one sample was required at an entry point for first year monitoring under subparagraph (ii)(E), or (F), required monitoring is reduced to one sample per entry point per year.

(B) For groundwater or GUDI entry points where VOCs are monitored in accordance with this paragraph, but are not detected during 3 years of quarterly or annual monitoring, or both, required monitoring is reduced to one sample per entry point during each subsequent compliance period. Reduced monitoring shall be conducted at 3-year intervals from the year of required initial monitoring.

(v) ***Repeat monitoring for VOCs with MCL exceedances.*** For entry points at which a VOC MCL is exceeded, monitoring shall be conducted quarterly, beginning the quarter following the exceedance. Quarterly monitoring shall continue until a minimum of 4 consecutive quarterly samples shows the system is in compliance as specified in subparagraph (x) and the Department determines the system is reliably and consistently below the MCL. If the Department determines that the system is in compliance and is reliably and consistently below the MCL, the Department may allow the system to monitor in accordance with subparagraph (iii)(C).

(vi) ***Confirmation samples.*** A confirmation sample shall be collected and analyzed for each VOC listed under 40 CFR 141.61(a) which is detected at a level in excess of its MCL during annual or less frequent compliance monitoring. The confirmation sample shall be collected within 2 weeks of notification by the accredited laboratory performing the analysis that an MCL has been exceeded. 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 VOC compliance monitoring.

(vii) ***Reduced monitoring.*** When reduced monitoring is provided under subparagraph (iii) or (iv), the system shall monitor the entry point during the calendar year quarter that previously yielded the highest analytical result, or as

specified by the Department. The reduced monitoring option in subparagraph (iv)(B) does not apply to entry points at which treatment has been installed for VOC removal. Quarterly performance monitoring is required for VOCs for which treatment has been installed.

(viii) ***Waivers.*** Waivers under 40 CFR 141.24(f)(7) and (10) will not be available for the VOC monitoring requirements in this paragraph. Systems with groundwater or GUDI entry points which have 3 consecutive years of quarterly or annual samples with no detection of a VOC may apply to the Department for a waiver. Entry points at which treatment has been installed to remove a VOC are not eligible for a monitoring waiver.

(A) A use waiver may be granted to a public water supplier from conducting monitoring under subparagraph (iii)(C), based on documentation provided by the public water supplier and a determination by the Department that the criteria has been met. Waivers may be granted after evaluating the following criteria:

(I) Knowledge of previous use, including transport, storage or disposal, of a substance containing VOCs within the wellhead protection area Zones I and II as defined under § 109.1 (relating to definitions).

(II) If a determination by the Department reveals no previous use, a waiver may be granted.

(B) If a use waiver is granted by the Department, required monitoring is reduced to one sample per entry point during each subsequent compliance period. Monitoring shall be conducted at 3-year intervals from the year of required initial monitoring.

(C) A use waiver is effective for one compliance period and may be renewed in each subsequent compliance period.

(D) Susceptibility waivers under 40 CFR 141.24(f)(8)(ii) will not be available for the VOC monitoring requirements in this paragraph.

(E) 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.

(ix) ***Invalidation of VOC samples.***

(A) The Department may invalidate results of obvious sampling errors.

(B) A VOC sample invalidated under this subparagraph does not count towards meeting the minimum monitoring requirements of this paragraph.

(x) ***Compliance determinations.*** Compliance with the VOC MCLs shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the system is in violation of the MCL.

(A) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average of all samples taken at each entry point.

(B) If monitoring is conducted annually or less frequently, the system is out of compliance if the level of a contaminant at any entry point is greater than the MCL. If a confirmation sample is collected as specified in subparagraph (vi), compliance is determined using the average of the two sample results.

(C) If any sample result will cause the running annual average to exceed the MCL at any entry point, the system is out of compliance with the MCL immediately.

(D) If a system fails to collect the required number of samples, compliance with the MCL will be based on the total number of samples collected.

(E) If a sample result is less than the detection limit, zero will be used to calculate compliance.

(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.

(i) ***Initial monitoring.*** Initial monitoring shall consist of 4 consecutive quarterly samples at each entry point beginning during the quarter beginning January 1, 1995, except for systems which are granted an initial monitoring waiver in accordance with subparagraph (vii). Systems which monitor during the initial monitoring period but begin monitoring before 1995 shall begin monitoring during the first calendar quarter of the year. New entry points

associated with new sources which are vulnerable to SOC contamination, as determined in accordance with subparagraph (vii), and which begin operation after March 31, 1995, shall be monitored quarterly, beginning the first full quarter the entry point begins serving the public.

(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:

(A) Monitoring for the detected SOC shall be conducted quarterly, beginning the quarter following the detection, until reduced monitoring is granted in accordance with this subparagraph.

(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.

(C) If the Department determines that the system is reliably and consistently below the MCL, the Department may allow the system to monitor annually. Systems which monitor annually shall monitor during the quarter that previously yielded the highest analytical result, or as specified by the Department.

(D) Systems which have 3 consecutive years of quarterly or annual samples with no detection of a contaminant may apply to the Department for a waiver as specified in subparagraph (vii). A waiver is effective for one compliance period and may be renewed in each subsequent compliance period.

(E) For entry points at which either heptachlor or heptachlor epoxide is detected during the initial round of consecutive quarterly samples, or in subsequent repeat samples, the monitoring shall be continued for both contaminants in accordance with the more frequent monitoring required of the two contaminants based on the level at which each is detected.

(iii) ***Repeat monitoring for SOCs that are not detected.*** For entry points at which SOCs are not detected during the first year of quarterly monitoring, the required monitoring is reduced to one sample in each 3-year compliance period for systems serving 3,300 or fewer persons and to 2 consecutive quarterly samples in each compliance period for systems serving more than 3,300 persons. Reduced monitoring shall be conducted at 3-year intervals from the year of required initial VOC monitoring, in accordance with paragraph (5)(ii).

