

TITLE 179 PUBLIC WATER SYSTEMS

CHAPTER 22 OPERATION AND MAINTENANCE OF COMMUNITY AND NON-TRANSIENT NON-COMMUNITY PUBLIC WATER SYSTEMS

22-001 SCOPE AND AUTHORITY: These regulations establish minimum requirements for the operation and maintenance of existing community and non-transient non-community (NTNC) public water systems. The authority is found in Neb. Rev. Stat. §§ 71-5301 to 71-5313. ~~These regulations are effective for the purpose of compliance on May 1, 2004.~~

~~22-002 COMPLIANCE DATE: These regulations are effective for the purpose of compliance beginning May 1, 2004. Until that date, operation and maintenance requirements for public water systems are found in 179 NAC 2-008.~~

22-003-002 DEFINITIONS

Containment means a method of backflow prevention that requires the installation of a backflow prevention assembly, device or method at the water service main.

Department means the Division of Public Health of the Department of Health and Human Services Regulation and Licensure.

Director means the Director of ~~Regulation and Licensure~~Public Health of the Division of Public Health or his/her authorized representative.

Encroachment means a potential source of contamination located less than a specified minimum horizontal ~~separation-setback~~ distance from a public water supply source or any other likely hazards to the safety of the drinking water quality, pressure, or economies delivered by the system. Examples applicable to community water systems include but are not limited to those potential sources of contamination and minimum horizontal ~~separation-setback~~ distances identified in ~~Attachment 4 of~~ 179 NAC ~~2-0077-007.03~~. Examples applicable to NTNC water systems include but are not limited to those potential sources of contamination and minimum horizontal separation distances identified in 178 NAC 12-003.01B.

Isolation means a method of backflow prevention that requires the installation of a backflow prevention assembly, device or method at the cross-connection rather than at the service main.

22-004-003 GENERAL OPERATING REQUIREMENTS: All community and NTNC public water systems must:

1. Be operated and supervised by competent personnel possessing a ~~certificate of competency~~ Nebraska issued water operator license equal to or greater than the classification of the system ~~issued by the Director.~~
2. Assure an adequate supply of safe drinking water on a continuous basis.
3. Notify the Director of any situation with the water system which presents or may present an imminent and substantial hazard to health.

4. Flush and disinfect all newly constructed or serviced storage facilities, wells, and water mains not subject to the requirements of 179 NAC ~~2-007.02 or 2-007.047~~. Disinfection must be accomplished prior to placing the new or repaired portion of the system into service. Disinfection must be accomplished in accordance with the following methods which are incorporated herein by reference. They are available for viewing at the Division of Public Health of the Department of Health and Human Services Regulation and Licensure, Public Health Assurance Division, 301 Centennial Mall South, Lincoln, NE 68509, or they can be obtained from the American Water Works Association, 6666 West Quincey Ave., Denver, CO 80235. Alternate methods may be approved by the Director after consultation.
  - a. Water wells
    - (1) Community – C654-97
    - (2) NTNC – C654-97 or requirements of 178 NAC 12
  - b. Water Storage – C652-02
  - c. Mains – C651-99
5. Provide or have available personnel, tools, spare parts, work areas, and chemicals necessary to accomplish continuous operation of the system and providing for the safety of the water system personnel.
6. Maintain an emergency plan of operations for safeguarding the water supply, protecting the drinking water, and ~~if necessary~~, providing for an alternate drinking water supply in the event of natural or man-made disasters. The plan must include a list of individuals who may be called for help in times of disaster, their titles and their phone numbers. This critical information and emergency contact list must contain a 24-hour phone number where a person can always be reached in the event of an emergency. It must be updated annually with a copy provided to the Department no later than the last working day in February. The plan must state the basic domestic water needs and usage under normal conditions. Any special institutional, commercial or industrial users must be shown. Any special back-up or standby equipment or auxiliary power supply must be included as well as alternate sources of supply or bottled water sources. All available chemicals and equipment for the purpose of disinfection must be listed. At least every 3 years, no later than the last working day in February, the ~~The~~ emergency plan must ~~outline all emergency operations and~~ must be updated at ~~least every 3 years~~ with copies provided to the Department ~~of Health and Human Services Regulation and Licensure~~ for inclusion in the state Drinking Water Emergency plan ~~located in the Division of Public Health Assurance~~. The system's emergency plan must be placed at key locations, clearly marked and readily accessible to utility personnel.
7. Within 30 days of notification of sanitary survey deficiencies
  - a. Notify the Department in writing that the deficiencies have been corrected or
  - b. Develop and submit to the Department a corrective action plan that meets the requirements of the Department's notification of deficiencies letter.

