TITLE 179 PUBLIC WATER SYSTEMS

CHAPTER 23 INITIAL DISTRIBUTION SYSTEM EVALUATION (IDSE)

23-001 SCOPE AND AUTHORITY: These regulations establish monitoring and other requirements for identifying 179 NAC 24 compliance monitoring locations for determining compliance with maximum contaminant levels (MCLs) for total trihalomethanes (TTHMs) and haloacetic acids (five) (HAA5s). These regulations apply to community 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; and non-transient non-community water systems that serve at least 10,000 people and 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 and systems that have not complied with the requirements of 40 CFR 141 Subpart U prior to the effective date of these regulations, that are identified by the Department after conducting compliance monitoring under 179 NAC 24 as requiring additional assessment. If a system began to comply with 40 CFR 141 Subpart U before the effective date of these regulations the system must complete the requirements under 179 NAC 23 upon its effective date. The statutory authority is found in Neb. Rev. Stat. §§ 71-5301 to 71-5313.

23-002 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.

Combined Distribution System means the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.

Consecutive System means a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

Dual Sample Set means a set of two samples collected at the same time and same location, with one sample analyzed for TTHMs and the other sample analyzed for HAA5. Dual sample sets are collected for the purposes of conducting an IDSE under 179 NAC 23 and determining compliance with the TTHM and HAA5 maximum contaminant levels (MCLs) under 179 NAC 24.

Finished Water means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (*e.g.*, booster disinfection, addition of corrosion control chemicals).

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 (five) (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.

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.

Wholesale System means a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

23-003 GENERAL REQUIREMENTS

23-003.01 Compliance Schedule

23-003.01A Systems (including those that are part of a combined distribution system) that have been notified by the Department to complete an IDSE must:

1. Submit a standard monitoring plan or system specific study plan within 3 months of notification by the Department of the requirement to comply.

    a. If, within 12 months after the system submits a standard monitoring plan or a system specific study plan, the Department does not approve a system's plan or notify the system that it has not yet completed its review, the system may consider the submitted plan as approved. The plan must be implemented and standard monitoring or a system specific study must be completed no later than the time frame identified in 179 NAC 23-003.01A item 2.

2. Complete standard monitoring or system specific study within 24 months of submitting a standard monitoring plan or system specific study plan to the Department.
3. Submit the IDSE report to the Department within three months of completing the standard monitoring or system specific study.

    a. If, within three months after the system submits its IDSE report to the Department, the Department does not approve the system's IDSE report or notify the system that it has not yet completed its review, the system may consider the submitted report as approved and must implement 179 NAC 24 monitoring as required.

23-003.01B For the purpose of the time frames in 179 NAC 23-003.01A, 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.

23-003.02 A system must conduct standard monitoring that meets the requirements in 179 NAC 23-004, or a system specific study that meets the requirements in 179 NAC 23-005.

23-003.03 A system must use only the analytical methods specified in 179 NAC 16-004 or otherwise approved by the United States Environmental Protection Agency for monitoring under this chapter to demonstrate compliance with the requirements of this chapter.

23-003.04 IDSE results will not be used for the purpose of determining compliance with maximum contaminant levels (MCLs) in 179 NAC 2-002.04E1 and 2-002.04E2a(1).

23-004 STANDARD MONITORING

23-004.01 Standard Monitoring Plan: A system's standard monitoring plan must comply with 179 NAC 23-004.01A through 23-004.01D. The system must prepare and submit its standard monitoring plan to the Department according to the time frame in 179 NAC 23-003.01.

23-004.01A A system's standard monitoring plan must include a schematic of the system's distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating locations and dates of all projected standard monitoring, and all projected compliance monitoring.

23-004.01B A system's standard monitoring plan must include justification of standard monitoring location selection and a summary of data the system relied on to justify standard monitoring location selection.

23-004.01C A system's standard monitoring plan must specify the population served and system type: surface water/GWUDI, or ground water.

