TITLE 179 PUBLIC WATER SYSTEMS

CHAPTER 17 INTERIM ENHANCED SURFACE WATER TREATMENT (SYSTEMS SERVING 10,000 OR MORE PEOPLE)

17-001 SCOPE AND AUTHORITY: This chapter applies to surface water and ground water under the direct influence of surface water systems serving at least 10,000 people, beginning January 1, 2002, unless otherwise specified in 179 NAC 17. The authority is found in Neb. Rev. Stat. §§ 71-5301 to 71-5313.

17-002 GENERAL REQUIREMENTS

17-002.01 These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under 179 NAC 13. The regulations in this chapter establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: *Giardia lamblia*, viruses, heterotrophic plate count bacteria, *Legionella*, *Cryptosporidium*, and turbidity. Each surface water system or ground water under the direct influence of surface water system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in 179 NAC 13-003. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

1. At least 99% (2-log) removal of *Cryptosporidium* between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or *Cryptosporidium* control under the wellhead protection program for unfiltered systems.

2. Compliance with the profiling and benchmark requirements under the provisions of 179 NAC 17-004.

17-002.02 A public water system subject to the requirements of 179 NAC 17 is considered to be in compliance with the requirements of 179 NAC 17-002.01 if:

1. It meets the requirements for avoiding filtration in 179 NAC 13-004 and 179 NAC 17-003 and the disinfection requirements in 179 NAC 13-005 and 17-004; or

2. It meets the applicable filtration requirements in either 179 NAC 13-006 or 179 NAC 17-005 and the disinfection requirements in 179 NAC 13-005 and 179 NAC 17-004.

17-002.03 Systems are not permitted to begin construction of uncovered finished water storage facilities.

17-002.04 Systems using surface water or ground water under the direct influence of surface water that did not conduct optional monitoring under 179 NAC 17-004 because they served fewer than 10,000 persons when such monitoring was required, but serve more than 10,000 persons prior to January 14, 2005 must comply with 179 NAC 17-002, 17-003, 17-005, 17-006, and 17-007. These systems must also consult with the Director to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in 179 NAC 17-004.03A items 1 through 3 must consult with the Director prior to making such change.

17-002.05 All surface water systems must provide filtration.

17-003 CRITERIA FOR AVOIDING FILTRATION: In addition to the requirements of 179 NAC 13-004, a public water system using groundwater under the direct influence of surface water, subject to the requirements of this chapter that does not provide filtration must meet all of the conditions of 179 NAC 17-003.01 and 17-003.02.

17-003.01 Site-Specific Conditions: In addition to site-specific conditions in 179 NAC 13-004.02, systems must maintain a wellhead protection program under 179 NAC 13-004.02B to minimize the potential for contamination by *Cryptosporidium* oocysts in the source water. The wellhead protection program must, for *Cryptosporidium*:

1. Identify wellhead protection area characteristics and activities which may have an adverse effect on source water quality, and
2. Monitor the occurrence of activities which may have an adverse effect on source water quality.

17-003.02 During the onsite inspection conducted under the provisions of 179 NAC 13-004.02C, the Department will determine whether the wellhead protection program established under 179 NAC 13-004.02B is adequate to limit potential contamination by *Cryptosporidium* oocysts. The adequacy of the program must be based on the comprehensiveness of the wellhead protection review; the effectiveness of the system's program to monitor and control detrimental activities occurring in the wellhead protection area; and the extent to which the water system has maximized land ownership and/or controlled land use within the wellhead protection area.

17-004 DISINFECTION PROFILING AND BENCHMARKING

17-004.01 Determination of Systems Required to Profile: A public water system subject to the requirements of 179 NAC 17 must determine its total trihalomethane (TTHM)

annual average using the procedure in 179 NAC 17-004.01A and its five haloacetic acids (HAA5) annual average using the procedure in 179 NAC 17-004.01B. The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.

17-004.01A The TTHM annual average must be the annual average during the same period as is used for the HAA5 annual average.

17-004.01A1 Those systems that collected data under the provisions of the Information Collection Rule must use the results of the samples collected during the last four quarters of required monitoring. The Department will approve any data, location, handling, and analytical requirements submitted from previous testing.

17-004.01B The HAA5 annual average must be the annual average during the same period as is used for the TTHM annual average.

17-004.01B1 Those systems that collected data under the provisions of the Information Collection Rule must use the results of the samples collected during the last four quarters of required monitoring. The Department will approve any data, location, handling, and analytical requirements submitted from previous testing.

17-004.01C The system may request that the Department approve a more representative annual data set than the data set determined under 179 NAC 17-004.01A or 17-004.01B for the purpose of determining applicability of the requirements of this section.