(iv) ***Repeat monitoring for SOCs with MCL exceedances.*** For entry points at which an SOC MCL is exceeded, monitoring for the detected SOC shall be conducted quarterly, beginning the quarter following the exceedance. Quarterly monitoring shall continue until a minimum of 4 consecutive quarterly samples shows the system is in compliance as specified in subparagraph (ix) and the Department determines the system is reliably and consistently below the MCL. If the Department determines that the system is in compliance and is reliably and consistently below the MCL, the Department may allow the system to monitor in accordance with subparagraph (ii)(C).

(v) ***Confirmation samples.*** A confirmation sample shall be collected and analyzed for each SOC listed under 40 CFR 141.61(c) which is detected at a level in excess of its MCL during annual or less frequent compliance monitoring. The confirmation sample shall be collected within 2 weeks of the water supplier receiving notification from the accredited laboratory performing the analysis that an MCL has been exceeded. The average of the results of the original and the confirmation samples will be used to determine compliance. Confirmation monitoring shall be completed by the deadline specified for SOC compliance monitoring.

(vi) ***Reduced monitoring.*** When reduced monitoring is provided under subparagraph (ii) or (iii), the system shall monitor the entry point during the second calendar year quarter, or the second and third calendar year quarter when 2 quarterly samples are required in each compliance period, unless otherwise specified by the Department. The reduced monitoring option in subparagraph (iii) does not apply to entry points at which treatment has been installed for SOC removal. Compliance monitoring for SOCs for which treatment has been installed to comply with an MCL shall be conducted at least annually, and performance monitoring shall be conducted quarterly.

(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) 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). 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 dioxin and PCBs.***

(I) For groundwater or GUDI entry points, the vulnerability assessment area shall consist of wellhead protection area Zones I and II.

(II) For surface water entry points, the vulnerability assessment area shall consist of the area that supplies water to the entry point and is separated from other watersheds by the highest topographic contour.

(B) ***Use waivers.*** A use waiver will be granted by the Department for contaminants which the Department has determined have not been used, stored, manufactured, transported or disposed of in this Commonwealth, or portions of this Commonwealth. A use waiver specific to a particular entry point requires that an SOC was not used, stored, manufactured, transported or disposed of in the vulnerability assessment area. If use waiver criteria cannot be met, a public water supplier may apply for a susceptibility waiver.

(C) ***Susceptibility waivers.*** A susceptibility waiver for specific contaminants may be granted based on the following criteria, and only applies to groundwater entry points:

(I) Previous analytical results.

(II) Environmental persistence and transport of the contaminant.

(III) Proximity of the drinking water source to point or nonpoint source contamination.

(IV) Elevated nitrate levels as an indicator of the potential for pesticide contamination.

(V) Extent of source water protection or approved wellhead protection program.

(D) ***Wavier requests and renewals.*** 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.

(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.

(viii) ***Invalidation of SOC samples.***

(A) The Department may invalidate results of obvious sampling errors.

(B) An SOC sample invalidated under this subparagraph does not count towards meeting the minimum monitoring requirements of this paragraph.

(ix) ***Compliance determinations.*** Compliance with the SOC MCLs shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the system is in violation of the MCL.

(A) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average of all samples taken at each entry point.

(B) If monitoring is conducted annually or less frequently, the system is out of compliance if the level of a contaminant at any entry point is greater than the MCL. If a confirmation sample is collected as specified in subparagraph (v), compliance is determined using the average of the two sample results.

(C) If any sample result will cause the running annual average to exceed the MCL at any entry point, the system is out of compliance with the MCL immediately.

(D) If a system fails to collect the required number of samples, compliance with the MCL will be based on the total number of samples collected.

(E) If a sample result is less than the detection limit, zero will be used to calculate compliance.

(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.*** Community water systems and nontransient noncommunity water systems not granted a waiver under clause (A) 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.

(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).

(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. 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.

(ii) ***Monitoring requirements for nitrate and nitrite.***

(A) ***Initial monitoring schedule.*** A public water system shall begin monitoring for nitrate and nitrite by taking one annual sample at each groundwater or GUDI entry point to the distribution system beginning during the year beginning January 1, 1993. Community water systems and nontransient noncommunity water systems with surface water sources shall monitor quarterly at each surface water entry point for nitrate and nitrite beginning during the quarter beginning January 1, 1993. Transient noncommunity water systems shall monitor each surface water entry point by taking one annual sample beginning during the year beginning January 1, 1993.

(B) ***Monitoring of new entry points.***

(I) New community and nontransient noncommunity surface water entry points associated with new sources shall be monitored quarterly, beginning the first full quarter the entry point begins serving the public. Quarterly monitoring shall continue until reduced monitoring is granted in accordance with clause (C)(II) or (D).

(II) New community and nontransient noncommunity groundwater or GUDI entry points and new transient noncommunity entry points associated with new sources shall be monitored annually, beginning within 1 year of serving the public.

(C) ***Repeat monitoring for systems with nitrate or nitrite levels equal to or greater than 50*** *% of the MCLs.*

(I) For entry points at which initial monitoring results or subsequent monitoring indicate nitrate or nitrite levels equal to or greater than 50% of the MCL, water systems shall begin quarterly monitoring the

quarter following detection at that level and continue quarterly monitoring for both nitrate and nitrite, unless reduced monitoring is granted in accordance with subclause (II) or (III).