23-004.01D A system must retain a complete copy of its standard monitoring plan including any Department modification of the system's standard monitoring plan, for as long as the system is required to retain its IDSE.

23-004.02 Standard Monitoring

23-004.02A A system must monitor as indicated in the following table. A system must collect dual sample sets at each monitoring location. One sample in the dual sample set must be analyzed for TTHMs. The other sample in the dual sample set must be analyzed for HAA5. A system must conduct one monitoring period during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature. A system must review available compliance, study, or operational data to determine the peak historical month for TTHM or HAA5 levels or warmest water temperature.

Source water type	Population size category	Monitoring periods and frequency of sampling	Distribution system monitoring locations[1]				
			Total per monitoring period	Near entry points	Average residence time	High TTHM locations	High HAA5 locations
Surface water and ground water under the direct influence of surface water	<500 consecutive systems	One (during peak historical month)[2]	2	1		1	
	<500 non-consecutive systems	One (during peak historical month)[2]	2			1	1
	500-3,300 consecutive systems	Four (every 90 days)	2	1		1	
	500-3,300 non-consecutive systems	Four (every 90 days)	2			1	1
	3,301 – 9,999	Four (every 90 days)	4		1	2	1
	10,000-49,999	Six (every 60 days)	8	1	2	3	2
	50,000-249,999	Six (every 60 days)	16	3	4	5	4
	250,000-999,999	Six (every 60 days)	24	4	6	8	6
	1,000,000-4,999,999	Six (every 60 days)	32	6	8	10	8
	≥5,000,000	Six (every 60 days)	40	8	10	12	10
Ground Water	<500 consecutive systems	One (during peak historical month)[2]	2	1		1	
	<500 non-consecutive systems	One (during peak historical month)[2]	2			1	1
	500-9,999	Four (every 90 days)	2			1	1
	10,000-99,999	Four (every 90 days)	6	1	1	2	2
	100,000-499,999	Four (every 90 days)	8	1	1	3	3
	≥500,000	Four (every 90 days)	12	2	2	4	4

[1] A dual sample set (i.e., a TTHM and an HAA5 sample) must be taken at each monitoring location during each monitoring period.
[2] The peak historical month is the month with the highest TTHM or HAA5 levels or the warmest water temperature.

23-004.02B Systems must take samples at locations other than the existing 179 NAC 16 or 24 monitoring locations. Monitoring locations must be distributed throughout the distribution system.

23-004.02C If the number of entry points to the distribution system is fewer than the specified number of entry point monitoring locations, excess entry point samples must be replaced equally at high TTHM and HAA5 locations. If there is an odd extra location number, systems must take a sample at a high TTHM location. If the number of entry points to the distribution system is more than the specified number of entry point monitoring locations, the system must take samples at entry points to the distribution system having the highest annual water flows.

23-004.02D Standard monitoring may not be reduced.

23-004.03 IDSE Report: IDSE reports must include the elements required in 179 NAC 23-004.03A through 23-004.03D. IDSE reports must be submitted to the Department according to the time frame in 179 NAC 23-003.01.

23-004.03A An IDSE report must include all TTHM and HAA5 analytical results from 179 NAC 16 or 24 compliance monitoring and all standard monitoring conducted during the period of the IDSE as individual analytical results and locational running annual averages (LRAAs) presented in a tabular or spreadsheet format acceptable to the Department. If changed from the standard monitoring plan submitted under 179 NAC 23-004.01, the report must also include a schematic of the distribution system, the population served, and system type: surface water/GWUDI~~,~~ or ground water.

23-004.03B The IDSE report must include an explanation of any deviations from the system's approved standard monitoring plan.

23-004.03C A system must recommend and justify 179 NAC 24 compliance monitoring locations and timing based on the protocol in 179 NAC 23-008.

