Clearinghouse Rule 22-074

The statement of scope for this rule, SS 037-21, was approved by the Governor on April 15, 2021, published in Register No. 784A3 on April 19, 2021, and approved by the Natural Resources Board on June 23, 2021. This rule was approved by the Governor on insert date.

ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD
REPEALING, RENUMBERING, RENUMBERING AND AMENDING, AMENDING, REPEALING AND RECREATING AND CREATING RULES

The Wisconsin Natural Resources Board proposes an order to **repeal** NR 811.39 (2) (e) 2., 811.48 (5) (e), 811.52 (1) (d) 1., 2., 3., 811.56 (1) (f), 811.57 (2) (j) 7. (Note), 811.58 (1) (e), 811.64 (4) (c) 1., (10) (i) (Note) and (16) (b); to **renumber** NR 811.02 (1), 811.232 (4) and 811.64 (4) (c) 2.; to **renumber and amend** NR 811.08 (3), 811.09 (1) (h) 2., 811.12 (11), (12) and (13), 811.21, 811.232 (intro.) (1), (2), (3), 811.39 (2) (e) 3., 811.40 (1) (n), 811.52 (1) (d) (intro.), 811.75 (1) (a) and 811.85; to **amend** NR 811.12 (1) (c) and (d) 1., 811.12 (5) (intro.), (a), (d) 9., (7) (b), (c), (h), (10) (c), (12) (f), (14) (a) 1., 15 (a) and (Note), 811.13 (1) (intro.), (a), (b), (c), (2), (3), (4) (title), (a), (c), (d), (5), (6) (intro.), (a), (7) (intro.), (a), (d), (e) 2. and (8), 811.14 (5), 811.19 (3) and (5), 811.21 (1) (intro.), (b), (e) and (2) (a), 811.22 (3), 811.23 (1) (f), 811.231 (2) (d) and (g), 811.27 (1) (c), 811.28 (5) (b), 811.29, 811.31 (2) (b), 811.34 (6) (e), 811.36 (1) (a), 811.37 (1), (4) (Note), (5) (a) and (b) 2., 811.39 (2) (e) (intro.), (f) 1., 2. (Note), (3) (d), (6) (a) to (d) and (7) (f), 811.40 (1) (d), (1) (g) and (j), 811.43 (1), (4), 811.45 (1) (e), 811.47 (intro.) and (7) (b) 1., 811.48 (1) (a) 2., 3., 4., (1) (b), (4) (title), (5) (title), (6) (b), (7) (a), 811.49 (1) (b), (c), (f) 6. b. and (j) 1., 811.50 (3), 811.51 (1) (c), (2) (a), (3) (h), 811.52 (3) (d), 811.53 (2) (e) 7., 811.54 (2) (d) 2., 811.55 (2) (c), 811.57 (2), (j) 3., 4., 811.60 (intro.), 811.60 (3) and (5) (c), 811.61 (7), 811.63 (5) (a) and (b), 811.64 (1) (a), (3) (a) 2., 3., (4) (a) 1., 3., 5., (4) (d) 1., (7) (a), (b), (8) (c), (10) (i) and (16) (c), 811.68 (2), (3), 811.69 (1), (3), 811.70 (1), (4), (9), 811.71 (1), (5), (7), 811.72 (1), (2) (c), 811.73 (2) (e), 811.75 (1) (c), 811.84 (9), 811.851, 811.853 (1), (2) (a), (d), (3) (b), (4) (b), (d), 811.856 (2) (a), 811.857 (2), (3), 811.858 (intro.), (1) (b), (d), (f), (2), (3), 811.859 (1) (intro.), (a), (2), 811.860 (1), 811.861 (1), (2), (4) (title) and 811.862 (1) (b); to **repeal and recreate** NR 811.12 (9), 811.13 (title), 811.39 (6) (intro.), 811.40 (1) (L), 811.45 (2) (k), 811.48 (8), 811.853 (2) (g) and (3) (d), 811.853 (4) (c), 811.854, 811.855, 811.856 (intro.), 811.858 (4) and 811.860 (2) and (3); and to **create** NR 811.02 (1g), (19m), (29m), (37d), (37h), (37p), (37t), (38m), (46m), (63m), (64m), 811.12 (1) (g) (intro.), 5., (k), (5) (d) 10., (10) (c) (Note), (12) (h), (i), (13) (a) 8., (b) 7., (14) (intro.), 811.13 (intro.), 811.21 (2) (a) (Note), 811.22 (1m), (3m), 811.23 (1) (i) and (j), 811.231 (2) (i), 811.232 (1) (d) and (2), 811.25 (1) (h) 2. bm., 811.31 (1m), 811.39 (2) (e) 3. a., b., c., d., e., (6) (e), (f), 811.40 (1) (cm), (n) 1., 2., 811.43 (9), 811.44 (1) (h) and (2) (Note), 811.45 (3m), 811.49 (1) (k) 9., 811.495, 811.50 (3) (Note), 811.57 (2) (j) 8. and 9., 811.575, 811.60 (Note), 811.605, 811.61 (7) (Note), 811.64 (4) (a) 6., 7., (8) (f) 4. and (16) (d), 811.685, 811.73 (2) (e) (Note), 811.75 (1) (ag), 811.85 (1), (2), 811.853 (intro.), (3) (e), 811.857 (1) (title), 811.858 (1) (g), (h), (2) (Note), and 811.861 (2) (Note) relating to updating, correcting and clarifying existing code requirements and adding requirements for new technologies related to community drinking water system sources, source water quality, storage, treatment, and distribution and affecting small business.

DG-22-20

Analysis Prepared by the Department of Natural Resources

1. Statute Interpreted: Chapters 280 and 281, Wis. Stats.

2. Statutory Authority: Chapters 280 and 281, Wis. Stats.

3. Explanation of Agency Authority:
Chapter 280, Wis. Stats., established the statutory authority and framework for regulation of community water systems. Section 280.11(1), Wis. Stats., specifically directs the department to prescribe, publish, and enforce minimum reasonable standards and rules for methods to be pursued to obtain pure drinking water for human consumption, and to establish safeguards deemed necessary in protecting the public health against the hazards of polluted sources of impure water supplies intended or used for human consumption. This statute gives the department general supervision and control over all methods of obtaining groundwater for human consumption, authority to prescribe, amend, modify, or repeal any applicable rule and to perform any act deemed necessary for the safeguarding of public health. Section 280.13(1), Wis. Stats, gives the department authority to exercise powers and promulgate rules reasonably necessary to carry out and enforce the provisions of ch. 280, Wis. Stats.

Under s. 281.12, Wis. Stats., the department has general supervision and control over waters of the state and authority to plan and manage the regulatory programs that are necessary for fulfilling that responsibility. Section 281.41(1), Wis. Stats, gives the department authority to require complete plans for proposed water system extensions, maintenance, and operation.

Section 281.17(8), Wis. Stats, authorizes the department to establish, administer, and maintain a safe drinking water program no less stringent than the requirements of the federal safe drinking water act.

4. Related Statutes or Rules:
Chapter NR 809, Wis. Adm. Code, establishes minimum standards and procedures for the protection of public health, safety, and welfare in the obtaining of safe drinking water. Chapter NR 810, Wis. Adm. Code, governs the general operation and maintenance of all public water systems.

5. Plain Language Analysis:
The primary objectives of revisions to ch. NR 811, Wis. Adm. Code, are to correct, clarify, and update design and construction standards and address new technologies related to community drinking water systems. Specific objectives include:

- Modify, add and clarify NSF/ANSI Standard 61 certification requirements for all materials or products that come into contact with finished water.
- Modify, add, and clarify groundwater well design including siting, construction, rehabilitation, reconstruction, and abandonment.
- Modify, add, and clarify groundwater and surface water treatment facility design including construction, reconstruction, treatment technologies, facility layout, equipment, piping, storage, and disposal of waste.
- Modify, add, and clarify finished water storage design including siting, construction, rehabilitation, reconstruction, and decommissioning.
- Modify, add, and clarify distribution and transmission system design including separation distance to potential contamination sources, installation, construction, location of appurtenances, rehabilitation technologies, testing, and abandonment.
- Modify, add, and clarify drinking water system building construction requirements.
- Modify, add, and clarify source water quality treatment requirements.
- Modify, add, and clarify exemptions or alternative code requirements for other-than-municipal (OTM) community drinking water systems.
- Remove code requirements that may be conflicting or are no longer applicable.
- Address grammatical errors and inconsistencies.

6. Summary of, and Comparison with, Existing or Proposed Federal Statutes and Regulations:

The U.S. Environmental Protection Agency (EPA) granted Wisconsin primary enforcement authority (primacy) for the federal Safe Drinking Water Act, which Wisconsin does through creation, maintenance, and enforcement of state statutes and administrative rules governing safe drinking water. As a primacy state, Wisconsin must enforce state regulations that assure that the design and construction of new or modified public water system facilities will be capable of compliance with the state primary drinking water regulations. (40 C.F.R. § 142.10(b)(5)).

