

Part XXIII
Stage 2 Disinfection Byproducts

§ 2301 GENERAL REQUIREMENTS

- A. General. The regulations in this part establish monitoring and other requirements for achieving compliance with maximum contaminant levels based on locational running annual averages (LRAA) for total trihalomethanes (TTHM) and haloacetic acids-5 (HAA5), and for achieving compliance with maximum residual disinfectant residuals for chlorine and chloramine for certain consecutive systems.
- B. Applicability. This part applies to community water systems and nontransient noncommunity water systems that use a primary or residual disinfectants other than ultraviolet light or delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light.
- C. Schedule. CWSs and NTNCWSs must comply with the requirements in this subpart according to the schedule in Table 2300.1.

TABLE 2300.1 SCHEDULE REQUIREMENTS BASED ON PUBLIC WATER SYSTEM TYPE

Type of system	Date of compliance with Stage 2 DBP monitoring by: ¹
1. System serving ≥100,000	April 1, 2012.
2. System serving 50,000-99,999	October 1, 2012.
3. System serving 10,000-49,999	October 1, 2013.
4. System serving < 10,000	October 1, 2013 if no <i>Cryptosporidium</i> monitoring is required under §2402 (A) (4) or October 1, 2014 if <i>Cryptosporidium</i> monitoring is required under §2402 (A) (4) or (A) (6)
Other systems that are part of a combined distribution system	
5. Consecutive system or wholesale system	--at the same time as the system with the earliest compliance date in the combined distribution system.
6. Monitoring frequency is specified in § 2302 (A) (2). <ul style="list-style-type: none"> a If quarterly monitoring is required, the owner/operator must begin monitoring in the first full calendar quarter that includes the compliance date in this Table. b If monitoring is required at a frequency that is less than quarterly, the owner/operator must begin monitoring in the calendar month recommended in the IDSE report prepared under §2202 or §2203 or the calendar month identified in the Stage 2 DBP monitoring plan developed under §2303 no later than 12 months after the compliance date in this Table. 	
7. If quarterly monitoring is required, the owner/operator must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If monitoring is required at a frequency that is less than quarterly, the owner/operator must make compliance calculations beginning with the first compliance sample taken after the compliance date.	
8. For the purpose of the schedule in this Table, the Director may determine that the combined distribution system does not include certain consecutive 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 Director may also determine that the combined distribution system does not include certain wholesale systems based on factors such as delivering water to a consecutive system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.	

¹ The Director may grant up to an additional 24 months for compliance with MCLs and operational evaluation levels if the system requires capital improvements to comply with an MCL.

D. Monitoring and compliance.

- 1. Systems required to monitor quarterly. To comply with Stage 2 DBP MCLs in §207 (B) (2),

the owner/operator must calculate LRAAs for TTHM and HAA5 using monitoring results collected under this part and determine that each LRAA does not exceed the MCL. If the owner/operator fails to complete four consecutive quarters of monitoring, the owner/operator must calculate compliance with the MCL based on the average of the available data from the most recent four quarters. If more than one sample per quarter is collected at a monitoring location, the average of all samples taken in the quarter at that location to determine a quarterly average must be used in the LRAA calculation.

2. Systems required to monitor yearly or less frequently. To determine compliance with Stage 2 DBP MCLs in §207 (B)(2), the owner/operator must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, the owner/operator must comply with the requirements of §2306. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

E. Violation. The public water system owner/operator is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the owner/operator fails to monitor.

§ 2302 ROUTINE MONITORING

A. Monitoring.

1. If an IDSE report was submitted, the owner/operator must begin monitoring at the locations and months that were recommended in the IDSE report submitted under §2206 following the schedule in § 2301 (C), unless the Director requires other locations or additional locations after its review. If a 40/30 certification was submitted under §2204, the system qualified for a very small system waiver under §2205, or the system is a nontransient noncommunity water system serving < 10,000, the owner/operator must monitor at the location(s) and dates identified in the monitoring plan in §1103 (F), updated as required by § 2303.
2. The owner/operator must monitor at no fewer than the number of locations identified in Table 2300.2.