(II) For surface water entry points, after 4 consecutive quarterly samples at an entry point for a water system indicate nitrate and nitrite levels in each sample are less than 50% of the MCLs, the required compliance monitoring is reduced to 1 sample per year at the entry point. Annual monitoring shall be conducted during the quarter which previously resulted in the highest analytical result, unless the Department determines that a different monitoring quarter should be used in accordance with paragraph (10).

(III) For groundwater or GUDI entry points, after 4 consecutive quarterly samples at an entry point for a water system indicate nitrate and nitrite levels in each sample are reliably and consistently below the MCL, the required compliance monitoring is reduced to 1 sample per year at the entry point. Annual monitoring shall be conducted during the quarter which previously resulted in the highest analytical result, unless the Department determines that a different monitoring quarter should be used in accordance with paragraph (10).

(IV) For nitrate or nitrite sample results in excess of the MCLs, the water supplier shall take a confirmation sample within 24 hours of having received the original sample result. A water supplier that is unable to comply with the 24-hour sampling requirement shall immediately notify persons served by the public water system in accordance with § 109.408. Systems exercising this option shall take and analyze a confirmation sample within 2 weeks of notification of the analytical results of the first sample.

(V) Noncommunity water systems for which an alternate nitrate level has been approved by the Department in accordance with 40 CFR 141.11(d) are not required to collect a confirmation sample if only the nitrate MCL is exceeded and nitrate is not in excess of the alternate nitrate level. If the alternate nitrate level is exceeded, the water supplier shall collect a confirmation sample within 24 hours after being advised by the certified laboratory performing the analysis that the compliance sample exceeded 20 mg/L for nitrate. Confirmation monitoring shall be completed by the deadline for compliance monitoring.

(VI) Quarterly performance monitoring is required for nitrate and nitrite at entry points where treatment has been installed to remove nitrate or nitrite.

(D) ***Repeat monitoring for systems with nitrate and nitrite levels less than 50*** *% of the MCLs.* For entry points at which initial monitoring results indicate nitrate and nitrite levels in each sample are less than 50% of the MCLs, nitrate and nitrite monitoring shall be repeated annually during the calendar quarter which previously resulted in the highest analytical result, unless the Department determines that a different monitoring quarter should be used in accordance with paragraph (10).

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

(A) ***Initial monitoring schedule.*** Community water systems and nontransient noncommunity water systems shall monitor each surface water entry point annually beginning during the year beginning January 1, 1993, and shall monitor each groundwater or GUDI entry point once every 3 years beginning during the year beginning January 1, 1994.

(B) ***Monitoring of new entry points.*** New groundwater or GUDI entry points which begin operation after December 31, 1994, shall begin initial monitoring in accordance with the schedule in clause (A) -- that is, 1997, and so forth. New surface water entry points shall begin initial annual monitoring during the first new calendar year after the entry point begins serving the public.

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

(I) For entry points at which initial monitoring results or subsequent monitoring indicates an IOC level in excess of the MCL, monitoring shall be repeated quarterly beginning the quarter following detection at that level for each IOC in excess of an MCL, until reduced monitoring is granted in accordance with subclause (II).

(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 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.

(III) A confirmation sample shall be collected and analyzed for each IOC listed under 40 CFR 141.62(b) which is detected at a level in excess of its MCL during annual or less frequent compliance monitoring. The confirmation sample shall be collected within 2 weeks of notification by the accredited laboratory performing the analysis that an MCL has been exceeded. The average of the results of the original and the confirmation samples will be used to determine compliance. Confirmation monitoring shall be completed by the deadline specified for IOC compliance monitoring.

(D) ***Waivers for antimony, arsenic, barium, beryllium, cadmium, chromium, fluoride, mercury, nickel, selenium and thallium monitoring.*** Except when treatment has been installed to remove the IOC, after 3 consecutive rounds of quarterly, annual or triennial monitoring indicate the contaminant level for an IOC is reliably and consistently below the MCL in all samples at an entry point, routine monitoring for the remainder of the compliance cycle for that IOC may be waived and the required monitoring for the IOC may be reduced to 1 sample per 9-year compliance cycle at that entry point.

(I) Waivers may be granted based on the following criteria:

(-a-) Previous analytical results.

(-b-) Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, changes in stream flows or characteristics, or other factors as determined by the Department on a case-by-case basis.

(II) A decision by the Department to grant a waiver will be made in writing and will set forth the basis for the determination. The determination may be made upon an application by the public water system. The public water system shall specify the basis for its request. The Department will review and, when appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency becomes available.

(III) Reduced monitoring shall be conducted during the first monitoring period of the next monitoring cycle. A waiver is effective for one compliance cycle and may be renewed in each subsequent compliance cycle.

(IV) 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.

(E) ***Waivers for cyanide monitoring.*** Waivers may be granted for monitoring of cyanide, provided that the system is not vulnerable due to lack of any industrial source of cyanide.

(F) ***Operational monitoring for fluoride.*** Public water suppliers who fluoridate shall conduct operational monitoring for fluoride daily.

(iv) ***Invalidation of IOC samples.***

(A) The Department may invalidate results of obvious sampling errors.

(B) An IOC sample invalidated under this subparagraph does not count towards meeting the minimum monitoring requirements of this section.

(v) ***Compliance determinations.*** Compliance with the IOC MCLs shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the system is in violation of the MCL.

(A) For systems monitoring more than once per year, compliance with the MCL for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average of all samples taken at each entry point. If the average at any entry point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately.

(B) For systems monitoring annually, or less frequently, the system is out of compliance with the MCL for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is collected as specified in subparagraph (ii)(C)(III), compliance is determined using the average of the two samples.

(C) Compliance with the MCLs for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with subparagraph (ii)(C)(III), and compliance shall be determined based on the average of the initial and confirmation samples.

