TITLE 179 PUBLIC WATER SYSTEMS

CHAPTER 24 STAGE 2 DISINFECTANTS AND DISINFECTION BYPRODUCTS (DBPs)

24-001 SCOPE AND AUTHORITY: These regulations establish monitoring and other requirements for achieving compliance with maximum contaminant levels (MCLs) based on locational running annual averages (LRAAs) for total trihalomethanes (TTHMs) and haloacetic acids (five) (HAA5), and for achieving compliance with maximum residual disinfectant levels for chlorine and chloramines for certain consecutive systems. This chapter applies to community and non-transient non-community public water systems that use a primary or residual disinfectant other than ultraviolet light or deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light. The authority is found in Neb. Rev. Stat. §§ 71-5301 to 71-5313.

24-002 DEFINITIONS

40/30 Certification means the certification a system provided to the Department saying the system met criteria specified in 40 CFR 141 Subpart U which exempted it from completing an initial distribution system evaluation.

Community Water System means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

Ground Water Under the Direct Influence of Surface Water (GWUDI) means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, or significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the Department. The Department determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well construction characteristics and geology with field evaluation.

Haloacetic Acids 5 (HAA5) means the sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid), rounded to two significant figures after addition.

Locational Running Annual Average (LRAA) means the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

Non-transient Non-community Water System means a public water system that is not a community water system and that regularly serves at least 25 of the same individuals over 6 months per year.

Public Water System means a system for the provision to the public of water for human consumption through pipes or, after August 5, 1998, other constructed conveyances, if such system has a least fifteen service connections or regularly serves an average of at least twenty-five individuals daily at least 60 days out of the year. Such term includes: any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system; and any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system. Such term does not include any "special irrigation district." A public water system is either a "community water system" or a "non-community water system."

Total Organic Carbon (TOC) means total organic carbon in mg/L measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.

Total Trihalomethanes (TTHMs) means the sum of the concentration in milligrams per liter of the trihalomethane compounds [trichloromethane (chloroform), dibromochloromethane, bromodichloromethane, and tribromomethane (bromoform)], rounded to two significant figures.

24-003 GENERAL REQUIREMENTS

24-003.01 Schedule: Systems must comply with the requirements in this chapter on the schedule in the following table based on system type.

System type	Compliance date[1]

Systems that are not part of a combined distribution system and systems that serve the largest population in the combined distribution system

(1) System serving > 100,000	Systems subject to 40 CFR 141 Subpart V prior to the effective date of these regulations are subject to 179 NAC 24 as of the effective date of these regulations.
(2) System serving 50,000-99,999	Systems subject to 40 CFR 141 Subpart V prior to the effective date of these reguations are subject to 179 NAC 24 as of the effective date of these regulations.
(3) System serving 10,000-49,999	October 1, 2013
(4) System serving < 10,000	October 1, 2013 if no *Cryptosporidium* monitoring is required under 179 NAC 25-004.01D or October 1, 2014 if *Cryptosporidium* monitoring is required under 179 NAC 25-004.01D or 25-004.01F

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

[1] The Department 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.

24-003.01A Systems' monitoring frequency is specified in 179 NAC 24-004.01B.

24-003.01A1 If a system is required to conduct quarterly monitoring, it must begin monitoring in the first full calendar quarter that includes the compliance date in the table in 179 NAC 24-003.01.

24-003.01A2 If a system is required to conduct monitoring at a frequency that is less than quarterly, it must begin monitoring in the calendar month recommended in the initial distribution system evaluation (IDSE) report or the calendar month identified in the monitoring plan developed under 179 NAC 24-005 no later than 12 months after the compliance date in the table in 179 NAC 24-003.01.

24-003.01B If a system is required to conduct quarterly monitoring, it 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 a system is required to conduct monitoring at a frequency that is less than quarterly, it must make compliance calculations beginning with the first compliance sample taken after the compliance date.

24-003.01C For the purpose of the schedule in 179 NAC 24-003.01 the Department 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 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 system only on an emergency basis or delivering only a small percentage and small volume of water to a consecutive system.

24-003.02 Monitoring and Compliance

24-003.02A Systems required to monitor quarterly: To comply with 179 NAC 24 MCLs in 179 NAC 2-002.04E2a, a system must calculate LRAAs for TTHMs and HAA5 using monitoring results collected under 179 NAC 24 and determine that each LRAA does not exceed the MCL. If a system fails to complete four consecutive quarters of monitoring, it must calculate compliance with the MCL based on the

average of the available data from the most recent four quarters. If a system takes more than one sample per quarter at a monitoring location, the system must average all samples taken in the quarter at that location to determine a quarterly average to be used in the LRAA calculation.