7. If Held, Summary of Comments Received During Preliminary Comment Period and at Public Hearing on the Statement of Scope:

The department held a virtual preliminary public hearing on the statement of scope on June 7, 2021. Thirteen members of the public attended the preliminary public hearing. No attendees provided testimony at the hearing. Comments were accepted through June 9, 2021. No written comments were received.

8. Comparison with Similar Rules in Adjacent States:

The four surrounding states use the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Manager Recommended Standards for Water Works (10 States Standards) as the regulatory requirements for community water systems. Wisconsin does not use the 10 State Standards directly for regulatory requirements, but many sections of ch. NR 811, Wis. Adm. Code, have similar requirements to the 10 States Standards. The proposed revisions to ch. NR 811, Wis. Adm. Code, generally include adopting requirements from the 10 States Standards.

A brief comparison with the four states surrounding Wisconsin – Illinois, Michigan, Iowa, and Minnesota – is provided below on the most substantive changes proposed in these rule revisions.

- The surrounding states, through the 10 States Standards, require that the total developed groundwater source capacity shall equal or exceed the design maximum day demand with the largest producing well out of service. For apartment units, condominium units, and manufactured (mobile) homes it is difficult to determine the maximum day demand. The department is proposing that the minimum pumping capacity for apartment units, condominium units, and manufactured (mobile) homes be 1 gallon per minute per living unit, which is generally deemed adequate capacity by department experience and industry standards.
- The surrounding states regulate nitrate treatment systems through the treatment requirements listed in the 10 States Standards. The existing and proposed rules for nitrate treatment in ch. NR 811, Wis. Adm. Code, largely follow the requirements listed in the 10 States Standards. However, the department is proposing to add a requirement that nitrate treatment or blending systems be provided with a continuous nitrate analyzer to ensure that entry point water is continuously meeting the maximum contaminant level for nitrate, which is an acute drinking water contaminant. This additional protection is not part of surrounding states' regulations but will provide additional protections for water consumers in Wisconsin.
- The surrounding states regulate packed tower aeration design with the requirements listed in the 10 States Standards. Wisconsin currently does not have specific design requirements for packed tower aeration systems and is proposing to adopt the requirements listed in the 10 States Standards.
- The surrounding states regulate pressure filtration design with the requirements listed in the 10 States Standards. Wisconsin currently does not have specific design requirements for pressure filtration systems and is proposing to adopt the requirements listed in the 10 States Standards.
- The surrounding states regulate anion exchange system design with the requirements listed in the 10 States Standards. Wisconsin currently does not have specific design requirements for anion exchange systems and is proposing to adopt the requirements listed in the 10 States Standards.

9. Summary of Factual Data and Analytical Methodologies Used and How Any Related Findings

Support the Regulatory Approach Chosen:
Many of the rule revisions simplify, clarify, and streamline rule language. Data and methodologies used to support substantive changes include:

- A series of four preliminary stakeholder meetings where the department gathered input from water systems, consultants, and industry professionals.
- Virtual meetings with two major chemical suppliers in Wisconsin where the department gathered information regarding industry standards for chemical addition and storage.
- A call with a tank installer to discuss proposed tank design requirement changes and the associated cost.
- Review of other regulatory requirements and industry standards, including:
    - American Water Works Association, *AWWA Standard: Water Wells*, A100-20, July 1, 2020.
    - ASTM International, *Standard Specification for Blended Hydraulic Cements*, ASTM C595, December 31, 2010.
    - Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, *Recommended Standards for Water Works (10 States Standard)*, 2018 ed.
    - The Chlorine Institute, *The Chlorine Manual*, 2000, 6th ed.
    - U.S. EPA, *Membrane Filtration Guidance Manual*, EPA 815-R-06-009, Nov. 2005.
    - NSF International Standard / American National Standard, *Drinking Water System Components – Health Effects*, NSF/ANSI 61 – 2016, January 5, 2016.
    - NSF International Standard / American National Standard, *Ultraviolet Microbiological Water Treatment Systems*, NSF/ANSI 55 – 2019, July 29, 2019.
    - U.S. EPA, *Membrane Filtration Guidance Manual*, EPA 815-R-06-009, Nov. 2005.
    - U.S. EPA, *Ultraviolet Disinfection Guidance Manual*, EPA 815-D-03-007, June 2003.

10. Analysis and Supporting Documents Used to Determine the Effect on Small Business or in Preparation of an Economic Impact Report:
The proposed revisions generally allow greater flexibility for small water systems throughout the state, which is anticipated to decrease the cost of compliance for those water systems. Specifically, allowing a minimum of 1 gallon per minute of capacity for apartment units, condominium units, and manufactured (mobile) homes is substantially less capacity than what is currently required by s. NR 811.29, Wis. Adm. Code. In many cases, this lower capacity will save other-than-municipal community water systems money by eliminating the need for drilling additional wells.

Additionally, the rule revision will require other-than-municipal community water systems to have an approved chemical injection tap, rather than owning all the equipment necessary to disinfect the water. This is expected to decrease the cost for other-than-municipal community water systems to meet code requirements.

The department received two comments regarding the cost estimates included in the EIA from community water systems. The department did not revise the EIA based on the comments received.

11. Effect on Small Business (initial regulatory flexibility analysis):
The majority of small businesses impacted by the rule are other-than-municipal community water systems. There are currently 423 other-than-municipal community water systems in Wisconsin. Most of the rule revisions that will affect other-than-municipal community water systems allow for additional exceptions or flexibility in meeting the requirements of ch. NR 811, Wis. Adm. Code. Examples include decreasing the required minimum source capacity to 1 gallon per minute per living unit for apartment units, condominium units, and manufactured (mobile) homes and no longer requiring small 6-inch

diameter wells be tested for plumbness and alignment.

The only anticipated additional costs is the result of requiring that when other-than-municipal community water systems install nitrate removal treatment system, they must also install continuous nitrate analyzers. Over the past 10 years, only one other-than-municipal community water system has installed a nitrate removal system and the department does not anticipate an increase in frequency of nitrate removal system installations in the next 10 years. See the Economic Impact Analysis form for additional details and a cost analysis regarding this rule change.

12. Agency Contact Person:
Theera Ratarasarn, P.E., Bureau of Drinking and Groundwater – DG/5
Department of Natural Resources
101 S. Webster Street
Madison, WI 53707
(608) 228-0555

13. Place where comments are to be submitted and deadline for submission:
Written comments may be submitted at the public hearings, by regular mail, or by email to:
McCrea Baker, Bureau of Drinking and Groundwater – DG/5
Department of Natural Resources
101 S. Webster Street
Madison, WI 53707
(608) 279-8426
McCrea.Baker@wisconsin.gov

Comments may be submitted to the department contact person listed above or to DNRAdministrativeRulesComments@wisconsin.gov until the deadline given in the upcoming notice of public hearing. The notice of public hearing and deadline for submitting comments will be published in the Wisconsin Administrative Register and on the department's website, at https://dnr.wi.gov/calendar/hearings/. Comments may also be submitted through the Wisconsin Administrative Rules Website at https://docs.legis.wisconsin.gov/code/chr/active.

The consent of the Attorney General will be requested for the incorporation by reference of:

- American Water Works Association, *AWWA Standard: Water Wells*, A100-20, July 1, 2020.
- ASTM International, *Standard Specification for Blended Hydraulic Cements*, ASTM C595, December 31, 2010.
- The Chlorine Institute, *The Chlorine Manual*, 2000, 6th ed.
- NSF International Standard / American National Standard, *Drinking Water System Components – Health Effects*, NSF/ANSI 61 – 2016, January 5, 2016.
- U.S. EPA, *Membrane Filtration Guidance Manual*, EPA 815-R-06-009, Nov. 2005.
- NSF International Standard / American National Standard, *Ultraviolet Microbiological Water Treatment Systems*, NSF/ANSI 55 – 2019, July 29, 2019.
- U.S. EPA, *Ultraviolet Disinfection Guidance Manual*, EPA 815-D-03-007, June 2003.

RULE TEXT

SECTION 1. NR 811.02 (1) is renumbered NR 811.02 (1r)

SECTION 2. NR 811.02 (1g), (19m), (29m), (37d), (37h), (37p), (37t), (38m), (46m), (63m) and (64m) are created to read:

NR 811.02 (1g) "Air gap" means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank or plumbing fixture and the flood level rim or spill level of the receptacle.

(19m) "Dimension ratio" means the specified outside diameter or the pipe divided by the specified minimum wall thickness.

(29m) "Frazil ice" means ice formed in supercooled water as small particles moving turbulently enough to prevent the formation of a sheet of ice.

(37d) "Intake structure" means a structure located at the end of a surface water intake intended to collect and divert raw water from a surface water source into a raw water transmission pipe or channel for the purpose of a surface water supply. An intake structure may include provisions for exclusion of debris from the intake pipe.

(37h) "Interconnection" means the connection between 2 public water systems that allows for the transfer of water between each system.