(D) If a system fails to collect the required number of samples, compliance with the MCL will be based on the total number of samples collected.

(E) If a sample result is less than the detection limit, zero will be used to calculate compliance.

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

(i) Consecutive water suppliers shall monitor for compliance with the MCL for microbiological contaminants at the frequency established by the EPA and incorporated by reference into this chapter.

(ii) Community consecutive water suppliers shall monitor the distribution system for compliance with the MCL for asbestos at the frequency indicated in paragraph (7)(i), when the Department determines that the system's distribution system contains asbestos cement pipe and optimum corrosion control measures have not been implemented.

(iii) Consecutive water suppliers may be exempt from conducting monitoring for the MCLs for VOCs, SOCs and IOCs and radionuclides if the public water system from which the finished water is obtained complies with paragraphs (5) -- (7) and (14) and is in compliance with the MCLs, except that asbestos monitoring is required in accordance with subparagraph (ii) .

(iv) For a public water system which is not a consecutive water system, the exemption in subparagraph (iii) applies to entry points which obtain finished water from another public water system.

(v) A public water supplier that obtains finished water from another permitted public water system using either surface water or GUDI sources shall, beginning May 16, 1992, measure the ***residual*** ***disinfectant*** concentration at representative points in the distribution system at least as frequently as the frequency required for total coliform sampling for compliance with the MCL for microbiological contaminants.

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

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

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

(9) ***Monitoring requirements for POE devices.*** A public water supplier using a POE device shall, in addition to the monitoring requirements specified in paragraphs (1) -- (8), conduct monitoring on the devices installed. As a minimum, the monitoring shall include the MCLs for which the POE device is intended to treat and monthly microbiological monitoring. The Department may allow the water supplier to reduce the frequency of microbiological monitoring based upon historical performance. Except for microbiological contaminants, monitoring shall be performed quarterly on 25% of the installed POE devices with the locations rotated so that each device is monitored at least once annually, unless increased monitoring is required by the Department under § 109.302.

(10) ***Additional monitoring.*** The Department may by written notice require a public water supplier to conduct monitoring for compliance with MCLs or MRDLs during a specific portion of a monitoring period, if necessary to ensure compliance with the monitoring or reporting requirements in this chapter.

(11) ***Monitoring requirements for entry points that do not provide water continuously.*** Entry points from which water is not provided during every quarter of the year shall monitor in accordance with paragraphs (5) -- (7), except that monitoring

is not required during a quarter when water is not provided to the public, unless special monitoring is required by the Department under § 109.302.

(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.

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

(A) ***Routine monitoring*****.**

(I) Systems that use either surface water or GUDI sources shall monitor as follows:

(-a-) Systems serving at least 10,000 persons shall take at least four samples per quarter per treatment plant. At least 25% of all samples collected each quarter shall be collected at locations representing maximum residence time. The remaining samples shall be taken at locations that are representative of at least average residence time and that are representative of the entire distribution system, taking into account the number of persons served, the different sources of water, and the different treatment methods.

(-b-) Systems serving from 500 to 9,999 persons shall take at least one sample per quarter per treatment plant. The sample shall be taken at a location that represents a maximum residence time.

(-c-) Systems serving fewer than 500 persons shall take at least one sample per year per treatment plant during the month of warmest water temperature. The sample shall be taken at a location that represents a maximum residence time. If the sample, or average of all samples, exceeds either a TTHM or HAA5 MCL, then the system shall take at least one sample per quarter per treatment plant beginning in the quarter immediately following the quarter in which the system exceeds either the TTHM or HAA5 MCL. The sample shall be taken at a location that represents a maximum residence time. If, after at least 1 year of monitoring, the TTHM running annual average is no greater than 0.060 mg/L and the HAA5 running annual average is no greater than 0.045 mg/L, the required monitoring is reduced back to one sample per year per treatment plant.

(-d-) If a system samples more frequently than the minimum required in items (-a-) -- (-c-), at least 25% of all samples collected each quarter shall be collected at locations representing maximum residence time, with the remainder of the samples representing locations of at least average residence time.

(II) Systems that use only groundwater sources not included under subclause (I) shall monitor as follows:

(-a-) Systems serving at least 10,000 persons shall take at least one sample per quarter per treatment plant. Multiple wells drawing water from a single aquifer may be considered as a single treatment plant. The sample shall be taken at a location that represents a maximum residence time.

(-b-) Systems serving fewer than 10,000 persons shall take at least one sample per year per treatment plant during the month of warmest water temperature. Multiple wells drawing water from a single aquifer may be considered as a single treatment plant. The sample shall be taken at a location that represents a maximum residence time. If the sample, or average of all samples, exceeds either a TTHM or HAA5 MCL, then the system shall take at least one sample per quarter per treatment plant beginning in the quarter immediately following the quarter in which the system exceeds either the TTHM or HAA5 MCL. The sample shall be taken at a location that represents a maximum residence

time. If, after at least 1 year of monitoring, the TTHM running annual average is no greater than 0.060 mg/L and the HAA5 running annual average is no greater than 0.045 mg/L, the required monitoring is reduced back to one sample per year per treatment plant.

(-c-) If a system samples more frequently than the minimum required, at least 25% of all samples collected each quarter shall be collected at locations representing maximum residence time, with the remainder of the samples representing locations of at least average residence time.

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

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

(-a-) For systems serving at least 10,000 persons, the required monitoring is reduced to one sample per quarter per treatment plant. The sample shall be taken at a location that represents a maximum residence time.

(-b-) For systems serving from 500 to 9,999 persons, the required monitoring is reduced to one sample per year per treatment plant. The sample shall be taken during the month of warmest water temperature and at a location that represents a maximum residence time.