78. Conduct an on-going program for the effective detection and elimination of cross-connections and the prevention of backflow. Such program is subject to review by the Director and must include and require:
- a. That there be no unprotected physical connection between the public water system and any pipes, pumps, hydrants, tanks, steam condensate returns, engine jackets, heat exchangers, or other water supplies whereby potentially unsafe water or contaminating materials may be discharged or drawn into the public water system unless first approved by the public water system and then by the Director.
  - b. That the public water system must install or require installation of properly located backflow prevention assemblies, devices or methods appropriate to the potential hazards enumerated in Tables 1 and 2 when such hazards exist and where, in the opinion of the public water system, effective measures consistent with a potential risk have not been taken to contain the potential contamination within the premises being served by the system by the use of either the "containment" and/or "isolation" method(s) of cross-connection control. Title 179 NAC 22-003 item ~~78~~.b. does not apply to lawn sprinkling systems, with the exception of those with provisions to inject toxic substances including lawn chemicals. A public water system that enacted provisions in its cross-connection control program requiring installation of dual check valves on residential service lines to protect the public water system from low hazard cross-connections prior to ~~[the effective date of these regulations]~~March 22, 2004 will be permitted to continue only if such installation was accomplished and maintenance of the devices is performed in accordance with the manufacturer's recommendations. Dual check valves with intermediate atmospheric vents that have been approved by one of the agencies listed in 179 NAC 22-003 item 8.g. for use on beverage dispensing machines may be used for those specific applications, provided they are maintained and repaired as recommended by the manufacturer.
  - c. That there be no interconnection with the public water system and another potable water system unless first approved by the public water system and then by the Director.

TABLE 1

**Cross-Connections Rated by Degree of Hazard for Commonly Encountered Equipment and Fixtures and Their Use**

[For a more complete list, refer to the Manual of Cross-Connection Control referenced in 179 NAC 22-003 item 78.i.(1)]

Direct or Indirect Potable Water Connections	Hazard	
	High	Low
<b>I. Subject to Back Pressure</b>		
A. Pumps, tanks and lines handling:		
1. Sewage	X	
2. Toxic substances	X	
3. Nontoxic substances		X
B. Water connection to steam and steam boiler		
1. Boiler or steam connection to toxic substances	X	
2. Boiler or steam connection to nontoxic substances (boiler blowoff through air gap)		X
<b>II. Not Subject to Back Pressure</b>		
A. Sewer-connected water line (not subject to waste stoppages)	X	
B. Low inlets to receptacles containing:		
1. Toxic substances	X	
2. Nontoxic substances		X
C. Coils or jackets used as heat exchangers in compressors in lines carrying:		
1. Sewage	X	
2. Toxic substances	X	
3. Nontoxic substances		X
D. Flush valve toilets or urinals	X	
E. Toilet, urinal tanks and approved bathtubs		X
F. Bidets, sitz tanks, or spa, therapy and roman pools not otherwise isolated by design or backflow protectors	X	
G. Valved outlets or fixtures with hose attachments that may constitute a cross-connection to:		
1. Toxic substances	X	
2. Nontoxic substances		X
H. Aspirators that may constitute a cross-connection to:		
1. Toxic substances	X	
2. Nontoxic substances		X