23-004.03D A system must retain a complete copy of its IDSE report submitted under 179 NAC 23-004 or 40 CFR 141 Subpart U for 10 years after the date that the report was submitted. If the Department modifies the 179 NAC 24 monitoring requirements that a system recommended in its IDSE report or if the Department approves alternative monitoring locations, the system must keep a copy of the Department's notification on file for 10 years after the date of the Department's notification. Systems must make the IDSE report and any Department notification available for review by the Department or the public.

23-005 SYSTEM SPECIFIC STUDIES

23-005.01 System Specific Study Plan: System specific study plans must be based on either existing monitoring results as required under 179 NAC 23-005.01A or modeling as required under 179 NAC 23-005.01B. Systems must prepare and submit system specific study plans to the Department according to the time frame in 179 NAC 23-003.01.

23-005.01A Existing monitoring results: Systems may comply by submitting monitoring results collected before they are required to begin monitoring under 179 NAC 23-003.01. The monitoring results and analysis must meet the following criteria:

1. Minimum requirements

   a. TTHM and HAA5 results must be based on samples collected and analyzed in accordance with 179 NAC 16-004. Samples must be collected no earlier than five years prior to the study plan submission date.

   b. The monitoring locations and frequency must meet the conditions identified in the following table. Each location must be sampled once during the peak historical month for TTHM levels or HAA5 levels or the month of warmest water temperature for every 12 months of data submitted for that location. Monitoring results must include all 179 NAC 16 or 24 compliance monitoring results plus additional monitoring results as necessary to meet minimum sample requirements.

System Type	Population size category	Number of monitoring locations	Number of samples	
			TTHM	HAA5
Surface Water and GWUDI	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	≥5,000,000	60	360	360
Ground Water	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
	≥500,000	24	96	96

2. Reporting Monitoring Results: Systems must report the following information:

   a. Systems must report previously collected monitoring results and certify that the reported monitoring results include all compliance and non-compliance results generated during the time period beginning with the first reported result and ending with the most recent 179 NAC 16 or 24 results.

b. Systems must certify that the samples were representative of the entire distribution system and that treatment and the distribution system have not changed significantly since the samples were collected.

c. Study monitoring plans must include a schematic of the distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed or planned system specific study monitoring.

d. System specific study plans must specify the population served and system type: surface water/GWUDI or ground water.

e. Systems must retain a complete copy of the system specific study plan submitted under 179 NAC 23-005.01A or 40 CFR 141 Subpart U, including any Department modification of the system specific study plan, for as long as the system is required to retain its IDSE report under 179 NAC 23-005.02 item 5.

f. If a system submits previously collected data that fully meet the number of samples required under 179 NAC 23-005.01A item 1.b and the Department rejects some of the data, the system must either conduct additional monitoring to replace rejected data on a schedule the Department approves or conduct standard monitoring under 179 NAC 23-004.

23-005.01B Modeling: Systems may comply through analysis of an extended period simulation hydraulic model. The extended period simulation hydraulic model and analysis must meet the following criteria:

1. Minimum Requirements:

a. The model must simulate 24 hour variation in demand and show a consistently repeating 24 hour pattern of residence time.

b. The model must represent the following criteria:

(1) 75% of pipe volume;
(2) 50% of pipe length;
(3) All pressure zones;
(4) All 12-inch diameter and larger pipes;
(5) All 8-inch and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves, or are known or expected to be significant conveyors of water;
(6) All 6-inch and larger pipes that connect remote areas of a distribution system to the main portion of the system;

(7) All storage facilities with standard operations represented in the model;
(8) All active pump stations with controls represented in the model; and
(9) All active control valves.

c. The model must be calibrated, or have calibration plans, for the current configuration of the distribution system during the period of high TTHM formation potential. All storage facilities must be evaluated as part of the calibration process. All required calibration must be completed no later than 12 months after plan submission.