(37p) "Jar test" means a laboratory procedure that simulates a water treatment plant's coagulation or flocculation units with different chemical doses and energy of rapid mix, energy of slow mix, and settling time.

(37t) "Landfill" means a solid waste facility for solid waste disposal.

(38m) "Maximum contaminant level" means the maximum permissible level of a contaminant in water that is delivered to any user of a public water system.

(46m) "Packer" means a solid or inflatable seal lowered into a well or drillhole or attached to a casing string to seal off a specific interval within the well or drillhole.

(63m) "Shore well" means a storage structure hydraulically connected to a surface water source designed for the diversion and collection of raw water.

(64m) "Supernatant" means the liquid removed from settled sludge.

SECTION 3. NR 811.08 (3) is renumbered 811.08 (3) (intro.) and amended to read:

NR 811.08 (3) PROJECTS REQUIRING DEPARTMENT APPROVAL BUT NOT REQUIRING SUBMITTAL BY A PROFESSIONAL ENGINEER. The requirements for the submittal of plans and specifications for reviewable projects are in ch. NR 108. The water supply owner or the owner's representative may submit reviewable projects to the department for approval without the seal of a professional engineer registered in Wisconsin for most operation and maintenance work and for all non-subdivision, other-than-municipal water systems as provided ~~in~~ under s. NR 108.04 (2) (c) 2. Plans shall be submitted by a registered well driller or pump installer ~~where~~when applicable. ~~Examples~~ The following are examples of projects not requiring a professional engineer's seal ~~are pump replacement~~:

(a) Replacement with similar equipment not affecting pumping capacity~~; test~~.

(b) Test well construction when to be pumped at a rate of 70 gallons per minute or more for a minimum duration of 72 hours, unless the well is to be converted to a municipal or subdivision well~~; well~~.

(c) Well reconstruction work~~; pump~~.

(d) Pump base reconstruction work~~; pumphouse~~.

(e) Pumphouse pump discharge piping and appurtenance replacement~~; well~~.

(f) Well rehabilitation work as described ~~in~~ under s. NR 811.12 (11) to (13)~~; changing~~.

(g) Changing chemical type or blend when the chemical feed equipment has been previously approved by the department~~;and painting~~.

(h) Painting or coating elevated water storage tank, reservoir, and hydro-pneumatic tank interiors.

SECTION 4. NR 811.09 (1) (h) 2. is renumbered NR 811.09 (1) (h) 2. (intro.) and amended to read:

NR 811.09 (1) (h) 2. 'Detailed plans.' The plans shall show ~~the~~ all of the following:

a. The location of the proposed water main within the street right-of-way or easement~~;the~~.

b. The location of other utilities, such as sanitary or storm sewers~~; elevations~~.

c. Elevations at intersections and hydrants or a profile of the proposed water main~~; location,~~ proposed or existing sanitary sewers, and storm sewers.

e. The location of proposed appurtenances~~; details~~.

f. Details or special features and connection to the existing system. ~~Profiles showing~~

g. When approval of a common trench is being requested in areas of high bedrock, the profile shall show the ground surface, the proposed water main, the proposed sanitary or storm sewer, and rock depths ~~are necessary when approval of a common trench is requested in high bedrock areas~~.

h. The size of proposed and existing water mains ~~shall also be shown~~.

SECTION 5. NR 811.12 (1) (c), and (d) 1. are amended to read:

NR 811.12 (1) (c) *Grout seal*. Permanent wells shall have a grout seal surrounding the protective casing and liner casings. The grout seal shall be a minimum of 1.5 inches in thickness to the depths specified in ss. NR 811.14, 811.18, 811.19, and 811.20.

(d) 1. All outer casings used in the construction of permanent wells shall be removed during or after the grouting process unless the exterior of the outer casing is grouted in place to the native formation with neat cement having a minimum thickness of 1.5 inches.

SECTION 6. NR 811.12 (1) (g) (intro.) and 5. and (k) are created to read:

NR 811.12 (1) (g) *Test wells*. Test wells may be drilled to determine aquifer water quantity and quality prior to constructing a final well. Test wells are subject to all of the following requirements:

5. Test wells may be converted to permanent wells only if all test well casings and screens are removed prior to reconstructing the well to be converted to the permanent well.

Note: The department recommends that test wells be sampled for regulated drinking water contaminants to ensure the permanent well produces water that meets the drinking water quality standards specified under ch. NR 809.

(k) The water system shall provide notice of the well construction or reconstruction to the department's regional drinking water representative at least 48 hours prior to the date and time of initiating work.

SECTION 7. NR 811.12 (5) (intro.), (a) and (d) 9. are amended to read:

NR 811.12 (5) WELL SITES. The suitability of a site for a well is dependent on geologic, hydrogeologic, and topographic conditions and possible sources of contamination. However, a well site shall meet all of the following general requirements ~~shall be met~~ :

(a) *Well site dimensions*. ~~For wells to serve municipal and subdivision other than municipal water systems, a~~ A water system shall reserve a lot or parcel of land ~~shall be reserved~~ for the construction of the well ~~which~~that has minimum dimensions of 100 feet by 100 feet. The well shall be located at or near the center of the lot or parcel~~. For non-subdivision other than municipal water system wells, the well~~ and shall be located a minimum of 50 feet from any property boundary. These dimensions may be modified by the department on a case-by-case basis where they are unnecessary or inadequate to protect water quality. ~~Larger well sites should be considered where necessary to provide adequate wellhead protection.~~ The department may require a larger well site where necessary to provide adequate wellhead protection. A deeper depth of grouted protective well casing may be required by the department when necessary to compensate for a smaller well site parcel or as a condition of approving a variance to a separation distance to a potential contamination source listed ~~in~~under par. (d).

(d) 9. Twelve hundred feet between a well and any solid waste storage, transportation, transfer, incineration, air curtain destructor, processing, wood burning, one time disposal or small demolition facility; ~~sanitary~~ landfill; any property with residual groundwater contamination that exceeds ch. NR 140 enforcement standards; coal storage area; salt or deicing material storage area; any single wall farm underground storage tank or single wall farm above ground storage tank or other single wall underground storage tank or above ground storage tank that has or has not received written approval from the department of safety and professional services or its designated Local Program Operator under s. ATCP 93.110 for a single wall tank installation. These requirements apply to tanks containing gasoline, diesel, bio-diesel, ethanol, other alternative fuel, fuel oil, petroleum product, motor fuel, burner fuel, lubricant, waste oil, or hazardous substances; and bulk pesticide or fertilizer handling or storage facilities.

SECTION 8. NR 811.12 (5) (d) 10. is created to read:

NR 811.12 (5) (d) 10. The separation distance requirements under s. NR 812.08 (4) apply for all contamination sources listed under s. NR 812.08 (4) that are not listed in subds. 1. to 9.

SECTION 9. NR 811.12 (7) (b), (c) and (h) are amended to read:

NR 811.12 (7) (b) Each length of casing shall be legibly marked in accordance with the ASTM or API marking specification and with s. NR ~~812.17 (2)~~ 812.11 (6) (d). The protective casing shall have the minimum weights and thicknesses given in Table 1.

(c) Liner pipe installed to seal off a caving zone shall be new, unused, and non-reclaimed steel pipe and shall have the minimum weights and thicknesses given in Table ~~No.~~ 1. The department may, on a case-by-case basis, approve the installation of ungrouted stainless steel repair sleeves, but only if the well is bacteriologically safe and water quality of the well meets all of the primary drinking water quality standards specified under ch. NR 809.

(h) ~~For wells in which the protective casing or liner pipe to be grouted is suspended, the upper terminus of the protective casing or liner pipe shall be securely attached by welding steel bands to the outer casing or by other approved methods, and the grout shall be supported on a steel ring welded to the bottom of the protective casing or liner pipe or on an approved packer attached to the bottom of the protective casing or liner pipe.~~ Protective casings shall rest on native formation during grouting for new well construction. Hung liner casings may be used for reconstruction of existing wells. Hung liner casing shall be securely attached by welding steel bands to the outer casing or by other approved methods, and the grout shall be supported on a steel ring welded to the bottom of the liner pipe or on an approved packer attached to the bottom of the liner pipe. The bottom of the protective casing or liner pipe may be flared out to meet this requirement.

SECTION 10. NR 811.12 (9) is repealed and recreated to read:

NR 811.12 (9) PACKERS. A packer may be used only if it meets all of the following requirements:

(a) The packer shall be of a material that will not impart taste, odors, toxic substances, or bacterial contamination to the water in the well. Lead packers may not be used.

(b) The packer may be utilized for test pumping, isolating portions of a well for water quality sampling, and for grouting liner casings.

(c) Permanent well reconstruction may not be completed with an inflatable packer.

SECTION 11. NR 811.12 (10) (c) is amended to read:

NR 811.12 (10) (c) Be designed to have an entrance velocity that does not exceed 0.1 feet per second under normal operating conditions or as detailed in AWWA Standard A100-20 dated July 1, 2020, which is incorporated by reference.