TABLE 2300.2 MINIMUM NUMBER OF MONITORING LOCATIONS (DISTRIBUTION SYSTEM MONITORING)

Distribution System Monitoring			
Source Water Type	Population Size Category	Monitoring Frequency ¹	Distribution System Monitoring Location Total per monitoring period ²
Surface Water	< 500	Per year	2
	500-3,300	per quarter	2
	3,301-9,999	per quarter	2
	10,000-49,999	Per quarter	4
	50,000-249,999	per quarter	8
	250,000-999,999	per quarter	12
	1,000,000-4,999,999	per quarter	16
	≥5,000,000	per quarter	20
Ground Water:	<500	per year	2
	500-9,999	per year	2
	10,000-99,999	per quarter	4
	100,000-499,999	per quarter	6
	≥5,000,000	per quarter	8

¹ All systems must monitor during the month of highest DBP concentrations.

² Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for Part VIII systems serving 500-3,300 persons. Systems on annual monitoring and Part VIII systems serving 500-3,300 persons are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. Only one

location with a dual sample set per monitoring period is needed if highest TTHM and HAA5 concentrations occur at the same location (and month, if monitored annually).

3. If an undisinfected system begins using a disinfectant other than UV light after the dates in Part XXII of these regulations for complying with the Initial Distribution System Evaluation requirements, the owner/operator must consult with the Director to identify compliance monitoring locations for this part. A monitoring plan must be developed under §2303 that includes those monitoring locations.
- B. Analytical methods. The owner/operator must use an approved method listed in Appendix E-1101-E for TTHM and HAA5 analyses in this part. Analyses must be conducted by laboratories that have received certification by EPA or the Director as specified in Appendix E-1101-E.

§ 2303 Stage 2 DBP MONITORING PLAN

- A. 1. The public water system owner/operator must develop and implement a monitoring plan to be kept on file for Director and public review. The monitoring plan must contain the elements in paragraphs (A)(1)(a) through (A)(1)(d) of this section and be complete no later than the date that initial monitoring is conducted under this part.
 - a. Monitoring locations;
 - b. Monitoring dates;
 - c. Compliance calculation procedures; and
 - d. Monitoring plans for any other systems in the combined distribution system if the Director has reduced monitoring requirements under the Director's authority in §142.16(m).
 2. If the public water system was not required to submit an IDSE report under either §2202 or §2203, and the owner/operator does not have sufficient Part XI monitoring locations to identify the required number of Stage 2 DBP compliance monitoring locations indicated in §2206 (B), the owner/operator must identify additional locations by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of compliance monitoring locations have been identified. The owner/operator must also provide the rationale for identifying the locations as having high levels of TTHM or HAA5. If the public water system has more Part XI monitoring locations than required for Stage 2 DBP compliance monitoring in § 2206 (B), the owner/operator must identify which locations to use for Stage 2 DBP compliance monitoring by alternating selection of locations representing high TTHM levels and high HAA5 levels until the required number of Stage 2 DBP compliance monitoring locations have been identified.
- B. If the public water system is a Part VIII system serving > 3,300 people, the owner/operator must submit a copy of the monitoring plan to the Director prior to the date that it will conduct initial monitoring under this part, unless an IDSE report submitted under Part XXII of these regulations contains all the information required by this section.
- C. The owner/operator may revise its monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Director-approved reasons, after consultation with the Director regarding the need for changes and the appropriateness of changes. If the owner/operator changes monitoring locations, the owner/operator must replace existing compliance monitoring locations with the lowest LRAA with new locations that reflect the current distribution system locations with expected high TTHM or HAA5 levels. The Director may also require modifications in the monitoring plan. If the system is a Part VIII system serving > 3,300 people, the owner/operator must submit a copy of a modified monitoring plan to the Director prior to the date the system is required to comply with the revised monitoring plan.

§ 2304 REDUCED MONITORING

- A. The owner/operator may reduce monitoring to the level specified in Table 2300.3 any time the LRAA is ≤0.040 mg/L for TTHM and ≤0.030 mg/L for HAA5 at all monitoring locations. The owner/operator may only use data collected under the provisions of this part or Part XI to qualify for reduced monitoring. In addition, the source water annual average TOC level, before any treatment, must be ≤4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either § 1103 (B)(1)(c) or § 1103 (D).