TABLE 2

**Permitted Backflow Assemblies, Devices and Methods**

Assembly, Device or Method <sup>1</sup>	Degree of Hazard				Installation <sup>2,3,4,6</sup>
	Low		High		
	Back Siph-onage	Back Pres-sure	Back Siph-onage	Back Pres-sure	
Air Gap	X	X	X	X	Must be a minimum of 1 inch but not less than 2 times the diameter of the effective spout opening when not affected by side walls, and 3 times the diameter of the effective opening when affected by side walls. Side walls will be assumed to not affect air gaps when they are spaced horizontally a distance greater than 4 times the effective opening from the spout opening.
Atmospheric Vacuum Breaker	X		X		Upright position. No valves downstream. Minimum of 6 inches or listed distance above all downstream piping & flood level rim of receptor <sup>5</sup>
Double Check Valve Assembly	X	X			Horizontal unless otherwise listed. Requires 1 foot below & sufficient side & head room for testing & maintenance with a maximum of 5 feet above the ground, work floor, or a permanently installed working platform with stairs or ladder affixed. Does not discharge water during normal operation.
Pressure Vacuum Breaker Assembly	X		X		Upright position. May have valves downstream. Minimum of 12 inches above all downstream piping & flood level rim of receptor. May discharge water.
Reduced Pressure Principle Backflow Prevention Assembly	X	X	X	X	Same as Double Check Valve Assembly above except may discharge water & wherever installed, provision for draining away at least 2 times the rated gallons per minute of the assembly must be made.

Footnotes:

<sup>1</sup> For description of assemblies and devices, refer to the Cross-Connection Control Standards found in 179 NAC 22-003 item 78.i. Backflow preventers described herein and in the standards as "assemblies" must be installed as assemblies keeping the shutoff valves intact. Examples of sites having potential cross-connections are found in the manuals referenced in 179 NAC 22-003 item 78.i.

- <sup>2</sup> Previous approval by the public water system is required for use of a pit or vault (normally prohibited due to possible flooding) or for parallel and bypass installations (normally prohibited without special design considerations and proper cross-connection controls).
- <sup>3</sup> Backflow preventers must not be located in any area containing fumes that are toxic, poisonous or corrosive; nor in any area in which they could be damaged by freezing, or by excessively high temperatures or pressures, vibration, physical impact or structural stress; nor knowingly be allowed to conduct highly corrosive or sandy waters without a special testing and maintenance program to assure proper & safe operation.
- <sup>4</sup> Refer to general and specific installation requirements as stated in the Cross-Connection Control Standards provided for in 179 NAC 22-003 item ~~78~~.i.(1) for conditions or situations not otherwise covered in these regulations.
- <sup>5</sup> Not to be subjected to operating pressure for more than 12 hours in any 24-hour period. Hose bibb vacuum breakers are permitted for some uses described in the Cross-Connection Control Standards listed in 179 NAC 22-003 item ~~78~~.i.(1). Where required under 179 NAC 22-003 item ~~78~~.b., hose bibbs must be protected with approved, anti-siphoning hose bibb vacuum breakers or a hose bibb with integral backflow protection. In hose bibb installations subject to freezing, such hose bibb vacuum breakers must be frost-proof and self-draining.
- <sup>6</sup> Fire protection systems as a minimum must be equipped with backflow prevention devices as described in AWWA Manual M-14, second edition. Backflow preventers under this regulation and connected to fire protection systems must be considered part of those systems. As such, they must not be installed, moved, removed, replaced, shut off or in any way altered unless in strict compliance with the rules and regulations promulgated by the State Fire Marshal.
  - d. That all backflow ~~protection-prevention devices-assemblies~~ equipped with test ports be tested as often as required by the public water system but at least once each year by a Grade 6 ~~certified-licensed~~ water operator, with test results certified to the public water system as often as required by the public water system, but in no case more than 30 calendar days after the test. Title 179 NAC 22-003 item ~~78~~.d. does not apply to lawn sprinkling systems, with the exception of those with provision to inject toxic substances including lawn chemicals.
  - e. That no less often than every five years the public water system ~~require-send a survey to its consumersthe owner/tenant of every active service connection to complete and return to the system. The survey must~~ to assess and report potential backflow hazards on the ~~ir premises, no less often than every five years and to take any steps necessary for protection of public health and safety as reasonably requested by the public water system. Systems must obtain a 60% return of the surveys for residential services and 90% for non-residential services, during each five year survey cycle. On subsequent five year survey cycles, additional effort must be made to obtain a survey from service connections that have not submitted a survey back to the public water system during the previous five year cycle. The public water system must be properly protected from any cross-connection identified through the survey process or any other means, as described in 179 NAC 22-003 items 8 through 8i(2). If a system implements the containment method for backflow~~