SECTION 12. NR 811.12 (10) (c) (Note) is created to read:

NR 811.12 (10) (c) Note: AWWA Standard: A100-20 is the American Water Works Association specification for Water Wells published on July 1, 2020. A copy of the AWWA standard is available for inspection at the legislative reference bureau and may be obtained from the American Water Works Association, awwa.org.

SECTION 13. NR 811.12 (11) is renumbered 811.12 (11) (intro.) and amended to read:

NR 811.12 (11) BLASTING. Approval shall be obtained from the department prior to blasting within a well. Information regarding the procedure, number, size, and location of charges shall be submitted to the department in writing. Blasting under this subsection is subject to all of the following requirements:

SECTION 14. NR 811.12 (12) is renumbered 811.12 (12) (intro.) and amended to read:

NR 811.12 (12) CHEMICAL CONDITIONING. Approval shall be obtained from the department prior to chemical conditioning of a well. Information regarding the method proposed, equipment, chemicals, testing for residual chemicals, disposal of waste, and inhibitors to be used shall be submitted to the department in writing. Chemical conditioning under this subsection is subject to all of the following requirements:

SECTION 15. NR 811.12 (12) (f) is amended to read:

NR 811.12 (12) (f) Following ~~the~~ completion of the chemical conditioning procedure, the well shall be thoroughly disinfected~~,~~ with chlorine only. Acids for pH control may only be used when the acid does not include additives or the only additives used are intended to mitigate corrosion of metal surfaces. Following disinfection, the well shall be pumped to waste and safe bacteriological water samples shall be collected according to the requirements ~~of~~under s. NR 810.09 (4).

SECTION 16. NR 811.12 (12) (h) and (i) are created to read:

NR 811.12 (12) (h) All material released from the casings, screen, and borehole as part of the rehabilitation shall be removed from the well.

(i) The department may require additional water quality sampling following a well rehabilitation based on well raw water quality and the rehabilitation methods used to verify water quality and to protect water consumers.

SECTION 17. NR 811.12 (13) is renumbered 811.12 (13) (intro.) and amended to read:

NR 811.12 (13) OTHER METHODS OF WELL RECONDITIONING. Approval shall be obtained from the department prior to performing any other type of reconditioning procedure, including hydrofracturing and impulse generation techniques. The requester shall submit written information regarding the procedure, the equipment, materials, chemicals, pressures to be used, and the disposal of waste to the department for approval. Reconditioning procedures under this subsection are subject to all of the following requirements:

SECTION 18. NR 811.12 (13) (a) 8., (b) 7. and (14) (intro.) are created to read:

NR 811.12 (13) (a) 8. All material released from the casings, screen, and borehole as part of the rehabilitation shall be removed from the well.

(b) 7. All material released from the casings, screen, and borehole as part of the rehabilitation shall be removed from the well.

(14) GROUTING REQUIREMENTS. The water system shall give notice to the department's regional drinking water staff person at least 48 hours prior to the date and time of the well grouting work. In addition, all of the following requirements shall be met:

SECTION 19. NR 811.12 (14) (a) 1. and (15) (a) and (Note) are amended to read:

NR 811.12 (14) (a) *Grout types and specifications*. 1. Neat cement grout shall be ASTM C150, Type I, ASTM C595, Type IL, or API-10A, Class A Portland cement and water from a known bacteriologically safe and uncontaminated source, with not more than 6 gallons of water per 94-pound sack ~~(94 lbs.)~~ of cement. A mud balance shall be used to measure the grout density. Additives, including bentonite~~,~~ to increase fluidity, reduce shrinkage, or control time of set may be used only with prior department approval. No more than 4.7 pounds of powdered bentonite, a maximum of 5~~%~~ percent, may be added to each 94-pound sack of cement. When bentonite is added, the volume of water shall be

increased. When bentonite is added, a pressurized mud balance shall be used to measure the grout density. Bentonite mixed with neat cement grout shall comply with Table ~~No.~~ 2.

(15) (a) Every well constructed in rock and all screened wells greater than 100 feet in depth shall be tested for plumbness and alignment by the method outlined in AWWA Standard ~~A100in effect at the time of well construction~~ A100-20 dated July 1, 2020, which is incorporated by reference, or by an equivalent method. The test method shall be clearly stated in the specifications. The department may waive the requirement for plumbness and alignment testing for 6-inch diameter wells that will have a submersible well pump installed.

Note: A copy of ~~the~~ AWWA Standard A100-20 dated July 1, 2020 is available for inspection at the ~~central office of the department of natural resources~~legislative reference bureau and may be obtained for personal use from the American Water Works Association, ~~6666 West Quincy Ave., Denver, Colorado 80235-3098~~awwa.org.

SECTION 20. NR 811.13 (title) is repealed and recreated to read:

NR 811.13 (title) **Well filling and sealing.**

SECTION 21. NR 811.13 (intro.) is created to read:

NR 811.13 Filling and sealing of community water system wells are subject to all of the following requirements:

SECTION 22. NR 811.13 (1) (intro.), (a), (b) and (c), (2), (3), (4) (title), (a), (c) and (d), (5), (6) (intro.) and (a), (7) (intro.), (a), (d) and (e) 2. and (8) are amended to read:

NR 811.13 (1) CRITERIA FOR ~~ABANDONMENT~~FILLING AND SEALING. The owner shall permanently ~~abandon~~ fill and seal all unused permanent wells, test wells, and monitoring wells for permanent wells or test wells unless the department agrees to the delayed ~~abandonment~~ filling and sealing of the well as part of an extended well ~~abandonment~~ filling and sealing agreement. Wells shall be ~~abandoned~~ filled and sealed in accordance with all of the following criteria:

(a) Test wells and monitoring wells constructed as part of the test well or permanent well construction and test pumping evaluation processes shall be permanently ~~abandoned~~ filled and sealed prior to placing the permanent well in service unless the department approves the wells to remain in service in accordance with the requirements ~~of~~under s. NR 811.12 (21).

(b) Permanent wells with one or more water quality parameters exceeding a primary drinking water standard ~~contained in~~under ch. NR 809 shall be permanently ~~abandoned~~ filled and sealed unless the owner obtains department approval ~~is obtained~~ to continue the well in service and only if department approved water treatment is installed to provide point-of-entry water quality compliance or the owner obtains an extended well ~~abandonment~~ filling and sealing agreement ~~is obtained~~ from the department ~~in conformance with~~under s. NR 810.22. The ~~department shall be contacted and~~ owner shall contact the department and obtain written department approval ~~shall be obtained~~ for the ~~abandonment~~ filling and sealing of contaminated wells ~~where the~~. The department ~~deems it necessary to~~ may require more stringent ~~abandonment~~ filling and sealing requirements ~~in order~~ to protect lower aquifers from additional contamination.

(c) The department may allow existing permanent wells that are not constructed in accordance with the minimum requirements of this chapter to remain in service if the well water quality continues to meet all of the primary drinking water standards ~~contained in~~under ch. NR 809 or if department-approved water treatment is installed to provide point-of-entry water quality compliance. All ungrouted municipal wells shall be immediately reconstructed by grouting in a liner casing to a depth approved by the department or the well shall be taken out of service and ~~permanently abandoned~~ filled and sealed.

(2) QUALIFICATIONS OF PERSONS ~~ABANDONING~~ FILLING AND SEALING WELLS. All wells shall be ~~permanently abandoned~~ filled and sealed by ~~persons~~ a person who ~~meet~~meets all of the following qualifications:

(3) TEMPORARY ABANDONMENT. When a well is temporarily removed from service, the top of the well casing shall be sealed with a watertight threaded or welded cap. The well shall be permanently ~~abandoned~~ filled and sealed no later than 5 years after the well is temporarily abandoned. The department may enter into a written extended well ~~abandonment~~ filling and sealing agreement with the ~~well~~ owner ~~in accordance with~~ under s. NR 810.22 to allow an unused or standby well to remain operational for more than 5 years after the well is temporarily abandoned.

(4) ~~PRE-ABANDONMENT~~PRE-FILLING AND SEALING REQUIREMENTS. (a) All debris, pumps, piping, ungrouted liner pipe that can be removed, inner ungrouted casings and well screens, and any other obstruction known to be in the well shall be removed if possible before the well is ~~permanently abandoned~~ filled and sealed.

(c) Wells that have uncertain construction details shall be televised prior to ~~abandonment~~ filling and sealing if required by the department to allow for a proper ~~well abandonment~~ filling and sealing.