TABLE 2300.3 REDUCED MONITORING FREQUENCY AND MONITORING LOCATIONS PER MONITORING PERIOD FOR DISTRIBUTION SYSTEMS

Distribution System

Source water type	Population size category	Monitoring Frequency ¹	Distribution System Monitoring location per monitoring period
Surface Water	<500	Monitoring may not be reduced
	500-3,300	per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one 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	per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
	10,000-49,999	per quarter	2 dual sample sets at the locations with the highest TTHM and highest HAA5 LRAAs.
	50,000-249,999	per quarter	4 dual sample sets--at the locations with the two highest TTHM and two highest HAA5 LRAAs.
	250,000-999,999	per quarter	6 dual sample sets--at the locations with the three highest TTHM and three highest HAA5 LRAAs.
	1,000,000-4,999,999	per quarter	8 dual sample sets--at the locations with the four highest TTHM and four highest HAA5 LRAAs.
	≥5,000,000	per quarter	10 dual sample sets--at the locations with the five highest TTHM and five highest HAA5 LRAAs.

Distribution System

Source Water Type	Population size category	Monitoring Frequency ¹	Distribution System Monitoring location per monitoring period
Ground Water	< 500	every third year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one 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.
	500-9,999	per year	1 TTHM and 1 HAA5 sample: one at the location and during the quarter with the highest TTHM single measurement, one 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.

10,000-99,999	per year	2 dual sample sets: one at the location and during the quarter with the highest TTHM single measurement, one at the location and during the quarter with the highest HAA5 single measurement.
100,000-499,999	per quarter	2 dual sample sets; at the locations with the highest TTHM and highest HAA5 LRAAs.
>500,000	per quarter	4 dual sample sets at the locations with the two highest TTHM and two highest HAA5 LRAAs.

¹ Systems on quarterly monitoring must take dual sample sets every 90 days.

- B. The public water system may remain on reduced monitoring as long as the TTHM LRAA is ≤ 0.040 mg/L and the HAA5 LRAA is ≤ 0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample is ≤ 0.060 mg/L and each HAA5 sample is ≤ 0.045 mg/L (for systems with annual or less frequent monitoring). In addition, the source water annual average TOC level, before any treatment, must be ≤ 4.0 mg/L at each treatment plant treating surface water or ground water under the direct influence of surface water, based on monitoring conducted under either § 1103(B) (1) (c) or §1103(D).
- C. 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 >4.0 mg/L at any treatment plant treating surface water or ground water under the direct influence of surface water, the owner/operator must resume routine monitoring under §2302 or begin increased monitoring if §2306 applies.
- D. The Director may return the public water system to routine monitoring at his/her discretion.

§ 2305 ADDITIONAL REQUIREMENTS FOR CONSECUTIVE SYSTEMS

If the public water system is a consecutive system that does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, the owner/operator must comply with analytical and monitoring requirements for chlorine and chloramines in Appendix E, 1101-E(C) and §1103(C) (1) and the compliance requirements in §1104(C) (1) beginning April 1, 2009, unless required earlier by the Director, and report monitoring results under §1105(C).

§ 2306 CONDITIONS REQUIRING INCREASED MONITORING

- A. If the public water system is required to monitor at a particular location annually or less frequently than annually under § 2302 or § 2304, the owner/operator must increase monitoring to dual sample sets once per quarter (taken every 90 days) at all locations if a TTHM sample is >0.080 mg/L or a HAA5 sample is >0.060 mg/L at any location.
- B. The owner/operator is in violation of the MCL when the LRAA exceeds the Stage 2 DBP MCLs in § 207 (B) (2), calculated based on four consecutive quarters of monitoring (or the LRAA calculated based on fewer than four quarters of data if the MCL would be exceeded regardless of the monitoring results of subsequent quarters). The owner/operator is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the owner/operator fails to monitor.
- C. The public water system may return to routine monitoring once the owner/operator has conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is ≤ 0.060 mg/L for TTHM and ≤ 0.045 mg/L for HAA5.