2. Reporting Modeling: System specific study plans must include the following information:

a. Tabular or spreadsheet data demonstrating that the model meets requirements in 179 NAC 23-005.01B item 1.b.

b. A description of all calibration activities undertaken, and if calibration is complete, a graph of predicted tank levels versus measured tank levels for the storage facility with the highest residence time in each pressure zone, and a time series graph of the residence time at the longest residence time storage facility in the distribution system showing the predictions for the entire simulation period (*i.e*., from time zero until the time it takes for the model to reach a consistently repeating pattern of residence time).

c. Model output showing preliminary 24 hour average residence time predictions throughout the distribution system.

d. Timing and number of samples representative of the distribution system planned for at least one monitoring period of TTHM and HAA5 dual sample monitoring at a number of locations no less than would be required for the system under standard monitoring in 179 NAC 23-004 during the historical month of high TTHMs. These samples must be taken at locations other than existing 179 NAC 16 or 24 compliance monitoring locations.

e. Description of how all requirements will be completed no later than 12 months after the system submits its system specific study plan.

f. Schematic of the system's distribution system (including distribution system entry points and their sources, and storage facilities), with notes indicating the locations and dates of all completed system specific study monitoring (if calibration is complete) and all 179 NAC 16 or 24 compliance monitoring.

g. Population served and system type: surface water/GWUDI or ground water.

h. Systems must retain a complete copy of their system specific study plan submitted under 179 NAC 23-005.01B or 40 CFR 141 Subpart U including any Department modification of the system specific study plan, for as long as the system is required to retain its IDSE report under 179 NAC 23-005.02 item 7.

3. If a system submits a model that does not fully meet the requirements under 179 NAC 23-005.01B, the system must correct the deficiencies and respond to Department inquiries concerning the model. If a system fails to correct deficiencies or respond to inquiries to the Department's satisfaction, the system must conduct standard monitoring under 179 NAC 23-004.

23-005.02 IDSE Report: The IDSE report must include the following elements. A system must submit its IDSE report according to the time frame in 179 NAC 23-003.01.

1. The IDSE report must include all TTHM and HAA5 analytical results from 179 NAC 16 or 24 compliance monitoring and all system specific study monitoring conducted during the period of the system specific study presented in a tabular or spreadsheet format acceptable to the Department. If changed from the system specific study plan submitted under 179 NAC 23-005.01, the IDSE report must also include a schematic of the distribution system, the population served, and system type: surface water/GWUDI or ground water.

2. If a system used the modeling provision under 179 NAC 23-005.01B, the system must include final information for the elements described in 179 NAC 23-005.01B item 2, and a 24-hour time series graph of residence time for each 179 NAC 24 compliance monitoring location selected.

3. A system must recommend and justify 179 NAC 24 compliance monitoring locations and timing based on the protocol in 179 NAC 23-008.

4. The IDSE report must include an explanation of any deviations from the system's approved system specific study plan.

5. The IDSE report must include the basis (analytical and modeling results) and justification used to select the recommended 179 NAC 24 monitoring locations.

6. A system may submit its IDSE report in lieu of a system specific study plan on the schedule identified in 179 NAC 23-003.01 for submission of the system specific study plan if the system believes that it has the necessary information by the time that the system specific study plan is due. If a system elects this approach, its IDSE report must also include all information required under 179 NAC 23-005.01

7. A system must retain a complete copy of its IDSE report submitted under 179 NAC 23-005 or 40 CFR 141 Subpart U for 10 years after the date the system submitted it. If the Department modifies the 179 NAC 24 monitoring requirements that the system recommended in its IDSE report or if the Department approves alternative monitoring locations, the system must keep a copy of the Department's notification on file for 10 years after the date of the Department's notification. A system must make the IDSE report and any Department notification available for review by the Department or the public.

23-006 40/30 CERTIFICATION: Systems that submitted 40/30 certification to the Department under 40 CFR 141 Subpart U must retain a complete copy of their certification for 10 years after the date that they submitted their certification. Systems must make the certification, all data upon which the certification is based, and any Department notification available for review by the Department or the public.