(d) All casings and liner pipes located within ungrouted annular spaces and that cannot be removed from a well prior to ~~abandonment~~ filling or sealing shall either be shot or ripped in place prior to ~~abandonment~~ filling and sealing of the well. ~~The~~All of the following minimum requirements shall be met:

(5) ~~ABANDONMENT~~ FILLING AND SEALING MATERIALS AND LIMITATIONS. All wells shall be ~~abandoned~~ filled and sealed using any of the following materials:

(6) GENERAL ~~ABANDONMENT~~ FILLING AND SEALING REQUIREMENTS. ~~Abandonment~~ Filling and sealing methods shall meet all of the following requirements:

(a) All wells shall be filled from the bottom of the well up to the ground surface using approved materials unless it is necessary to terminate the ~~abandonment~~ filling and sealing below the ground surface to accommodate construction over the well. Well casings and ~~abandonment~~ filling and sealing materials may be terminated as much as 3 feet below the ground surface or to a depth below any future building foundation to accommodate construction over the well.

(7) SPECIAL ~~ABANDONMENT~~FILLING AND SEALING REQUIREMENTS. To ~~permanently abandon~~ fill and seal a well, the owner shall have a person who meets the qualifications ~~of~~ under sub. (2) fill and seal the well to prevent it from acting as a channel for the vertical movement of contamination or groundwater, by the following applicable method:

(a) Monitoring wells. Monitoring wells constructed to ch. NR 141 requirements shall be ~~permanently abandoned~~ filled and sealed in accordance with ch. NR 141 requirements.

(d) *Bedrock formation wells*. Wells completed in bedrock formations shall be completely filled from the bottom up with concrete, sand-cement, neat cement, or approved slow-hydrating bentonite chips. Sealing materials shall meet the requirements ~~of~~ under sub. (5). Wells shall be filled and sealed in accordance with the following formation specific requirements, as applicable:

1. *Maquoketa Shale*. As an alternative for uncontaminated bedrock wells deeper than 250 feet or for wells cased and grouted through the Maquoketa Shale formation, chlorinated, sand-free pea gravel may be used to fill the open drillhole from the bottom of the well up to the 250-foot depth or to a depth 20 feet below the bottom of the protective casing, whichever is deeper. ~~Additionally, minimum~~The owner shall contact the department for specific filling and sealing requirements where the top or the bottom of the Maquoketa Shale formation is exposed in the open drillhole.

2. *Cambrian Sandstone and Eau Claire formations*. Minimum 40-foot thick plugs of sealing materials meeting the requirements ~~of~~ under sub. (5) shall be centered at the top of the uppermost Cambrian Sandstone formation and at the top of the Eau Claire formation where these formations are open in the drillhole. ~~The department shall be contacted for specific abandonment requirements where the top or the bottom of the Maquoketa Shale formation is exposed in the open drillhole.~~

(e) 2. If constructed partially or completely into bedrock, the well shall be filled from the bottom up to the ground surface with concrete, sand-cement, neat cement, approved slow-hydrating bentonite chips or a combination of the above except that if bedrock is encountered below the ground surface, these materials shall be placed to a point at least 2 feet above the top of the bedrock. The remainder of the well may be ~~abandoned~~ filled and sealed with any of the materials listed ~~in~~under subd. 1. Sealing materials shall meet the requirements ~~of~~under sub. (5).

(8) ~~ABANDONMENT~~FILLING AND SEALING REPORTS. The person who ~~abandoned~~ filled and sealed the well shall file ~~an abandonment~~ a filling and sealing report with the department, on forms provided by the department, within 30 days after the completion of the well ~~abandonment~~ filling and sealing. The report shall be completely filled out in accordance with the information known and shall include complete information on the depths and types of sealing materials used. Well drillers and pump installers shall report to the department any unused or unabandoned wells on the property of which they have knowledge.

SECTION 23. NR 811.14 (5) is amended to read:

NR 811.14 (5) GROUT SEAL. A sand ~~or bentonite~~ seal, bentonite seal, or seal constructed of both sand and bentonite shall be provided to prevent leakage ~~of grout~~ into the gravel pack ~~or screen shall be provided~~. The seal shall be ~~no more than~~ 2 to 4 feet thick.

SECTION 24. NR 811.19 (3) and (5) are amended to read:

NR 811.19 (3) If the depth of unconsolidated material overlying the limestone is 60 feet or greater for a minimum radius of one-half mile and there is no record of sinkholes, quarries, improperly constructed wells, or outcrops within that area, the minimum depth of grouted casing shall be 60 feet. The department may require greater depths of grouted casing in areas where there is known bacteria or nitrate concentrations exceeding drinking water standards. The casing shall be installed to a depth of 10 feet below the anticipated pumping water level unless the department waives this requirement after finding it unnecessary in meeting the requirements of this chapter.

(5) If the depth of unconsolidated material is less than 60 feet at the well site or within one-half mile of the well site, the water system shall contact the department ~~shall be contacted~~ to determine the required minimum depth of grouted casing. An inner casing size of at least 12 inches in diameter shall be required to permit the installation of a grouted liner at a future date if the water from the well shows evidence of contamination. The department may waive the casing size requirement if it is demonstrated that it is unnecessary to meet the requirements of this chapter. In such cases, a minimum of 100 feet of grouted casing is ~~usually~~ required ~~and, where conditions dictate, considerably more than 100 feet shall be required~~.

SECTION 25. NR 811.21 is renumbered NR 811.21 (intro.) and amended to read:

NR 811.21 General requirements. Surface water sources include all lakes, rivers, and streams. The source of water selected by the water system as a surface water supply shall be from the best available source ~~which is~~ practicable. The source shall provide the highest quality water reasonably available which, with appropriate treatment and adequate safeguards, will meet the drinking water standards ~~in~~under ch. NR 809. The water system shall contact the department's office of energy ~~should be contacted~~ to initiate pre-application consultation regarding ~~chapter~~ ch. 30, Stats., permitting. Any proposal ~~which~~ that will result in a diversion from the Great Lakes basin requires department approval ~~in accordance with~~under s. 281.346, Stats. A water system utilizing a surface water source shall meet all of the following requirements:

SECTION 26. NR 811.21 (1) (intro.), (b) and (e) and (2) (a) are amended to read:

NR 811.21 (1) QUALITY ~~An~~ The water system shall conduct an investigative study ~~shall be made of the factors,~~ that includes both natural and ~~man-made, which~~ man-made factors that may affect water quality of the selected surface water supply. The study shall include all of the following:

(b) Determining degree of control of the watershed by the water ~~user~~ system.

(e) For lakes, an analysis of the area water currents and for streams, an analysis of streamflows, and their potential impact on water quality. Consideration shall be given to potential wind and ice conditions.

(2) (a) Be adequate in conjunction with water from other existing sources to meet the maximum ~~20-year~~20-year projected water demand of the service area, as shown by calculations based on a one in ~~50-year~~50-year drought or the extreme drought of record, and ~~should~~shall include multiple year droughts.

SECTION 27. NR 811.21 (2a) (Note) is created to read:

Note: The department recommends water systems using a surface water supply source are provided with redundant intakes or an alternative means of supplying the maximum day water demand.

SECTION 28. NR 811.22 (1m) is created to read:

NR 811.22 (1m) When buried surface water collectors are used, sufficient opening area to minimize headloss shall be provided. Particular attention should be given to the selection of backfill material in relation to the collector pipe slot size and gradation of the native material over the collector system.

Note: The department recommends water systems using a surface water supply source include redundant intakes or an alternate means of supplying the maximum day water demand.

SECTION 29. NR 811.22 (3) is amended to read:

NR 811.22 (3) Inspection manholes every 1,000 feet~~for pipe sizes large enough to permit visual inspection~~.

SECTION 30. NR 811.22 (3m) is created to read:

NR 811.22 (3m) Means for cleaning of the inlet pipe.

SECTION 31. NR 811.23 (1) (f) is amended to read:

NR 811.23 (1) (f) Have the intake piping valved with provisions for backflushing ~~and~~, testing for leaks, ~~where practical~~ and control of frazil ice.

SECTION 32. NR 811.23 (1) (i) and (j) are created to read:

NR 811.23 (1) (i) Sanitary sewer and finished water piping located within the shore well shall be installed in a manner to protect the shore well water quality and preserve the quality of the finished water. It is recommended that piping not be installed above the shore well to allow for access to the piping for routine maintenance.

(j) Water discharged from traveling screens and hub drains within the shore well station may discharge into the shore well.

SECTION 33. NR 811.231 (2) (d) and (g) are amended to read:

NR 811.231 (2) (d) Point of influent flow is separated from the point of withdrawal, with separate pipes for influent to and effluent from the reservoir.

(g) The reservoir is covered~~, where practical~~.

SECTION 34. NR 811.231 (2) (i) is created to read:

NR 811.231 (2) (i) A bypassing line is provided to allow for direct pumping to the treatment facilities.

SECTION 35. NR 811.232 (intro.), (1), (2) and (3) are renumbered NR 811.232 (1) (intro.), (a), (b) and (c), and (1) (intro.) and (c), as renumbered, are amended to read:

NR 811.232 Intake chemical treatment. (1) If the department determines that chemical treatment is warranted for taste and odor control or the control of zebra and other mussels and other nuisance organisms in an intake structure, all of the following requirements shall be met:

(c) A spare solution line shall be installed to provide redundancy and to facilitate the use of alternate chemicals~~, where practical~~.