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

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

(-a-) For systems serving at least 10,000 persons that have a TTHM running annual average that is no greater than 0.040 mg/L and an HAA5 running annual average that is no greater than 0.030 mg/L, the required monitoring is reduced to one sample per year per treatment plant. The sample shall be taken during the month of warmest water temperature and at a location that represents a maximum residence time. If the annual TTHM average exceeds 0.060 mg/L or the annual HAA5 average exceeds 0.045 mg/L, the system shall resume routine monitoring as prescribed in clause (A) in the quarter immediately following the quarter in which the system exceeds 0.060 mg/L for TTHMs or 0.045 mg/L for HAA5.

(-b-) For systems serving fewer than 10,000 persons that have an annual TTHM average that is no greater than 0.040 mg/L and an annual HAA5 average that is no greater than 0.030 mg/L for 2 consecutive years or an annual TTHM average that is no greater than 0.020 mg/L and an annual HAA5 average that is no greater than 0.015 mg/L for 1 year, the required monitoring is reduced to one sample per 3-year cycle per treatment plant. The sample shall be taken at a location that represents a maximum

residence time during the month of warmest water temperature. The 3-year period shall begin on January 1 following the quarter in which the system qualifies for reduced monitoring. If the TTHM annual average exceeds 0.060 mg/L, or the HAA5 annual average exceeds 0.045 mg/L the system shall resume routine monitoring as prescribed in clause (A), except that systems that exceed either a TTHM or HAA5 MCL shall increase monitoring to at least one sample per quarter per treatment plant beginning in the quarter immediately following the quarter in which the system exceeds the TTHM or HAA5 MCL.

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

(A) ***Applicability and schedule.***

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

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

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

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

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

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

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

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

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

(B) ***Routine monitoring.***

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

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

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

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

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

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

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

Population size	Monitoring frequencies	Distribution system monitoring location total per monitoring period
< 500	Annually	2
500 --	Quarterly	2
3,301 --	Quarterly	2
10,000 --	Quarterly	4
50,000 --	Quarterly	8
250,000 --	Quarterly	12
1,000,000 --	Quarterly	16
>=	Quarterly	20

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

Population size	Monitoring frequencies	Distribution system monitoring location total per monitoring period
< 500	Annually	2
500 --	Annually	2
10,000 --	Quarterly	4
100,000 --	Quarterly	6
>=	Quarterly	8

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

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

(C) ***Reduced monitoring.***

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

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

Population size	Monitoring frequencies	Distribution system monitoring location total per monitoring period
< 500	Monitoring may not be reduced	
500 -- 3,300	Annually	1 TTHM and 1 HAA5 sample: 1 at the location and during the quarter with the highest TTHM single measurement, 1 at the location and during the quarter with the highest HAA5 single measurement; 1 dual sample set per year if the highest

		TTHM and HAA5 measurements occurred at the same location and quarter.
3,301 -- 9,999	Annually	2 dual sample sets: 1 at the location and during the quarter with the highest TTHM single measurement, 1 at the location and during the quarter with the highest HAA5 single measurement.
10,000 -- 49,999	Quarterly	2 dual sample sets at the locations with the highest TTHM and the highest HAA5 LRAAs.
50,000 -- 249,999	Quarterly	4 dual sample sets at the locations with two highest TTHM and two highest HAA5 LRAAs.

250,000 -- 999,999	Quarterly	6 dual sample sets at the locations with the three highest TTHM and the three highest HAA5 LRAAs.
1,000,000 -- 4,999,999	Quarterly	8 dual sample sets at the location with the four highest TTHM and four highest HAA5 LRAAs.
>= 5,000,000	Quarterly	10 dual sample sets at the locations with the five highest TTHM and five highest HAA5 LRAAs.

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

Population size	Monitoring frequencies	Distribution system monitoring location total per monitoring period
< 500	Every third year	1 TTHM and 1 HAA5 sample: 1 at the location and during the

		quarter with the highest TTHM single measurement; 1 at the location and during quarter with highest HAA5 single measurement; 1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
500 -- 9,999	Annually	1 TTHM and 1 HAA5 sample: 1 at the location and during the quarter with highest TTHM single measurement; 1 at the location during the quarter with the highest HAA5 single measurement;

		1 dual sample set per year if the highest TTHM and HAA5 measurements occurred at the same location and quarter.
10,000 -- 99,999	Annually	2 dual sample sets: 1 at the location and during the quarter with the highest TTHM single measurement; 1 at the location and during the quarter with the highest HAA5 single measurement.
100,000 -- 499,999	Quarterly	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
>= 500,000	Quarterly	4 dual sample sets at the locations with the

two highest TTHM and two highest HAA5 LRAAs.

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

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

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

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

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

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

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

(D) ***Increased monitoring.***

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

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

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

(E) ***General monitoring and compliance requirements.***

(I) A system required to monitor quarterly shall calculate LRAAs for TTHM and HAA5 using monitoring results collected under this subparagraph and determine that each LRAA does not exceed the MCL. A system that fails to complete four consecutive quarters of monitoring, shall calculate compliance with the

MCL based on the average of the available data from the most recent 4 quarters. A system that takes more than one sample per quarter at a monitoring location shall average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

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

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

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

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

(A) ***Routine monitoring.***

(I) ***Daily monitoring.*** Systems shall take daily samples at the entrance to the distribution system. Systems that must conduct additional monitoring in accordance with clause (B) shall continue to take routine daily samples at the entrance to the distribution system.

(II) ***Monthly monitoring.***

(-a-) Systems shall take a three-sample set each month in the distribution system. The system shall take one sample at each of the following locations:

(-1-) As close to the first customer as possible.