23-007 VERY SMALL SYSTEM WAIVERS: Systems serving <500 people that received a small system waiver under 40 CFR 141 Subpart U prior to the effective date of these regulations do not have to comply with 179 NAC 23.

23-008 179 NAC 24 COMPLIANCE MONITORING LOCATION RECOMMENDATIONS

23-008.01 A system's IDSE report must include its recommendations and justification for where and during what month(s) TTHM and HAA5 monitoring for 179 NAC 24 should be conducted. A system must base its recommendations on the criteria in 179 NAC 23-008.02 through 23-008.05.

23-008.02 A system must select the number of monitoring locations specified in the following table. A system must use these recommended locations and/or the sites listed in 179 NAC 24-004 as 179 NAC 24 routine compliance monitoring locations, unless the Department requires different or additional locations. A system should distribute locations throughout the distribution system to the extent possible.

Source water type	Population size category	Monitoring frequency[1]	Distribution system monitoring location			
			Total per monitoring period[2]	Highest TTHM locations	Highest HAA5 locations	Existing 179 NAC 16 compliance locations
Surface water and GWUDI	<500	per year	2 (1 TTHM, 1 HAA5)	1	1	--
	500-3,300	per quarter		1	1	
	3,301-9,999	per quarter	2 (1 TTHM, 1 HAA5)	1	1	--
	10,000-49,999	per quarter		2	1	1
	50,000-249,999	per quarter	2 Dual	3	3	2
	250,000-999,999	per quarter	4 Dual	5	4	3
	1,000,000-4,999,999	per quarter	8 Dual 12	6	6	4
	≥5,000,000	per quarter	16 Dual	8	7	5
			20 Dual			
Ground water	<500	per year	2 (1 TTHM, 1 HAA5)	1	1	--
	500-9,999	per year		1	1	--
	10,000-99,999	per quarter	2 Dual	2	1	1
	100,000-499,999	per quarter	4 Dual	3	2	1
	≥500,000	per quarter	6 Dual	3	3	2
			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.

23-008.03 Systems must recommend 179 NAC 24 compliance monitoring locations based on standard monitoring results, system specific study results, and 179 NAC 16 or 24 compliance monitoring results. Systems must follow the protocol in 179 NAC 23-008.03A through 23-008.03H. If required to monitor at more than eight locations, a system must repeat the protocol as necessary. If the system does not have existing 179 NAC 16 or 24 compliance monitoring results or if it does not have enough existing 179 NAC 16 or 24 compliance monitoring results, it must repeat the protocol, skipping the provisions of 179 NAC 23-008.03C and 23-008.03G as necessary, until it has identified the required total number of monitoring locations.

23-008.03A Location with the highest TTHM LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03B Location with the highest HAA5 LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03C Existing 179 NAC 16 average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water

systems) with the highest HAA5 LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03D Location with the highest TTHM LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03E Location with the highest TTHM LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03F Location with the highest HAA5 LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03G Existing 179 NAC 16 average residence time compliance monitoring location (maximum residence time compliance monitoring location for ground water systems) with the highest TTHM LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.03H Location with the highest HAA5 LRAA not previously selected as a 179 NAC 24 monitoring location.

23-008.04 A system may recommend locations other than those specified in 179 NAC 23-008.03 if it includes a rationale for selecting other locations. If the Department approves the alternate locations, the system must monitor at these locations to determine compliance under 179 NAC 24.

23-008.05 A system's recommended schedule must include 179 NAC 24 monitoring during the peak historical month for TTHM and HAA5 concentration, unless the Department approves another month. Once a system has identified the peak historical month and if it is required to conduct routine monitoring at least quarterly, it must schedule 179 NAC 24 compliance monitoring at a regular frequency of every 90 days or fewer.