SECTION 36. NR 811.232 (1) (d) and (2) are created to read:

NR 811.232 (1) (d) Chemical feeders shall be interlocked with the plant system controls to shut down the chemical feed pump automatically when the raw water flow stops.

(2) The department may require pilot testing or demonstration studies of alternate intake treatment. Studies shall satisfy the requirements under s. NR 811.44.

SECTION 37. NR 811.232 (4) is renumbered NR 811.232 (1) (e).

SECTION 38. NR 811.25 (1) (h) 2. bm. is created to read:

NR 811.25 (1) (h) 2. bm. A floor drain or hub drain may be connected to a storm sewer where available if the building drain and building sewer piping will only carry water from the floor or hub drain and if the building floor elevation is at least one foot above the rim elevation of the nearest upstream storm sewer manhole. If a storm sewer is available but a manhole is not located nearby or the manhole

does not comply with the upstream location or the one-foot requirement, the department may require installation of an additional manhole on the storm sewer main or on the building sewer discharge line.

SECTION 39. NR 811.27 (1) (c) is amended to read:

NR 811.27 (1) (c) A portable power source not owned by the municipality but only if the water system owner obtains a written agreement with the owner of any portable power source, including tractors or trailered engine-generator sets, that requires the water system owner to have primary access to the power source in an emergency and that allows the portable power source to be brought to the water system as required for testing. The portable power source ~~should~~shall be located in the community if ~~possible but shall be located within 10 miles of the water system facilities at which it will be used~~ practical.

SECTION 40. NR 811.28 (5) (b) is amended to read:

NR 811.28 (5) (b) *Piping*. Piping shall be designed to minimize friction losses and shall be protected against pressure surges or water hammer. Piping shall be supported, restrained, and buttressed as necessary. Where applicable, each pump shall have an individual suction line or ~~lines so~~ manifolded lines that ~~they~~ insure similar hydraulic and operation conditions. Discharge piping exposed in buildings shall be ductile iron, copper, steel, stainless steel, or galvanized pipe. For other-than-municipal water systems, piping downstream of the control valve is subject to requirements under ch. SPS 383. The use of minimum schedule 80 PVC pipe meeting the requirements of SPS Table 384.30-7 is acceptable where the water to be carried in the piping can be documented as being aggressive to metal pipe or where necessary to be compatible with water treatment equipment and processes provided that the piping is properly restrained. All piping shall be certified to ANSI/NSF standard 61 dated January 5, 2016, which is incorporated by reference.

Note: A copy of ANSI/NSF standard 61 dated January 5, 2016 is available for inspection at the legislative reference bureau and may be obtained for personal use from NSF International, https://www.nsf.org/

SECTION 41. NR 811.29 is amended to read:

NR 811.29 Pumping capacity requirements. Figure No. 1 located in the Appendix shall be used for determining minimum pump capacities for domestic service only, unless specific information is submitted to the department for review and the department approves the alternate pump capacities. When

using Figure No. 1, the number of homes may be reduced by one-third for apartment units, condominium units, and manufactured ~~(mobile)~~ or mobile homes. ~~More detailed engineering studies are necessary for determining pump capacities in systems providing water for multiple uses, including domestic, commercial, and industrial usage and fire protection.~~ As an alternative, for apartment units, condominium units, and manufactured or mobile homes, the minimum pump capacity may be reduced to 1 gallon per minute per living unit. The department may require the water system to perform more detailed engineering studies to determine pump capacities for multiple uses, including domestic, commercial, and industrial usage and fire protection.

SECTION 42. NR 811.31 (1m) is created to read:

NR 811.31(1m) COLUMN PIPES. Column pipes for lineshaft vertical turbine pumps located within the well casing shall be constructed of steel, stainless steel, or galvanized steel pipe.

SECTION 43. NR 811.31 (2) (b) is amended to read:

NR 811.31 (2) (b) For water lubricated pumps with static water levels deeper than 50 feet, provision shall be made for prelubricating the column bearings prior to pump startup. All prelubrication water lines shall be equipped with metering ~~or~~ and controls to monitor and limit the volume of prelubrication water. At systems where chemical addition is practiced, solenoid valve control of the prelubrication water line shall be provided. If auxiliary power is provided, additional valving of the prelubrication water line shall be provided. When pump backspin is allowed to occur after the motor shuts off, the design engineer for the water system shall determine the necessity for lubrication during this period and provide for lubrication if necessary.

SECTION 44. NR 811.34 (6) (e) is amended to read:

NR 811.34 (6) (e) Control or piping and valve measures shall be provided to prevent water from becoming stagnant in pressure tanks ~~where water would otherwise be forced to reside in the pressure tanks for long periods if the pump will operate continuously to maintain system pressure~~. The variable output control device shall be programmed to allow a 10-psi pressure drop from pump 'off' mode to pump 'on' mode to allow time for the pressure tanks to empty.

SECTION 45. NR 811.36 (1) (a) is amended to read:

NR 811.36 (1) (a) For wells without pitless units, a metal vent pipe shall be installed ~~which~~that terminates in a 24-mesh corrosion resistant screened "U" bend or mushroom cap at least 24 inches above

the floor. The vent pipe diameter shall be a minimum of 2 inches for well casings 10 inches in diameter and larger. The department may, on a case-by-case basis, allow smaller diameter well vents on existing installations if water drawdown has not resulted in the sanitary seal to be compromised or require larger diameter well vents for wells with significant water level drawdown. Vent piping shall be welded watertight to the side of the well casing a minimum of 4 inches above the floor and may extend through a concrete pump base or collar where one is present. Alternatively, vent piping may project ~~watertight~~ through a well seal or pump discharge head if the well seal or discharge head is watertight and will facilitate the installation of the vent pipe.

SECTION 46. NR 811.37 (1), (4) (Note), (5) (a) and (b) 2. are amended to read:

NR 811.37 (1) BURIED LINES. Adequate positive pressure shall be maintained on all buried piping. Pump suction and discharge lines ~~which~~that are to be buried shall be designed so that the line is under a continuous pressure head ~~which~~that is higher than the elevation of the ground surface under all operating conditions. Lines where a positive pressure head ~~which~~that is higher than the elevation of the ground surface cannot be maintained may be installed if the lines are encased for their entire length in a watertight pipe conduit or a tunnel. Buried ~~suction~~ lines ~~which~~that, under all operating conditions, are not under a positive pressure head ~~which~~that is higher than the elevation of the ground surface and are not encased for their entire length in watertight pipe conduit or a tunnel are not permitted.

(4) Note: It is recommended that pump-to-waste fittings installed inside the pump station be installed as close as possible to the well or pump head in order to minimize the piping and appurtenances that water to be wasted will be pumped through. The department recommends a valve and hydrant be installed outside the pump station on the buried pump discharge piping for municipal and subdivision water systems.

(5) (a) *Air-vacuum relief valve.* For line-shaft vertical turbine pump discharge pipes, an air-vacuum relief valve shall be installed between the pump and the check valve. The connecting and discharge ~~line from~~ lines for the relief valve shall be constructed of copper, ductile iron, steel, or stainless steel and shall face downward and terminate with a 24-mesh corrosion resistant screen, at least 24 inches above the floor. For well line-shaft vertical turbine pump discharge pipes that discharge directly to reservoirs, the air relief valve is not required but a vacuum relief valve and a check valve are required. The installation of an air-vacuum relief valve is not required for submersible pump installations where check valves are installed at the pump and above grade, and there are no weep holes in the pump drop

pipe unless entrained air in the well water or pressure surges are a concern and the installation of an air relief valve is necessary or required by the department.

(b) 2. If chemical addition, water treatment, or water storage is installed, a second entry point sampling faucet shall be installed as far downstream of the chemical injection, water treatment, or water storage as practical. If necessary to obtain a water sample representing finished water quality, a water service lateral shall be brought back into the building and fitted with a sampling faucet after being connected to the ~~finished~~ building discharge water main outside the building.

SECTION 47. NR 811.39 (2) (e) (intro.) is amended to read:

NR 811.39 (2) (e) *Anti-siphon devices*. Chemical feed pumps shall be provided with anti-siphon devices meeting all of the following requirements:

SECTION 48. NR 811.39 (2) (e) 2. is repealed.

SECTION 49. NR 811.39 (2) (e) 3. is renumbered NR 811.39 (2) (e) 3. (intro.) and amended to read:

NR 811.39 (2) (e) 3. Peristaltic chemical feed pumps shall be provided with a back pressure valve device installed in the discharge piping of the chemical feed pump in accordance with the requirements ~~of~~under subd. 1. The department may allow exceptions to the requirements under subd. 1. for peristaltic chemical feed pumps when the installation meets all of the following requirements:

SECTION 50. NR 811.39 (2) (e) 3. a., b., c., d., and e. are created to read:

NR 811.39 (2) (e) 3. a. The pump has 3 rollers.

b. The pump has a sealed roller housing.

c. A check valve is installed at the point of chemical injection.

d. The pump is installed above the top of the chemical solution tank.

e. The chemical injection location is at a point of continuous positive pressure.