prevention, the system is not required to send surveys to owners/tenants of service connections which are properly protected by an appropriate backflow preventer located on the main service line(s) and where the backflow preventer is properly tested and/or maintained according to 179 NAC 22-003 items 8(d) and (i). The service connections which are properly protected but not surveyed may be counted in the total number of surveys returned to the system for meeting the 60%/90% required return rate.

- f. That the public water system must maintain, or cause to be maintained, records of locations, types, tests and repairs of backflow preventers for a period of five years of said tests and repairs.
- g. That backflow preventers required by this regulation must have been tested and approved or listed for the intended use by one of the following organizations:
- (1) Foundation for Cross-Connection Control and Hydrologic Research, University of Southern California, University Park, Kaprielian Hall 200, Los Angeles, California 90089, Ph: (213) 740-2032.
  - (2) American National Standards Institute (headquarters), 1430 Broadway, New York, New York 10018-1819 L Street, NW, 6<sup>th</sup> floor, Washington, DC 20036, Ph: 202-293-8020.
  - (3) Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, Illinois 60062-2600 N.W. Lake Rd., Camas, WA 98607-8542, Ph: 877-854-3577.
  - (4) ~~National Sanitation Foundation~~ NSF International, 2355 West Stadium Boulevard, P.O. Box 1468 P.O. Box 130140, 789 N. Dixboro Road, Ann Arbor, Michigan 48106-48113-0140, Ph. 800-673-6275.
  - (5) International Association of Plumbing and Mechanical Officials, 5032 Alhambra Avenue, Los Angeles 4755 E. Philadelphia St., Ontario, California 90032-91761, Ph: 909-472-4100.
- h. ~~That~~ No less often than once per year an on-going public information program must be conducted by the public water system to further the public water system customers' understanding and awareness of cross-connection hazards, the types of remedies available and the need to protect the public water system against backflow ~~no less often than once per year~~.
- i. That approval of Cross-Connection Control Programs (including as a minimum, backflow preventers, their installation, operation, testing, maintenance and repair) must be based on the following standards unless otherwise specified in 179 NAC 22-003 items 8.a through 8.i.

- (1) Manual of Cross-Connection Control, published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, ninth edition, a copy of which is available for viewing at the ~~Office of the~~Division of Public Health of the Nebraska Department of Health and Human Services ~~Regulation and Licensure, Public Health Assurance Division~~, 301 Centennial Mall South, Lincoln, NE 68509. Said manual may be obtained from the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California, KAP-200 University Park MC-2531, Los Angeles, CA 90089-2531.
- (2) American Water Works Manual, M-14, second edition, a copy of which is available for viewing at the ~~Office of the~~Division of Public Health of the Nebraska Department of Health and Human Services ~~Regulation and Licensure, Public Health Assurance Division~~, 301 Centennial Mall South, Lincoln, NE 68509. Said manual may be obtained from the American Water Works Association, 6666 West Quincey Ave., Denver, CO 80235.

~~22-005-004~~ GENERAL MAINTENANCE: All community and NTNC public water systems must adopt and carry out a preventive maintenance program incorporating the following elements:

1. Secure all water system facilities in a manner that protects the supply from contamination and prevents unauthorized entry and vandalism.
2. Inspection, servicing, replacement, and record keeping of all mechanical equipment in accordance with manufacturer's recommendations for such maintenance. An operation and maintenance manual must be maintained and updated when facility equipment changes occur. The operation and maintenance manual must include specification of equipment and recommended maintenance practices of that equipment as specified by the manufacturers. Where no maintenance recommendations or schedules are provided by the manufacturer of equipment, the maintenance recommendations and schedules deemed to be best operation and maintenance practices by the equipment supplier and/or the American Water Works Association must be incorporated in the operation and maintenance manual.
3. Prevention of rust and corrosion by application of paint, protective coatings, cathodic protection, or other treatment capable of prolonging the useful life of the system.
4. Maintaining a system of records in order to
  - a. Evaluate the system, and
  - b. for the owner's annual review of the capability of the source of supply, treatment, storage, and distribution facilities. Annually review and update the system's to provide for future service demands both short-term (2 year) and long-term (2 and 10 year plans); plans (which must be kept 10 years).
5. Take all available action as necessary, within the system's legal capability, to protect the system and its components from encroachments which are likely hazards to the safety of the drinking water quality, or which could have a substantial