§ 2307 OPERATIONAL EVALUATION LEVELS

- A. The public water system has exceeded the operational evaluation level at any monitoring location where the sum of the two previous quarters' TTHM results plus twice the current quarter's TTHM result, divided by 4 to determine an average, exceeds 0.080 mg/L, or where the sum of the two previous quarters' HAA5 results plus twice the current quarter's HAA5 result, divided by 4 to determine an average, exceeds 0.060 mg/L.
- B. 1. If the public water system exceeds the operational evaluation level, the owner/operator must conduct an operational evaluation and submit a written report of the evaluation to the Director no later than 90 days after being notified of the analytical result that causes the public water system to exceed the operational evaluation level. The written

report must be made available to the public upon request.

2. The public water system's operational evaluation must include an examination of system treatment and distribution operational practices, including storage tank operations, excess storage capacity, distribution system flushing, changes in sources or source water quality, and treatment changes or problems that may contribute to TTHM and HAA5 formation and what steps could be considered to minimize future exceedences.
 - a. The owner/operator may request and the Director may allow the owner/operator to limit the scope of an evaluation if the owner/operator is able to identify the cause of the operational evaluation level exceedance.
 - b. The public water system's request to limit the scope of the evaluation does not extend the schedule in paragraph (B) (1) of this section for submitting the written report. The Director must approve this limited scope of evaluation in writing and the owner/operator must keep that approval with the completed report.

§ 2308 REQUIREMENTS FOR REMAINING ON REDUCED TTHM AND HAA5 MONITORING BASED ON PART XI RESULTS

The public water system may remain on reduced monitoring after the dates identified in §2301 (C) for compliance with this part only if the public water system qualifies for a 40/30 certification under §2204 or has received a very small system waiver under §2205, plus it meets the reduced monitoring criteria in §2304 (A), and the owner/operator does not change or add monitoring locations from those used for compliance monitoring under Part XI of these regulations. If the public water system's monitoring locations under this part differ from the system's monitoring locations under Part XI of these regulations, the system may not remain on reduced monitoring after the dates identified in §2301(C) for compliance with this part.

§ 2309 REQUIREMENTS FOR REMAINING ON INCREASED TTHM AND HAA5 MONITORING BASED ON PART XI RESULTS

If the public water system was on increased monitoring under §1103 (B) (1), it must remain on increased monitoring until the system qualifies for a return to routine monitoring under §2306 (C). The owner/operator must conduct increased monitoring under § 2306 at the monitoring locations in the monitoring plan developed under §2303 beginning on the date identified in §2301 (C) for compliance with this part and must remain on increased monitoring until the system qualifies for a return to routine monitoring under §2306 (C).

§ 2310 REPORTING AND RECORDKEEPING REQUIREMENTS

A. Reporting.

1. The owner/operator must report the following information for each monitoring location to the Director within 10 days of the end of any quarter in which monitoring is required:
 - a. Number of samples taken during the last quarter.
 - b. Date and results of each sample taken during the last quarter.
 - c. Arithmetic average of quarterly results for the last four quarters for each monitoring location (LRAA), beginning at the end of the fourth calendar quarter that follows the compliance date and at the end of each subsequent quarter. If the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters, the owner/operator must report this information to the Director as part of the first report due following the compliance date or anytime thereafter that this determination is made. If the system is required to conduct monitoring at a frequency that is less than quarterly, the owner/operator must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless the owner/operator is required to conduct increased monitoring under §2306.
 - d. Whether, based on §207 (B) (2) and this subpart, the MCL was violated at any monitoring location.
 - e. Any operational evaluation levels that were exceeded during the quarter and, if so, the location and date, and the calculated TTHM and HAA5 levels.
2. If the public water system is a Part VIII system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, the owner/operator must report the following source water TOC information for each treatment plant that treats surface water or ground water under the direct influence of surface water to the Director within 10 days of the end of any quarter in which monitoring is required:

- a. The number of source water TOC samples taken each month during the last quarter.
 - b. The date and result of each sample taken during the last quarter.
 - c. The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.
 - d. The running annual average (RAA) of quarterly averages from the past four quarters.
 - e. Whether the RAA exceeded 4.0 mg/L.
3. The Director may choose to perform calculations and determine whether the MCL was exceeded or the system is eligible for reduced monitoring in lieu of having the system report that information.
- B. Recordkeeping. The public water system owner/operator must retain any Stage 2 DBP monitoring plans and Stage 2 DBP monitoring results as required by §503.