17-004.01D The Department may require that a system use a more representative annual data set than the data set determined under 179 NAC 17-004.01A or 17-004.01B for the purpose of determining applicability of the requirements of 179 NAC 17-004.02.

17-004.01E Any system having either a TTHM annual average >0.064 mg/L or an HAA5 annual average >0.048 mg/L during the period identified in 179 NAC 17-004.01A and 17-004.01B must comply with 179 NAC 17-004.02.

17-004.02 Disinfection Profiling

17-004.02A Any system that meets the criteria in 179 NAC 17-004.01E must develop a disinfection profile of its disinfection practice for a period of up to three years.

17-004.02B The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 13.1-13.6, 13.7, and 13.8 of 179 NAC 13-007.02 as appropriate, through the entire treatment plant. As a minimum, the system with a

single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in 179 NAC 17-004.02B items 1 to 4. A system with more than one point of disinfectant application must conduct the monitoring in 179 NAC 17-004.02B Items 1. to 4. for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in 179 NAC 13-007.01 as follows:

1. The temperature of the disinfected water must be measured once per day at each residual disinfectant concentration sampling point during peak hourly flow.

2. If the system uses chlorine, the pH of the disinfected water must be measured once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow.

3. The disinfectant contact times ("T") must be determined for each day during peak hourly flow.

4. The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection must be measured each day during peak hourly flow.

17-004.02C In lieu of the monitoring conducted under the provisions of 179 NAC 17-004.02B to develop the disinfection profile, the system may elect to meet the requirements of 179 NAC 17-004.02C1. In addition to the monitoring conducted under the provisions of 179 NAC 17-004.02B to develop the disinfection profile, the system may elect to meet the requirements of 179 NAC 17-004.02C2.

17-004.02C1 A PWS that has three years of existing operational data may submit those data, a profile generated using those data, and a request that the Department approve use of those data in lieu of monitoring. The Department will determine whether these operational data are substantially equivalent to data collected under the provisions of 179 NAC 17-004.02B. These data must also be representative of *Giardia lamblia* inactivation through the entire treatment plant and not just of certain treatment segments. Until the Department approves this request, the system is required to conduct monitoring under the provisions of 179 NAC 17-004.02B.

17-004.02C2 In addition to the disinfection profile generated under 179 NAC 17-004.02B, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of 179 NAC 17-004.03. The Department will determine whether these operational data are substantially equivalent to data collected under the provisions of 179 NAC 17-004.02B. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.

17-004.02D The system must calculate the total inactivation ratio as follows:

1. If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment based on either of the following methods:

   a. Determine one inactivation ratio $CTcalc/CT_{(99.9)}$ before or at the first customer during peak hourly flow.

   b. Determine successive $CTcalc/CT_{(99.9)}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining $CTcalc/CT_{(99.9)}$ for each sequence and then adding the $CTcalc/CT_{(99.9)}$ values together to determine ($\Sigma CTcalc/CT_{99.9}$).

2. If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CTcalc/CT_{99.9}$) value of each segment and [$\sum(CTcalc/CT_{99.9})$] must be calculated using the method in 179 NAC 17-004.02D item 1.

3. The system must determine the total logs of inactivation by multiplying the value calculated in 179 NAC 17-004.02D item 1 or 2 by 3.0.

17-004.02E A system that uses either chloramines or ozone for primary disinfection must also calculate the logs of inactivation for viruses using a method approved by the Department.

17-004.02F The system must retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the Department for review as part of sanitary surveys conducted by the Department.

17-004.03 Disinfection Benchmarking

17-004.03A Any system required to develop a disinfection profile under the provisions of 179 NAC 17-004.01 and 17-004.02 and that decides to make a significant change to its disinfection practice must consult with the Department prior to making such change. Significant changes to disinfection practice are:

1. Changes to the point of disinfection;
2. Changes to the disinfectant(s) used in the treatment plant; and
3. Changes to the disinfection process.

17-004.03B Any system that is modifying its disinfection practice must calculate its disinfection benchmark using the following procedure:

1. For each year of profiling data collected and calculated under 179 NAC 17-004.02, the system must determine the lowest average monthly *Giardia lamblia* inactivation in each year of profiling data. The system must determine the average *Giardia lamblia* inactivation for each calendar month for each year of profiling data by dividing the sum of daily *Giardia lamblia* of inactivation by the number of values calculated for that month.

2. The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of *Giardia lamblia* inactivation in each year of profiling data.

17-004.03C A system that uses either chloramines or ozone for primary disinfection must also calculate the disinfection benchmark for viruses using a method approved by the Department.