24-003.02B Systems required to monitor yearly or less frequently: To determine compliance with 179 NAC 24 MCLs in 179 NAC 2-002.04E2a, a system must determine that each sample taken is less than the MCL. If any sample exceeds the MCL, the system must comply with the requirements of 179 NAC 24-008. If no sample exceeds the MCL, the sample result for each monitoring location is considered the LRAA for that monitoring location.

24-003.03 Violation: A system is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the system fails to monitor.

24-004 ROUTINE MONITORING

24-004.01 Monitoring

24-004.01A If a system submitted an IDSE report under 40 CFR 141 Subpart U or submits an IDSE report under 179 NAC 23, it must begin monitoring at the locations and months the system recommended in its IDSE following the schedule in 179 NAC 24-003.01, unless the Department requires other locations or additional locations after its review. If a system submitted a 40/30 certification under 40 CFR 141 Subpart U or it qualified for a very small system waiver under 40 CFR 141 Subpart U or it is a non-transient non-community water system serving <10,000 individuals, it must monitor at the location(s) and dates identified in its monitoring plan in 179 NAC 16-005.06, updated as required by 179 NAC 24-005.

24-004.01B A system must monitor at no fewer than the number of locations identified in the following table.

Source water type	**Population size category**	**Monitoring Frequency[1]**	**Distribution system monitoring location total per monitoring period[2]**
Surface water and GWUDI	<500	per year	2 individual
	500-3,300	per quarter	2 individual
	3,301-9,999	per quarter	2 dual
	10,000-49,999	per quarter	4 dual
	50,000-249,999	per quarter	8 dual
	250,000-999,999	per quarter	12 dual
	1,000,000-4,999,999	per quarter	16 dual
	>5,000,000	per quarter	20 dual
Ground Water:	<500	per year	2 individual
	500-9,999	per year	2 dual

	10,000-99,999 100,000-499,999 >500,000	per quarter per quarter per quarter	4 dual 6 dual 8 dual

[1] All systems must monitor during month of highest DBP concentrations.
[2] Systems on quarterly monitoring must take dual sample sets every 90 days at each monitoring location, except for surface water and GWUDI systems serving 500-3,300. Ground water systems serving 500-9,999 on annual monitoring must take dual sample sets at each monitoring location. All other systems on annual monitoring and surface water and GWUDI systems serving 500-3,300 are required to take individual TTHM and HAA5 samples (instead of a dual sample set) at the locations with the highest TTHM and HAA5 concentrations, respectively. For systems serving fewer than 500 people, 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.

24-004.01C If a system is an undisinfected system that begins using a disinfectant other than UV light, the system must consult with the Department to identify compliance monitoring locations for 179 NAC 24. The system must then develop a monitoring plan under 179 NAC 24-005 that includes those monitoring locations.

24-004.02 Monitoring Sites

24-004.02A Systems with existing data that have not conducted an IDSE must select compliance monitoring locations according to the recommendations in 179 NAC 23-008, and in consultation with the Department.

24-004.02B Systems with no existing data must select compliance monitoring locations (in consultation with the Department) by identifying sites in the distribution system with anticipated high DBP levels, using the following criteria and the protocol in 179 NAC 23-008.

1. Sites with anticipated high TTHM levels are:

   a. Near the ends of the distribution system, at or before the last group of customers (particularly on smaller lines, far from major transmission lines),
   b. In mixing zones where water from different sources combine within the distribution system,
   c. In areas with low disinfectant residual, and
   d. Downstream of storage facilities, but at or before the last group of customers.

2. Sites with anticipated high HAA5 levels are:

   a. Near the ends of the distribution system, at or before the last group of customers (particularly on smaller lines, far from major transmission lines),
   b. In mixing zones where water from different sources combine within the distribution system,
   c. In areas with low but existing disinfectant residual, and
   d. Downstream of storage facilities, but at or before the last group of customers.

24-004.02C TTHM samples sites should not be located at a dead end where there are no customers or immediately prior to booster disinfection.

24-004.02D HAA5 sample sites should not be located at a dead end where there are no customers, immediately prior to booster disinfection, where no disinfectant residual exists or in areas with biofilm problems.