(-2-) At a location representing an average residence time.

(-3-) At a location representing a maximum residence time.

(-b-) Systems that must conduct additional monitoring in accordance with subclause (III) may use the results of the additional monitoring to meet the monthly monitoring requirements of this subclause.

(III) ***Additional monitoring.*** If a daily sample at the entrance to the distribution system exceeds the chlorite MCL, the system shall take three samples in the distribution system on the following day. The system shall take one sample at each of the following locations:

(-a-) As close to the first customer as possible.

(-b-) At a location representing an average residence time.

(-c-) At a location representing a maximum residence time.

(B) ***Reduced monitoring.*** Chlorite monitoring in the distribution system required by clause (A)(II) is reduced to one three-sample set per quarter after 1 year of monitoring where no individual chlorite sample taken in the distribution system under clause (A)(II) has exceeded the chlorite MCL and the system has not been required to conduct additional monitoring under clause (A)(III). If any of the three individual chlorite samples taken quarterly in the distribution system exceeds the chlorite MCL or the system is required to conduct additional monitoring under clause (A)(III), the system shall revert to routine monitoring as prescribed by clause (A).

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

(A) ***Routine monitoring.*** Systems shall take one sample per month for each treatment plant that uses ozone. Systems shall take the monthly sample at the entrance to the distribution system while the ozonation system is operating under normal conditions.

(B) ***Reduced monitoring.***

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

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

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

(A) ***Routine monitoring.*** Systems shall take monthly samples of the source water alkalinity, the source water TOC and postsedimentation TOC for each treatment plant that uses conventional filtration. Postsedimentation TOC can be taken at any point between sedimentation effluent and the entry point to the distribution system. The three samples shall be taken concurrently and at a time that is representative of both normal operating conditions and influent water quality.

(B) ***Reduced monitoring.*** For systems with an average postsedimentation TOC of less than 2.0 mg/L for 2-consecutive years, or less than 1.0 mg/L for 1 year, the required monitoring for source water alkalinity, source TOC and postsedimentation TOC is reduced from monthly to quarterly for each applicable treatment plant. The system shall revert to routine monitoring as prescribed by clause (A) in the month following the quarter when the annual average postsedimentation TOC is not less than 2.0 mg/L.

(C) ***Early monitoring.*** Systems may begin monitoring to determine whether the TOC removal requirements of 40 CFR 141.135(b)(1) (relating to enhanced coagulation and enhanced softening performance requirements) can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the requirements of 40 CFR 141.135(b)(1) and shall therefore apply for alternate minimum TOC removal requirements under 40 CFR 141.135(b)(4) is not eligible for retroactive approval of the alternate minimum TOC removal requirements and is in violation. Systems may apply for alternate minimum TOC removal requirements any time after the compliance date.

(13) ***Monitoring requirements for disinfectant residuals.*** Community water systems and nontransient noncommunity water systems that use either chlorine, chloramines or chlorine dioxide shall monitor for ***disinfectant residuals*** in accordance with this paragraph. Community water systems and nontransient noncommunity water systems that obtain finished water from another public water system that uses either chlorine or chlorine dioxide to treat the finished water shall monitor for chlorine ***residual*** 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.

(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.

(ii) ***Chlorine dioxide.***

(A) ***Routine monitoring.*** Systems shall take one sample per day at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the system shall conduct additional monitoring as specified in clause (B) in addition to the sample required at the entrance to the distribution system.

(B) ***Additional monitoring.*** If a daily sample at the entrance to the distribution system exceeds the chlorine dioxide MRDL, the system shall take three samples in the distribution system on the following day. If chlorine dioxide or chloramines are used to maintain a ***disinfectant*** ***residual*** in the distribution system, or if chlorine is used to maintain a ***disinfectant*** ***residual*** in the distribution system and there are no ***disinfectant*** addition points after the entrance to the distribution system, the system shall take three samples as close to the first customer as possible, at intervals of at least 6 hours. If chlorine is used to maintain a ***disinfectant*** ***residual*** in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system, the system shall take one sample at each of the following locations:

(I) As close to the first customer as possible.

(II) At a location representing an average residence time.

(III) At a location representing a maximum residence time.

(14) ***Monitoring requirements for radionuclides.*** Community water systems shall monitor for compliance with the MCLs for radionuclides established by the EPA under 40 CFR 141.66(b), (c), (d) and (e) (relating to maximum contaminant levels for radionuclides). The monitoring shall be conducted according to the requirements established by the EPA under 40 CFR 141.25 and 141.26 (relating to analytical methods for radioactivity; and monitoring frequency and compliance requirements for radionuclides in community water systems) which are incorporated by reference, except as modified by this chapter. Initial or first-year monitoring mentioned in this paragraph refers to monitoring conducted on or after January 1, 2005.

(i) ***Monitoring requirements for gross alpha particle activity, radium-226, radium-228 and uranium.***

(A) ***Initial monitoring schedule.*** The initial monitoring shall consist of 4 consecutive quarterly samples for each radionuclide at each entry point in accordance with the following monitoring schedule except for systems that are granted reduced initial monitoring in accordance with subclause (V).

(I) Systems serving more than 3,300 persons shall begin monitoring during the quarter beginning January 1, 2005.

(II) Systems serving 500 to 3,300 persons shall begin monitoring during the quarter beginning January 1, 2006.

(III) Systems serving fewer than 500 persons shall begin monitoring during the quarter beginning January 1, 2007.

(IV) Systems that add new entry points associated with new sources shall conduct initial quarterly monitoring beginning the first full quarter the entry point begins serving the public. Quarterly monitoring shall continue until reduced monitoring is granted in accordance with clause (B) or subclause (V).