impact on the system pressure or economies delivered by the system. Such action includes the adoption of ordinances, regulations, contracts, or other enforceable instruments necessary to ensure adequate protection from such encroachments. This may include issues such as zoning, water rights, condemnation, land purchases, easements, abandonment of old wells, and establishing lakes, lagoons, drainage ways, special use areas, and sanitary and water districts.

6. Have ~~arrangements made for obtaining disinfection on-site~~ the equipment necessary to apply emergency disinfection in the event of any situation which presents a ~~within 24 hours of an incident that potentially impacts the~~ microbiological quality threat to the quality of the drinking water.
7. If the system disinfects, have available equipment for accurate measurement of disinfectant residual that provides numeric results that do not require interpretation. The testing equipment must be standardized at least once annually or as often as recommended by the manufacturer of the equipment.

~~22-006—005~~ WELLS AND PUMPING FACILITIES: All NTNC public water systems must comply with the first four of the following items. All community public water systems must comply with all the following items.

1. Maintain ~~a sanitary seal on~~ each wellhead in a sealed and sanitary condition.
2. Seal cracks and crevices to prevent entry of vermin, flooding, or other contaminants.
3. Maintain down-turned well casing vents, and where applicable, air release/vacuum relief valves, with 24-mesh corrosion resistant screens.
4. Tightly seal all penetrations into the upper terminus of the well casing.
5. Maintain a means to pump each well to waste.
6. Provide a labeled, dedicated electrical outlet, in each appropriate location for chemical feed equipment.
7. Have a chemical tap available on the finished water discharge line located downstream from the check valve.
8. For systems that are required to disinfect on a continuous basis and have treatment facilities that are not staffed 24 hours per day, the system must provide a means by which a disinfectant is applied accurately on a continuous basis. This does not apply to systems under an Administrative Order that require chlorination for only six months.
9. Record accurate measurement of gallons of water pumped per minute (gpm) and the time pumped or total gallons pumped, for each well not less than once per week.
10. Measure and record static water levels and pumping water levels, and calculate available drawdown in each active well at a frequency of no less than once every three months from October 1 through April 30 of each year, and at a frequency of no less than once per month from May 1 through September 30 of each year. Static and pumping levels must be expressed as the distance in feet from the measuring point at the upper terminus of the well to the water level in the well. Available drawdown must be expressed as the distance in feet between the static water level and the top of the well screen or pump intake whichever is located nearer to the static water level.
11. Have on-site or have a written signed agreement for a readily accessible auxiliary power source to provide a supply of safe drinking water for emergency use ~~within 24 hours.~~

12. Provide and maintain on the premises signage for emergencies and chemical hazards in accordance with 179 NAC 22 Attachment 1.
13. Maintain clean well houses and pumping facilities for the purpose of producing safe drinking water with the emphasis on easy access to those system components requiring periodic attention.

~~22-007-006~~ DISTRIBUTION SYSTEMS: All community and NTNC public water systems must:

1. Operate to maintain a minimum positive pressure of 20 psi throughout the distribution system except under extraordinary conditions such as unusual peak fire flow demand or major distribution system breaks.
2. Maintain an up-to-date map of the distribution system showing locations, sizes and materials of underground lines and appurtenances.
3. ~~Following a drop in system pressure to less than 20 psi, but maintaining a positive pressure, collect a minimum of two water samples at least 24 hours apart from each affected zone on the sample site plan. All samples must be collected within five working days of the recorded drop in system pressure and submitted for analysis to the Department Laboratory or to a laboratory that has entered into an agreement with the Department pursuant to 179 NAC 3-009. If any samples collected pursuant to the requirements of 179 NAC 22-006 item 3 show the presence of coliform organisms, disinfection procedures must be accomplished in accordance with AWWA Standard C651-99. Alternate disinfection procedures may be used after consultation with and approval by the Director. If used, alternate disinfection procedures must continue until collection of water samples as prescribed in 179 NAC 22-006 item 3 show the complete absence of coliform organisms. When system pressure drops to less than 20 psi, but is still positive, the system must do one of the following:~~
  - a. Immediately initiate a disinfection process utilizing procedures substantial to produce and maintain a minimum free chlorine residual of 0.2 mg/L or a total chlorine residual of 0.5 mg/L in the distribution system at the maximum residence time location(s) for at least 48 consecutive hours. Following completion of the disinfection process and return of water quality to that found during normal operations, a PWS must collect one sample from each affected coliform sampling zone within seven calendar days from the date of pressure drop. All samples must show the absence of coliform organisms or the PWS must again apply disinfection and resample as described herein until a sample shows the absence of coliform organisms, or
  - b. Collect a minimum of two samples from each affected coliform sampling zone. The samples must be collected at least 24 hours apart. All samples must be collected within five working days of the recorded reduced system pressure and submitted for analysis to the Department Laboratory or a laboratory that has entered into an agreement with the Department pursuant to 179 NAC 3-009. If any samples collected pursuant to the requirements of this paragraph show the presence of coliform organisms,

disinfection procedures must be accomplished in accordance with item a above.

4. ~~When system pressure is completely lost, collect a minimum of two sets of five samples from each affected zone on the sample site plan. Each set must be collected at least 24 hours apart. All samples must be collected within five working days of the recorded complete loss in system pressure and submitted for analysis to the Department Laboratory or a laboratory that has entered into an agreement with the Department pursuant to 179 NAC 3-009. If any samples collected pursuant to the requirements of 179 NAC 22-006 item 4 show the presence of coliform organisms, disinfection procedures must be accomplished in accordance with AWWA Standard C651-99. Alternate disinfection procedures may be used after consultation with and approval by the Director. If used, emergency disinfection procedures must continue until collection of water samples as prescribed in 179 NAC 22-006 item 4 show the complete absence of coliform organisms.~~ the system must do one of the following:

- a. Immediately initiate a disinfection process utilizing procedures substantial to produce and maintain a minimum free chlorine residual of 0.2 mg/L or a total chlorine residual of 0.5 mg/L in the distribution system at the maximum residence time location(s) for at least 48 consecutive hours. Following completion of the disinfection process and return of water quality to that found during normal operations, a PWS must collect one set of five samples from each affected coliform sampling zone within seven calendar days from the date of pressure loss. All samples must show the absence of coliform organisms or the PWS must again apply disinfection and resample as described herein until all five samples from each set of samples show the absence of coliform organisms,  
or

- b. Collect a minimum of two sets of five samples from each affected coliform sampling zone. Each set must be collected at least 24 hours apart. All samples must be collected within five working days of the recorded complete loss in system pressure and submitted for analysis to the Department Laboratory or a laboratory that has entered into an agreement with the Department pursuant to 179 NAC 3-009. If any samples collected pursuant to the requirements of this paragraph show the presence of coliform organisms, disinfection procedures must be accomplished in accordance with item a above.

~~22-008—007~~ **POTABLE WATER STORAGE FACILITIES:** All community and NTNC public water systems must:

1. ~~Inspect~~Perform an internal inspection, and clean if necessary, water storage facilities equipped for accessibility (those that have minimum oval openings of 24" x 18", round with 24" diameter, square openings of 20" per side, or rectangular openings of 24" x 18"), no less than once every five years. Storage facilities equipped with a smaller inspection opening must be inspected by visual observation from the opening of the facility.
2. Secure the storage facility by use of locks on access manholes and hatches, and take other necessary precautions to prevent trespassing, vandalism, and sabotage.