17-004.03D The system must submit the following information to the Department as part of its consultation process:

1. A description of the proposed change;
2. The disinfection profile for *Giardia lamblia* (and, if necessary, viruses) under 179 NAC 17-004.02 and benchmark as required by 179 NAC 17-004.03B; and
3. An analysis of how the proposed change will affect the current levels of disinfection.

17-005 FILTRATION: A public water system subject to the requirements of 179 NAC 17 that does not meet all of the criteria in this section and 179 NAC 13 for avoiding filtration must provide treatment consisting of both disinfection, as specified in 179 NAC 13-005.01, and filtration treatment which complies with the requirements of 179 NAC 17-005.01 or 17-005.02 or 179 NAC 13-006.02 or 13-006.03 by December 31, 2001, which is included for informational purposes only.

17-005.01 Conventional Filtration Treatment or Direct Filtration

17-005.01A For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured as specified in 179 NAC 13-007.01 and 13-007.03.

17-005.01B The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in 179 NAC 13-007.01 and 13-007.03.

17-005.01C A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the Department.

17-005.02 Filtration Technologies Other Than Conventional Filtration Treatment, Direct Filtration, Slow Sand Filtration, or Diatomaceous Earth Filtration: A public water system may use a filtration technology not listed in 179 NAC 17-005.01 or in 179 NAC 13-006.02 or 13-006.03 if it demonstrates to the Department, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of 179 NAC 13-005.02, consistently achieves 99.9% removal and/or inactivation of *Giardia lamblia* cysts and 99.99% removal and/or inactivation of viruses, and 99% removal *Cryptosporidium* oocysts, and the Department approves the use of the filtration technology. For each approval, the Department will set turbidity performance requirements that the system must meet at least 95% of the time and that the system may not exceed at any time at a level that consistently achieves 99.9% removal and/or inactivation of *Giardia lamblia* cysts, 99.99% removal and/or inactivation of viruses, and 99% removal of *Cryptosporidium* oocysts.

17-006 FILTRATION SAMPLING REQUIREMENTS:

17-006.01 Monitoring Requirements for Systems Using Filtration Treatment: In addition to monitoring required by 179 NAC 13-007, a public water system subject to the requirements of 179 NAC 17 that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in 179 NAC 13-007.01 and must calibrate turbidimeters using the procedure specified by the manufacturer and by using analytical test procedures contained in *Technical Notes on Drinking Water Methods*, EPA-600/R-94-173, October 1994, which is incorporated herein by reference. This document is available from the National Technical Information Service, NTIS PB95-104766, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. The document may be inspected at the Department of Health and Human Services Regulation and Licensure, Public Health Assurance Division, 301 Centennial Mall South, Lincoln, NE 68509.

Systems must record the results of individual filter monitoring a minimum of every 15 minutes.

17-006.02 If there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.

17-007 REPORTING AND RECORDKEEPING REQUIREMENTS: In addition to the reporting and recordkeeping requirements in 179 NAC 13-008, a public water system subject to the requirements of 179 NAC 17 that provides conventional filtration treatment or direct filtration

must report monthly to the Department the information specified in 179 NAC 17-007.01 and 17-007.02 beginning January 1, 2002. In addition to the reporting and recordkeeping requirements in 179 NAC 13-008, a public water system subject to the requirements of this chapter that provides filtration approved under 179 NAC 17-005.02 must report monthly to the Department the information specified in 179 NAC 17-007.01 beginning January 1, 2002. The reporting in 179 NAC 17-007.01 is in lieu of the reporting specified in 179 NAC 13-008.02A.

17-007.01 Turbidity measurements as required by 179 NAC 17-005 must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:

1. The total number of filtered water turbidity measurements taken during the month.

2. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in 179 NAC 17-005.01 or 17-005.02.

3. The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the Department under 179 NAC 17-005.02.

17-007.02 Systems must maintain the results of individual filter monitoring taken under 179 NAC 17-006 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under 179 NAC 17-006 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under 179 NAC 17-006 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in 179 NAC 17-007.02A to 17-007.02D. Systems that use lime softening may apply to the Department for alternative exceedance levels for the levels specified in 179 NAC 17-007.02A to 17-007.02D if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

17-007.02A For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within seven days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

17-007.02B For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the

turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within seven days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.

17-007.02C For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.

17-007.02D For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the Department or a third party approved by the Department no later than 30 days following the exceedance and have the evaluation completed and submitted to the Department no later than 90 days following the exceedance.

17-007.03 Additional Reporting Requirements

1. If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system must inform the Department as soon as possible, but no later than the end of the next business day.

2. If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the Department under 179 NAC 17-005.02 for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must inform the Department as soon as possible, but no later than the end of the next business day.