(V) If the first 2 quarterly samples for a radionuclide at an entry point have results below the detection limit, as defined in 40 CFR 141.25(c)(1), the final 2 quarterly samples for that radionuclide at that entry point are waived.

(VI) For entry points at which the average of the initial monitoring results for a radionuclide is above the MCL, the system shall collect and analyze quarterly samples for that radionuclide at that entry point until the system has results from 4 consecutive quarters for that radionuclide at that entry point that are at or below the MCL.

(B) ***Repeat monitoring.*** Beginning with the January 1, 2008, compliance period, systems shall take one sample for each radionuclide at each entry point in each 3-year compliance period, unless the system qualifies for reduced monitoring as follows:

(I) For entry points where the average of the initial monitoring results for a radionuclide is at or above the detection limit as defined in 40 CFR 141.25(c)(1), but at or below one-half of the MCL for that radionuclide, the repeat monitoring is reduced to one sample for that radionuclide at that entry point every 6 years.

(II) For entry points where the average of the initial monitoring results for a radionuclide is below the detection limit as defined in 40 CFR 141.25(c)(1), the repeat monitoring is reduced to one sample for that radionuclide at that entry point every 9 years.

(III) If a system has a monitoring result that exceeds the MCL for a radionuclide, the system shall collect and analyze quarterly samples for that radionuclide at that entry point beginning the next calendar quarter following the exceedance until the system has results from 4 consecutive quarters for that radionuclide at that entry point that are below the MCL.

(IV) Systems shall use the results of the samples collected during the repeat monitoring period to determine the monitoring frequency for subsequent monitoring periods.

(V) Reduced monitoring does not apply to those systems where treatment has been installed for radionuclide removal to comply with an MCL listed under 40 CFR 141.66. Compliance monitoring for radionuclides where treatment has been installed to comply with an MCL shall be conducted at least annually, and performance monitoring for the specific radionuclides for which treatment is provided shall be conducted quarterly.

(C) ***Gross alpha substitution.*** A gross alpha particle activity measurement may be substituted for the required radium-226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/L. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/L. The gross alpha measurement shall have a confidence interval of 95% (1.65 [sgr] , where [sgr] is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. If the gross alpha particle activity result is less than the detection limit as defined in 40 CFR 141.25(c)(1), one-half of the detection limit will be used to determine compliance and the future monitoring frequency.

(D) ***Grandfathering.*** The Department will allow appropriate historical data collected at an entry point to satisfy the initial monitoring requirements required under clause (A) for that entry point in the following situations:

(I) A system having only one entry point may use the monitoring data from the compliance monitoring period between June 2000 and December 8, 2003.

(II) A system with multiple entry points and having appropriate historical data for each entry point may use the monitoring data from the compliance monitoring period between June 2000 and December 8, 2003.

(III) A system with multiple entry points and having appropriate historical data for a representative point in the distribution system may use the monitoring data from the compliance monitoring period between June 2000 and December 8, 2003, provided that the Department finds that the appropriate historical data satisfactorily demonstrate that each entry point is expected to be in compliance based upon the appropriate historical data and reasonable assumptions about the variability of radionuclide levels between entry points. The system shall supply sufficient information to allow the Department to make a written finding indicating how the data conform to these requirements.

(ii) ***Monitoring requirements for beta-particle and photon radioactivity.***

(A) Systems designated by the Department as vulnerable to beta-particle or photon radioactivity, or both, shall sample for beta particle and photon radioactivity. Systems shall collect quarterly samples for beta emitters and annual samples for tritium and strontium-90 at each entry point, beginning within 1 quarter after being notified by the Department.

(I) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at an entry point has a running annual average (computed quarterly) less than or equal to 50 pCi/L (screening level), the frequency of monitoring at that entry point shall be repeated every 3 years. Systems shall collect all samples required in clause (A) during the reduced monitoring period.

(II) For systems in the vicinity of a nuclear facility, the system may utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry points, when the Department

determines that the data is applicable to the system. If there is a release from a nuclear facility, systems that are using surveillance data shall begin monitoring at the community water system's entry points in accordance with clause (A).

(B) Systems designated by the Department as utilizing waters contaminated by effluents from nuclear facilities shall sample for beta particle and photon radioactivity. Systems shall monitor quarterly for beta emitters and iodine-131, and annually for tritium and strontium-90 at each entry point, beginning within 1 quarter after being notified by the Department. Monitoring shall be conducted as follows:

(I) Monitoring for gross beta particle activity shall be based on the average of an analysis of 3 monthly samples.

(II) For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. More frequent monitoring, as determined by the Department, shall be conducted when iodine-131 is identified in the finished water.

(III) Monitoring for strontium-90 and tritium shall be conducted by means of the analysis of 4 quarterly samples.

(IV) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity at an entry point has a running annual average (computed quarterly) less than or equal to 15 pCi/L (screening level), the frequency of monitoring at that entry point shall be reduced to four consecutive quarterly samples taken once every 3 years. Systems shall collect all samples required in clause (B) during the reduced monitoring period.

(V) For systems in the vicinity of a nuclear facility, the system may utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry points, when the Department determines that the data is applicable to the system. If there is a release from a nuclear facility, systems that are using surveillance data shall begin monitoring at the system's entry points in accordance with clause (B).

(C) Systems designated by the Department to monitor for beta particle and photon radioactivity may not apply to the State for a waiver from the monitoring frequencies specified in clause (A) or (B).

(D) Systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. The potassium-40 beta particle activity shall be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.