24-004.03 After compliance monitoring data has been collected for two years (over eight consecutive quarters), the Department will evaluate the compliance monitoring data. After evaluating the data, the Department may require the system to conduct an IDSE if the system had any monitoring violations or if any individual sample exceeded 0.040 mg/L for TTHMs or 0.030 mg/L for HAA5s to determine if there is the possibility of higher distribution system DBP concentrations in areas that have not previously been monitored.

24-004.04 Analytical Methods: A system must use an approved method listed in 179 NAC 16-004 for TTHM and HAA5 analyses required in this chapter. Analyses must be conducted by the Department Public Health Environmental Laboratory (certified by EPA) or a laboratory that has entered into an agreement with the Department Laboratory as specified in 179 NAC 20.

24-005 MONITORING PLAN

24-005.01 Developing and Implementing

24-005.01A A system must develop and implement a monitoring plan to be kept on file for Department and public review. The monitoring plan must contain the following elements and be complete no later than the date the system conducts its monitoring under this chapter.

1. Monitoring locations;
2. Monitoring dates;
3. Compliance calculation procedures; and
4. Monitoring plans for any other systems in the combined distribution system if the Department has reduced monitoring requirements.

24-005.01B If a system did not submit an IDSE report under the standard monitoring or system specific provisions of 40 CFR 141 Subpart U, and it does not have sufficient 179 NAC 16 monitoring locations to identify the required number of 179 NAC 24 compliance monitoring locations indicated in 179 NAC 23-008.02, the system 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 system must also provide the rationale for identifying the locations as having high levels of TTHMs or HAA5s. If a system has more 179 NAC 16 monitoring locations than required for 179 NAC 24 compliance monitoring in 179 NAC 23-008.02, it must identify which locations it will use for 179 NAC 24 compliance monitoring by alternating selection

of locations representing high TTHM levels and high HAA5 levels until the required number of 179 NAC 24 compliance monitoring locations have been identified.

24-005.02 If a system is a surface water or GWUDI system serving >3,300 people, the system must submit a copy of its monitoring plan to the Department prior to the date it conducts its initial monitoring under this chapter unless its IDSE report contains all the information required by 179 NAC 24-005. The Department may also require a system serving 3,300 or fewer people to submit a copy of its monitoring plan.

24-005.03 A system may revise its monitoring plan to reflect changes in treatment, distribution system operations and layout (including new service areas), or other factors that may affect TTHM or HAA5 formation, or for Department-approved reasons, after consultation with the Department regarding the need for changes and the appropriateness of changes. If a system changes monitoring locations, the system 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 Department may also require modifications in the monitoring plan. A surface water or GWUDI system serving >3,300 people must submit a copy of its modified monitoring plan to the Department prior to the date it is required to comply with the revised monitoring plan.

24-006 REDUCED MONITORING

24-006.01 A system may reduce monitoring to the level specified in the following table any time the LRAA is <0.040 mg/L for TTHMs and <0.030 mg/L for HAA5 at all monitoring locations. A system may only use data collected under the provisions of this chapter or 179 NAC 16 to qualify for reduced monitoring. In addition, the source water annual average total organic carbon (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 179 NAC 16-005.02 item 1.c. or 16-005.04.

Source water type	**Population size category**	**Monitoring frequency[1]**	**Distribution system monitoring location per monitoring period**
Surface water or GWUDI:	<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.
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.

24-006.02 A system may remain on reduced monitoring as long as the TTHM LRAA ≤0.040 mg/L and the HAA5 LRAA ≤0.030 mg/L at each monitoring location (for systems with quarterly reduced monitoring) or each TTHM sample ≤0.060 mg/L and each HAA5 sample ≤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 179 NAC 16-005.02 item 1.c or 179 NAC 16-005.04.

24-006.03 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 system must resume routine monitoring under 179 NAC 24-004 or begin increased monitoring if 179 NAC 24-008 applies.

24-006.04 The Department may return a system to routine monitoring at the Department's discretion.

24-007 ADDITIONAL REQUIREMENTS FOR CONSECUTIVE SYSTEMS

24-007.01 If a consecutive system does not add a disinfectant but delivers water that has been treated with a primary or residual disinfectant other than ultraviolet light, the system must comply with analytical and monitoring requirements for chlorine and chloramines in 179 NAC 16-004.03 and 179 NAC 16-005.03 item 1 and the compliance requirements in 179 NAC 16-006.03 item 1 and report monitoring results under 179 NAC 16-007.03.

24-008 CONDITIONS REQUIRING INCREASED MONITORING

24-008.01 If a system is required to monitor at a particular location annually or less frequently than annually under 179 NAC 24-004 or 179 NAC 24-006, the system 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 an HAA5 sample is >0.060 mg/L at any location.