SECTION 51. NR 811.39 (2) (f) 1., 2. (Note) and (3) (d) are amended to read:

NR 811.39 (2) (f) 1. Chemical solutions shall be prevented from being siphoned into the water supply. ~~Anti-siphon~~Anti-siphon protection shall be provided by discharging chemicals at points of positive pressure and by providing anti-siphon devices in accordance with par. (e), or through a suitable air gap or other effective means approved by the department. ~~A point of continuous positive pressure shall be assured on the system side of the last shut-off valve. If a second shut-off valve is provided downstream of the primary shut-off valve, the point of injection may be between the 2 shut-off valves.~~

2. Note: It is recommended that all chemicals be fed downstream of both the check valve and the shutoff valve. If a second shut-off valve is provided downstream of the primary shut-off valve, the point of injection may be between the 2 shut-off valves.

(3) (d) Be located within a containment basin capable of receiving accidental spills, drainage, or overflows without an uncontrolled discharge outside of the containment basin. ~~A common containment basin may be provided for each group of compatible chemicals.~~ At minimum, the containment basin shall be sized to contain the volume of the largest tank that could fail. Chemical containment basins shall not be provided with floor drains. Trapped and vented floor drains discharging to sanitary sewers, holding tanks, or the ground surface in accordance with s. NR 811.25 (1) (h) may be installed for chemical rooms outside of containment basins. Chemical feed pumps shall be located within the containment basin. Piping shall be designed to minimize or contain chemical spills in the event of pipe ruptures.

SECTION 52. NR 811.39 (6) (intro.) is repealed and recreated to read:

NR 811.39 (6) CHEMICAL USE MEASUREMENT. The determination of chemical usage when using chemical feeders shall meet all of the following requirements:

SECTION 53. NR 811.39 (6) (a) to (d) are amended to read:

NR 811.39 (6) (a) ~~Be~~ Weighing scales shall be provided for weighing cylinders at all plants utilizing chlorine gas.

(b) ~~Be~~ Weighing scales are required for ~~other~~ liquid solution feed unless comparable means for determining usage is approved by the department.

(c) ~~Be~~ Weighing scales are required for volumetric dry chemical feeders.

(d) ~~Be~~ Weighing scales shall be accurate enough to measure increments of 0.5~~%~~ percent of load.

SECTION 54. NR 811.39 (6) (e) and (f) are created to read:

NR 811.39 (6) (e) Graduated lines on chemical tanks shall be displayed in units of volume and be in maximum increments of 3 percent of tank capacity.

(f) Radar and sonic level sensors that are programed to display in pounds of chemical and that are accurate enough to measure increments of 0.5 percent of load may be used to determine chemical use.

SECTION 55. NR 811.39 (7) (f) is amended to read:

NR 811.39 (7) (f) ~~Include corporation stops and removable injection nozzles~~ Injection taps shall be constructed of metal or SCH 80 PVC components and shall include check valves. Removable injection quills shall be provided when application is into a pipe ~~line~~ of adequate diameter. Injection ~~nozzles~~ quills installed in a horizontal section of pipe shall be installed up into the bottom half of the pipe.

SECTION 56. NR 811.40 (1) (d) is amended to read:

NR 811.40 (1) (d) Solution storage or day tanks supplying feeders directly shall have a maximum capacity such that daily chemical solution usage is a minimum of 5~~%~~ percent of the tank capacity. The department may approve chemical container storage volumes that will allow daily chemical solution usage less than 5~~%~~ percent of the tank capacity if supporting information is provided to the department and the chemical storage container is placed on a scale, or another department approved method is installed, to accurately determine daily chemical usage. Graduated lines shall not be used to determine daily chemical usage in cases ~~where~~when the daily use is less than 5~~%~~ percent of the tank capacity. ~~In any case, the~~The maximum storage volume shall not exceed 45 days for sodium hypochlorite and 60 days for all other chemicals.

SECTION 57. NR 811.40 (1) (cm) is created to read:

NR 811.40 (1) (cm) Graduated lines may not be used to determine daily chemical usage when the daily use is less than 5 percent of the tank capacity.

SECTION 58. NR 811.40 (1) (g) and (j) are amended to read:

NR 811.40 (1) (g) Means shall be provided to accurately determine the amount of chemical applied ~~either by measurement of the solution level in the tank or by weighing scales. Graduation lines~~

~~shall be in increments of approximately 2% to 3% of tank capacity. A meter shall be provided on the water fill line to a fluoride saturator~~ in accordance with s. NR 811.39 (6).

(j) Overflow pipes, if provided, shall be turned downward, ~~be appropriately screened~~ provided with a 24-mesh corrosion resistant screen, have a free air break discharge, and be located in a conspicuous location.

SECTION 59. NR 811.40 (1) (L) is repealed and recreated to read:

NR 811.40 (1) (L) Chemical Location. Chemicals shall be stored in accordance with the following requirements:

1. Each chemical shall be provided with its own secondary leakage containment.

2. Each of the following shall be stored in a separate room:

a. Fluoride.
b. Ammonia.
c. Powders.
d. Gases.

SECTION 60. NR 811.40 (1) (n) is renumbered NR 811.40 (1) (n) (intro.) and amended to read:

NR 811.40 (1) (n) Gases from feeders, storage, and equipment exhausts shall be conveyed to the ~~outside atmosphere~~ exterior of the building above grade and remote from air intakes~~. Liquid storage tanks shall be vented to the outside but not through vents in common with day tanks.~~to reduce the health and safety risk to operators and reduce corrosion of equipment and facilities from chemical vapors, and shall meet the following requirements as applicable:

SECTION 61. NR 811.40 (1) (n) 1. and 2. are created to read:

NR 811.40 (1) (n) 1. Fluoride and ammonia liquid storage tanks shall be vented to the outside but not through vents in common with day tanks.

2. Chemical tank vents, when provided, shall be vented the exterior of the building and terminate downward facing with a 24-mesh corrosion resistant screen. The tank vent should terminate as high as practical, but a minimum of 24 inches above surrounding grade.

SECTION 62. NR 811.43 (1) and (4) are amended to read:

NR 811.43 (1) DISINFECTION CAPABILITY REQUIRED. All existing and new municipal water systems ~~and all other than municipal water systems~~ constructed or modified after December 1, 2010, shall ~~be provided with~~ have equipment and the necessary appurtenances ~~which~~that can continuously disinfect the water. The department may require the installation of disinfection equipment at existing other-than-municipal water systems if necessary to ensure a safe water supply.

(4) DISINFECTION OF GROUNDWATER EXPOSED TO THE ATMOSPHERE AS PART OF A TREATMENT PROCESS. Disinfection of water drawn from groundwater sources ~~shall be~~ is required ~~in~~ at facilities ~~which~~that expose the water to the atmosphere, such as open basins, open filters, air stripping towers, or gravity aerators.

SECTION 63. NR 811.43 (9) is created to read:

NR 811.43 (9) TREATMENT FOR NITRATE. If the source water quality exceeds the nitrate maximum contaminant level set under s. NR 809.11 and treatment, blending, or other department-approved methods are provided to reduce the entry point nitrate concentration beneath the maximum contaminant level, a continuous nitrate analyzer shall be provided at the entry point. The continuous nitrate analyzer shall be programmed to include shut off controls or alarms if the nitrate concentration at the entry point exceeds the maximum contaminant level.

SECTION 64. NR 811.44 (1) (h) and (2) (Note) are created to read:

NR 811.44 (1) (h) Justification for pilot plant design and operation that does not meet the requirements of the applicable sections of subch. VII.

(2) Note: The department recommends the submittal of pilot plant results reports prior to submittal of final plans and specifications for treatment vessels.

SECTION 65. NR 811.45 (1) (e) is amended to read:

NR 811.45 (1) (e) Perforations are 3/16 to 1/2 inches in diameter, spaced one to 3 inches on ~~centers~~center, when perforations are used.

SECTION 66. NR 811.45 (2) (k) is repealed and recreated to read:

NR 811.45 (2) (k) The air inlet to the blower and the tower discharge vent shall meet all of the following requirements:

1. Be screened.

2. Be provided with a downturned, hooded, or mushroom cap that protects the screen from the entrance of extraneous matter including insects and birds, obnoxious fumes, all types of precipitation and condensation, and windborne debris or dust.

3. Be constructed of 24-mesh corrosion resistant material and installed at a location least susceptible to vandalism or damage.

4. Contain an air inlet that is provided with a dust filter.

SECTION 67. NR 811.45 (3m) is created to read:

NR 811.45 (3m) PACKED TOWER AERATION. Packed tower aeration systems shall meet all of the following requirements:

(a) Materials of construction shall meet all of the following requirements:

1. The packing material shall be certified by ANSI/NSF standard 61 dated January 5, 2016, which is incorporated by reference.

Note: A copy of ANSI/NSF standard 61 dated January 5, 2016 is available for inspection at the legislative reference bureau and may be obtained for personal use from NSF International, https://www.nsf.org.