3. Provide and maintain corrosion resistant screen of an effective mesh size on water storage structure vents. Screen mesh size must be proper for the vent design. Replace when necessary with in-kind screen.
4. Maintain water tightness, as designed, of walls, floor, and roof to prevent the entrance of nonpotable water, birds, and other contaminant sources.
5. Provide and maintain a corrosion resistant screen of effective mesh size and/or a self-closing flap valve installed near or at the termination of all overflow lines on water storage structures. Screen mesh size and flap valves must be proper for the overflow line design. Replace when necessary with in-kind screen and/or flap valve. The termination point of the overflow lines must be maintained so that overflow discharge does not create, or contribute to, an erosion problem.

22-009-008 TREATMENT: All community and NTNC public water systems that use a process for removal of a primary or secondary contaminant, or apply chemicals for the purpose of conditioning, continuous disinfection, or adjustment of drinking water quality must:

1. Maintain and record accurate measurement of chemical use no less often than five days per week. Accurate measurement must demonstrate that the chemical is being applied within +/- 10% of the Department approved design application rate.
  - a. A system need not measure and record the amount (pounds/gallons) of chlorine added if the system uses chlorine as a disinfectant and measures and records the disinfectant residual at least five days a week
    - (1). At or near the point(s) of entry to the distribution system and
    - (2) At or near the point of maximum residence time in the distribution system.
  - b. Likewise, if a system adds fluoride and measures and records the fluoride content of the water at or near each point of application or common point of entry in the distribution system where the water is representative of the water in the system at least five days per week, the system need not measure the amount (pounds/gallons) of fluoride added.
2. If sampling is to be used in lieu of measuring the amount (pounds/gallons) of chlorine or fluoride added, a sampling plan must be submitted for review and approval by the Department.
23. Provide an ammonia solution for use in detecting chlorine leaks when gas chlorination is used.
34. Store chemicals in accordance with manufacturer's recommendations for chemical compatibility, and dispose of any stored chemicals that have exceeded their expiration date or have degraded to a point of ineffectiveness (for example, sodium hypochlorite or calcium hypochlorite).
45. Maintain color coding in accordance with the following color scheme, or utilize other identification to easily differentiate between pipes.

**Water Lines**

Raw	Olive Green
Settled or Clarified	Aqua
Finished or Potable	Dark Blue

**Chemical Lines**

Alum or Primary Coagulant	Orange
Ammonia	White
Carbon Slurry	Black
Caustic	Yellow with green band
Chlorine (gas and solution)	Yellow
Fluoride	Light blue with red band
Lime Slurry	Light green
Ozone	Yellow with orange band
Phosphate Compounds	Light green with red band
Polymers or Coagulant Aids	Orange with green band
Potassium Permanganate	Violet
Soda Ash	Light green with orange band
Sulfuric Acid	Yellow with red band
Sulfur Dioxide	Light green with yellow band

**Waste Lines**

Backwash Waste	Light brown
Sludge	Dark brown
Sewer (sanitary or other)	Dark gray

**Other**

Compressed Air	Dark green
Gas	Red
Other Lines	Light gray

56. Where applicable, maintain operational records and filtration log used in conjunction with treatment processes used for removal or inactivation of regulated contaminants for a minimum of five years.
67. If disinfecting or fluoridating, provide approved methodology equipment for accurate measurement of ~~disinfectant residual~~ chemical content that provides numeric results that do not require human interpretation. The testing equipment must be standardized at least once annually or as often as recommended by the manufacturer of the equipment.
78. When treating to remove or inactivate regulated contaminants, provide proper test equipment to determine process control changes. For contaminants that are not regulated, perform process control tests at least weekly.

- 89. For systems that are required to disinfect on a continuous basis and have treatment facilities that are not staffed 24 hours per day, the system must provide a means by which a disinfectant is applied accurately on a continuous basis. This does not apply to systems under an Administrative Order that require chlorination for only six months.
- 910. Record accurate measurement of gallons of water pumped per minute (gpm) and the total time pumped or total gallons pumped of each treatment plant not less than once per week.
- 4011. Provide functional operational controls for each filter used in conjunction with treatment processes ~~consisting of removal of regulated contaminants~~.