(E) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the screening level, an analysis of the sample shall be performed to identify the major radioactive constituents present in the sample. The results of the individual constituent analysis shall be reported in pCi/L, and the appropriate doses must be calculated and summed to determine compliance with the MCL, using the formula in 40 CFR 141.66(d)(2). Doses shall also be calculated and combined for measured levels of tritium and strontium to determine compliance.

(F) Systems shall monitor monthly at the entry points that exceed the MCL beginning the month after the exceedance occurs. Systems shall continue monthly monitoring until the system has established, by a rolling average of three monthly samples, that the MCL is being met. Systems that establish that the MCL is being met shall return to quarterly monitoring until they meet the requirements set forth in subclause (A)(I) or (B)(IV).

(iii) ***General monitoring and compliance requirements.***

(A) The Department may require more frequent sampling than specified in subparagraphs (i) and (ii), or may require confirmation samples. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

(B) Each system shall monitor at the time designated by the Department during each compliance period.

(C) Compliance with the MCLs will be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the system is in violation of the MCL.

(I) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each entry point. If the running annual average at an entry point is greater than the MCL,

the system is in violation of the MCL. If a sample result will cause the running annual average to exceed the MCL at an entry point, the system is in violation of the MCL immediately.

(II) Systems shall include all samples taken and analyzed under this section in determining compliance, even if that number is greater than the minimum required.

(III) If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.

(IV) If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium-226 or uranium, or both. If the gross alpha particle activity result is less than detection, one-half of the detection limit will be used to calculate the annual average.

(D) The Department may delete results of obvious sampling or analytic errors.

History

SOURCE:

The provisions of this § 109.301 adopted December 7, 1984, effective December 8, 1984, 14 Pa.B. 4479; amended March 24, 1989, effective March 25, 1989, 19 Pa.B. 1289; amended June 16, 1989, effective June 17, 1989, 19 Pa.B. 2543; corrected July 28, 1989, effective June 17, 1989, 19 Pa.B. 3164; amended May 15, 1992, effective May 16, 1992, 22 Pa.B. 2621; amended October 7, 1994, effective October 8, 1994, *24 Pa.B. 5175;* amended December 23, 1994, effective December 24, 1994, *24 Pa.B. 6404;* corrected March 10, 1995, effective March 11, 1995, *25 Pa.B. 833;* amended April 23, 1999, effective April 24, 1999, *29 Pa.B. 2231;* amended July 20, 2001, effective July 21. 2001, *31 Pa.B. 3895 and 3938;* amended August 9, 2002, effective August 10, 2002, *32 Pa.B. 3894;* corrected December 5, 2003, effective August 10, 2002, *33 Pa.B. 5916;* amended April 2, 2004, effective April 3, 2004, *34 Pa.B. 1762;* amended June 18, 2004, effective June 19, 2004, *34 Pa.B. 3130;* amended August 13, 2004, effective August 14, 2004, *34 Pa.B. 4435;* amended May 22, 2009, effective May 23, 2009, *39 Pa.B. 2661;* corrected August 29, 2009, effective August 1, 2009, *39 Pa.B. 5119;* amended December 24, 2009, effective December 26, 2009, *39 Pa.B. 7279.* Immediately preceding text appears at serial pages (345283) to (345318).

Annotations

Notes

NOTES:

Research References & Practice Aids

Cross References

This section cited in *25 Pa. Code § 109.202* (relating to State MCLs, MRDLs and treatment technique requirements); *25 Pa. Code § 109.302* (relating to special monitoring requirements); *25 Pa. Code § 109.303* (relating to sampling requirements); *25 Pa. Code § 109.305* (relating to fees); *25 Pa. Code § 109.408* (relating to tier 1 public notice -- categories, timing and delivery of notice); *25 Pa. Code § 109.503* (relating to public water system construction permits); *25 Pa. Code § 109.701* (relating to reporting and recordkeeping); *25 Pa. Code § 109.703* (relating to facilities operation); *25 Pa. Code § 109.705* (relating to sanitary survey); *25 Pa. Code § 109.710* (relating to ***disinfectant residual*** in the distribution system); *25 Pa. Code § 109.714* (relating to filter profile, filter self-assessment and comprehensive performance evaluations); *25 Pa. Code § 109.810* (relating to reporting and notification requirements); and *25 Pa. Code § 109.1003* (relating to monitoring requirements); and *25 Pa. Code § 109.1204* (relating to requirements for microbial toolbox components).

HIERARCHY NOTES:

Title Note

Article Note

Chapter Note

Subchapter Note

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25 Pa. Code § 109.710

This document is current through the May 2015 supplement Changes effective through 45 Pa.B. 1242 (March 7, 2015)

Pennsylvania Administrative Code > ***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 G. SYSTEM MANAGEMENT RESPONSIBILITIES***

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

(a) A ***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.

(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:

(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 l 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) 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.

History

SOURCE:

The provisions of this § 109.710 adopted December 7, 1984, effective December 8, 1984, 14 Pa.B. 4479; corrected December 14, 1984, effective December 8, 1984, 14 Pa.B. 4511; amended March 24, 1989, effective March 25, 1989, 19 Pa.B. 1289; amended May 15, 1992, effective May 16, 1992, 22 Pa.B. 2621; amended July 20, 2001, effective July 21, 2001, *31 Pa.B. 3895 and 3938;* amended August 13, 2004, effective August 14, 2004, *34 Pa.B. 4435.* Immediately preceding text appears at serial page (290569).

Annotations

Notes

NOTES:

Research References & Practice Aids

Cross References

This section cited in *25 Pa. Code § 109.701* (relating to reporting and record keeping).

HIERARCHY NOTES:

Title Note

Article Note

Chapter Note

Subchapter Note

PENNSYLVANIA ADMINISTRATIVE CODE Commonwealth of Pennsylvania Pennsylvania Codes
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