24-008.02 A system is in violation of the MCL when the LRAA exceeds the 179 NAC 24 MCLs in 179 NAC 2-002.04E2a, 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). A system is in violation of the monitoring requirements for each quarter that a monitoring result would be used in calculating an LRAA if the system fails to monitor.

24-008.03 A system may return to routine monitoring once the system has conducted increased monitoring for at least four consecutive quarters and the LRAA for every monitoring location is ≤0.060 mg/L for TTHMs and ≤0.045 mg/L for HAA5s.

24-009 OPERATIONAL EVALUATION LEVELS

24-009.01 A 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.

24-009.02 Operational Evaluations

24-009.02A If a system exceeds the operational evaluation level, the system must conduct an operational evaluation and submit a written report of the evaluation to the Department no later than 90 days after being notified of the analytical result that caused the system to exceed the operational evaluation level. The written report must be made available to the public upon request.

24-009.02B A 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 source(s) 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.

24-009.02B1 A system may request and the Department may allow the system to limit the scope of its evaluation if the system is able to identify the cause of the operational evaluation level exceedance.

24-009.02B2 A system's request to limit the scope of the evaluation does not extend the schedule in 179 NAC 24-009.02A for submitting the written report. The Department must approve this limited scope of evaluation in writing and the system must keep that approval with the completed report.

24-010 REQUIREMENTS FOR REMAINING ON REDUCED TTHM AND HAA5 MONITORING BASED ON 179 NAC 16 RESULTS: A system may remain on reduced monitoring after the dates identified in 179 NAC 24-003.01 for compliance with 179 NAC 24 only if the system qualified for a 40/30 certification under 40 CFR 141 Subpart U or has received a very small system waiver under 40 CFR 141 Subpart U, plus the system meets the reduced monitoring criteria in 179 NAC 24-006.01 and the system does not change or add monitoring locations from those used for compliance monitoring under 179 NAC 16. If a system's monitoring locations under this chapter differ from its monitoring locations under 179 NAC 16, the system may not remain on reduced monitoring after the dates identified in 179 NAC 24-003.01 for compliance with 179 NAC 24.

24-011 REQUIREMENTS FOR REMAINING ON INCREASED TTHM AND HAA5 MONITORING BASED ON 179 NAC 16 RESULTS: If a system was on increased monitoring under 179 NAC 16-005.02 item 1, the system must remain on increased monitoring until it qualifies for a return to routine monitoring under 179 NAC 24-008.03. The system must conduct increased monitoring under 179 NAC 24-008 at the monitoring locations in the monitoring plan developed under 179 NAC 24-005 beginning at the date identified in 179 NAC 24-003.01 for compliance with this chapter and remain on increased monitoring until the system qualifies for a return to routine monitoring under 179 NAC 24-008.03.

24-012 REPORTING AND RECORDKEEPING REQUIREMENTS

24-012.01 Reporting

24-012.01A A system must report the following information for each monitoring location to the Department within 10 days of the end of any quarter in which monitoring is required:

1. Number of samples taken during the last quarter.

2. Date and results of each sample taken during the last quarter.

3. 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 system must report this information to the Department as part of the first report due following the compliance date or anytime thereafter that this determination is made. If a system is required to conduct monitoring at a frequency that is less than quarterly, the system must make compliance calculations beginning with the first compliance sample taken after the compliance date, unless the system is required to conduct increased monitoring under 179 NAC 24-008.

4. Whether, based on 179 NAC 2-002.04E2a and this chapter, the MCL was violated at any monitoring location.

5. Any operational evaluation levels that were exceeded during the quarter, and if so, the location and date, and the calculated TTHM and HAA5 levels.

24-012.01B If a system is a surface water or GWUDI system seeking to qualify for or remain on reduced TTHM/HAA5 monitoring, the system 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 Department within 10 days of the end of any quarter in which monitoring is required:

1. The number of source water TOC samples taken each month during last quarter.

2. The date and result of each sample taken during last quarter.

3. The quarterly average of monthly samples taken during last quarter or the result of the quarterly sample.

4. The running annual average (RAA) of quarterly averages from the past four quarters.

5. Whether the RAA exceeded 4.0 mg/L.

24-012.01C The Department 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.

24-012.02 Recordkeeping: A system must retain any monitoring plans for disinfection byproducts monitoring as long as it must keep 179 NAC 24 monitoring results (see 179 NAC 5-005).