#### 22-010-009 RECORDS

1. All community and NTNC public water systems must maintain the following records for a minimum of five years:
  - a. Written public health-oriented customer complaints (who, what, where, when) related to water quality, quantity, pressure and system integrity.
  - b. Water main repair and replacement records, including results of special samples collected for microbiological water quality analysis, and disinfection method associated with repair and replacement.
  - c. Chemical use, where applicable.
  - d. Records of process control test results, test equipment quality assurance, and quality control.
2. All community and NTNC public water systems must maintain records pertaining to cleaning, inspection, repair, and protective coatings on water storage facilities for a minimum of 20 years.

**179 NAC 22 -- Attachment 1**

This attachment prescribes the minimum hazardous material signage that water system facilities must place on entrances to chemical storage facilities as well as on bulk chemical storage containers and chemical day tanks.

- I. **Entrances to water system facilities and/ or rooms within water system facilities that store or use hazardous chemicals as part of the treatment process:**  
Precautionary entrance labeling identifying the hazardous chemical: This labeling shall contain the following.
- A. Common name of the chemical
  - B. A signal word such as "WARNING" or "DANGER" as described below.
    - 1. Signs depicting "WARNING" must be yellow with black lettering to identify a potentially hazardous situation.
    - 2. Signs depicting "DANGER" must have the word "DANGER" highlighted on a bright red background and be used for conditions that indicate an immediately hazardous situation.
  - C. Identification of the key hazard such as flammable or vapor harmful, etc.
  - D. A statement of precaution to avoid the hazards.
  - E. A color-coded diamond that readily distinguishes the degree of emergency health hazard (blue), fire hazard (red), reactivity hazard (yellow), and any other special hazards the chemical may represent. The following describes the appropriate labeling conditions.

**FIRE HAZARD -----RED**

0 --- WILL NOT BURN

1 --- WILL IGNITE IF PREHEATED

2 --- WILL IGNITE IF MODERATELY HEATED

3 --- WILL IGNITE AT MOST AMBIENT CONDITIONS

4 -- BURNS READILY AT AMBIENT CONDITIONS

**HEALTH HAZARD -----BLUE**

- 0 --- MINIMAL HAZARD
- 1 --- SLIGHTLY HAZARDOUS
- 2 --- HAZARDOUS
- 3 – EXTREME DANGER
- 4 – DEADLY

**REACTIVITY HAZARD ---- YELLOW**

- 0 – STABLE AND DOES NOT REACT WITH WATER
- 1 – UNSTABLE IF HEATED
- 2 – VIOLENT CHEMICAL CHANGE
- 3 – SHOCK AND HEAT MAY DETONATE
- 4 – READILY CAPABLE OF DETONATION AT NORMAL TEMPERATURE AND PRESSURE

**SPECIFIC HAZARDS – WHITE**

- OX --- OXIDIZER
- ACID --- ACID
- ALK --- ALKALINE
- COR – CORROSIVE
- ~~W~~ – REACTIVE WITH WATER



RADIOACTIVE

- F. All the above information can be obtained from the chemical Material Safety Data Sheets (MSDS) for each chemical. The public water system must retain the most current copy of all MSDS(s) for all chemicals used in the treatment of potable water and have the MSDS located in an area so that they are available and accessible to all water operators and facility personnel.

- G. All signage installed on entrances to water treatment facilities or rooms within the facilities must be located so that signage is readily visible to individuals entering the facility or rooms within the facility.

**II. LABELING OF BULK TANK CHEMICAL STORAGE AND OR DAY-TANK CHEMICAL STORAGE**

- A. All bulk chemical storage tanks must be labeled as follows:
  - 1. The common name of the chemical
  - 2. The appropriate color-coded diamond with four quadrants designating the degree of emergency health hazard (blue), fire hazard (red), reactivity hazard (yellow), and any other special hazards as designated in the remaining quadrant (white). The coding for each hazard is described in 179 NAC 22 Attachment 1 item I.E.. The size of characters in this signage must be a minimum of 4 inches tall and placed so that the signage is visible from 200 feet away.
- B. All day-tank chemical storage tanks are to be labeled in the same manner as described above with the signage characters a minimum of 3 inches in height and signage placed so it is visible a minimum of 100 feet away.