2. The tower shall be constructed of stainless steel, concrete, or aluminum.

(b) Process design shall meet all of the following requirements:

1. Water loading rates shall be in the range from 15 to 30 gallons per minute/square foot. Water loading rates outside of this range may be used if justified to the department by pilot testing under s. NR 811.44.

2. The ratio of the packing height to column diameter shall be at least 7:1 for the pilot unit and at least 10:1 for the full-scale tower. The type and size of the packing used in the full-scale unit shall be the same as that used in the pilot study.

3. The minimum volumetric air to water ratio at peak water flow shall be 25:1 and the maximum should be 80:1. Air to water ratios outside of these ranges may be justified to the department by pilot testing under s. NR 811.44.

(c) The water flow system shall meet all of the following requirements:

1. Water shall be distributed uniformly at the top of the tower using spray nozzles or orifice-type distributer trays that prevent short circuiting.

2. A mist eliminator shall be provided above the water distributor system.

3. A side wiper redistribution ring shall be provided at least every 10 feet in order to prevent water channeling along the tower wall and short circuiting.

4. Smooth end sample faucets shall be provided on the influent and effluent piping.

5. The effluent sump shall have easy access for inspection and cleaning.

6. A pump to waste line shall be provided in the effluent piping to allow for discharge of water and chemicals used to clean the tower.

7. The design shall prevent freezing of the influent riser and effluent piping when the unit is not operating. If piping is buried, it shall be maintained under positive pressure higher than the ground surface.

8. The water flow to each tower shall be metered.

9. Include an overflow line that discharges 12 to 24 inches above a splash pad or drainage inlet. Proper drainage shall be provided to prevent flooding of the area.

10. Butterfly valves may be used in the water effluent line for better flow control and to minimize air entrainment.

11. Include means to prevent flooding of the air blower.

12. The water influent pipe shall be supported separately from the tower's main structural support.

(d) The air flow system shall meet all of the following requirements:

1. The air intake and outlet vent shall be protected with a 24-mesh corrosion resistant screen and cover and be accessible for maintenance and inspection.

2. The air inlet shall be in a location protected from airborne contaminants.

3. An air flow meter shall be provided on the influent air line or an alternative method to determine the air flow.

4. A positive air flow sensing device and a pressure gauge shall be installed on the air influent line. The positive air flow sensing device shall be a part of an automatic control system that will turn off the influent water if positive air flow is not detected. The pressure gauge shall serve as an indicator of the fouling buildup. The backup motor for the air blower shall be readily available.

(e) Other design features shall meet all of the following requirements:

1. Include a sufficient number of access ports with a minimum diameter of 24 inches to facilitate inspection, media replacement, media cleaning, and maintenance of the interior.

2. Include a method of cleaning the packing material when fouling may occur.

3. Tower effluent collection and pumping wells shall be constructed to potable reservoir construction standards as required under subch. IX.

4. Include provisions for extending the tower height without major reconstruction.

5. Include disinfection application points both ahead of and after the tower to control biological growth.

6. Include disinfection and adequate contact time after the water has passed through the tower, prior to the distribution system.

7. Include adequate packing support to allow free flow of water and prevent deformation with deep packing heights.

8. Include adequate foundation to support the tower and lateral support to prevent overturning to wind loading.

9. Include protections to prevent vandalism to the tower.

10. Provide access of all components of the tower, including the exhaust port and demister.

11. The operation of the blower and chemical feed pump shall be interlocked with the operation of the appropriate well or service pump.

SECTION 68. NR 811.47 (intro.) and (7) (b) 1. are amended to read:

NR 811.47 **Clarification.** ~~Plants designed to reduce suspended solids concentrations~~ Clarification plants prior to filtration shall meet all of the following requirements unless other design criteria are justified through pilot testing under s. NR 811.44 or other specific information provided to the department supports the proposed design, as determined by the department:

(7) (b) 1. 'Mixing.' The detention period shall not be more than ~~thirty~~30 seconds with mixing equipment capable of imparting a minimum velocity gradient (G) of at least 750 feet per second per foot or as determined through jar testing. The appropriate G value and detention time shall be determined through jar testing.

SECTION 69. NR 811.48 (1) (a) 2., 3., 4., (1) (b), (4) (title) and (5) (title) are amended to read:

NR 811.48 (1) (a) 2. ~~Hypochlorite feeders of the positive~~Positive displacement diaphragm type pumps.

3. Digitally controlled constant stroke length positive displacement type pumps.

4. Peristaltic type pumps.

(b) *Capacity*. The chlorinator capacity shall be such that a free chlorine ~~residual~~ dose of at least 2 mg/~~1~~L can be attained ~~in the water after a contact time of at least 30 minutes~~ when maximum flow rates coincide with anticipated maximum chlorine demands. Liquid chemical feed equipment shall be designed to operate in accordance with the requirements ~~of~~under s. NR 811.39 (2) (c). Solution-feed-gas-type chlorination chemical feed equipment shall be designed to operate between ~~30%~~ 10 percent and 70~~%~~ percent of the rotameter capacity. This may require that 2 rotameters be provided, one for normal feed rates and one for emergency feed rates. For all chemical feed systems, the emergency feeder setting shall be designed to provide a minimum of 2 mg/~~1~~L of chlorine.

(4) GAS CHLORINATOR PIPING.

(5) CHLORINE GAS HOUSING.

SECTION 70. NR 811.48 (5) (e) is repealed.

SECTION 71. NR 811.48 (6) (b) and (7) (a) are amended to read:

NR 811.48 (6) (b) The exhaust fan suction shall be ~~near~~ within 12 inches of the floor as far as practical from the door and air inlet, with the point of discharge located to avoid contamination of air inlets to other rooms and structures, and to avoid being blocked by snow or other obstructions.

(7) (a) Respiratory protection equipment, known as gas masks, meeting the requirements of the National Institute for Occupational Safety and Health (NIOSH) shall be available where chlorine gas is handled, and shall be stored at a convenient heated location, but not inside any room where chlorine is used or stored. The gas masks shall use compressed air, have at least a 30-minute capacity, and be compatible with or exactly the same as the gas masks used by the fire department responsible for the plant. The gas masks shall be available at all installations where chlorine gas is handled and shall be placed outside every room where chlorine gas is used or stored. At installations utilizing ~~100 or~~ 150-pound, or less, cylinders, an agreement with the local fire department ~~which~~that has an approved type of gas mask for the fire department to handle water system chlorine gas leaks may be approved by the department. Instructions for using, testing and replacing gas mask parts shall be posted. Other protective clothing shall be provided as necessary.

SECTION 72. NR 811.48 (8) is repealed and recreated to read:

NR 811.48 (8) AMMONIA. Ammonia chemical feed installations shall meet all of the following requirements:

(a) *Gaseous ammonia*. Housing and ventilation for ammoniation shall meet the requirements under subs. (5) and (6) for chlorine, except that the exhaust fan inlet shall be near the ceiling and the fresh air inlet shall be near the floor. Ammonia storage and feed facilities shall be separate from chlorine facilities because of the combustion hazard. A plastic bottle of hydrochloric acid shall be available and used for leak detection.

(b) *Ammonium sulfate*. Ammonium sulfate chemical feed installation shall meet the chemical storage requirements under s. NR 811.40.

(c) *Aqua ammonia*. Aqua ammonia installation shall meet all of the following requirements:

1. An aqua ammonia chemical feed and storage system shall be installed in its own dedicated room.

2. Bulk liquid storage tanks and day tanks shall be vented to the outside of the building and discharge downward facing with a 24-mesh corrosion resistant screen a minimum of 24 inches above grade. The chemical tank vents shall be provided with inert liquid traps.

3. An incompatible connector or lockout provisions shall be provided to prevent accidental addition of other chemical to the bulk liquid storage tanks.

4. The bulk liquid storage tanks shall be designed to avoid temperature increases that cause the ammonia vapor pressure over the aqua ammonia to exceed atmospheric pressure. The provisions shall include refrigeration or other means of external cooling or dilution and mixing of the contents with water without opening the bulk liquid storage tank.

5. An exhaust fan shall be installed to withdraw air from high points in the room and makeup air shall be allowed to enter at a low point.

6. The aqua ammonia feed pump, regulators, and lines shall be fitted with pressure relief vents discharging outside the building away from any air intake and with water purge lines leading back to the headspace of the bulk storage tanks.

7. The aqua ammonia shall be conveyed directly from a day tank to the treated water stream injector without the use of a carrier water stream unless the carrier stream is softened.

SECTION 73. NR 811.49 (1) (b), (c), (f) 6. b. and (j) 1. are amended to read:

811.49 (1) (b) *Number*. At least 2 filter units or cells shall be provided. Provisions shall be made to meet the plant design capacity at the approved filtration rate with one filter out of service. If only 2 units or cells are provided, each shall be capable of meeting the plant design capacity, normally the projected maximum daily demand.

(c) *Rate of filtration*. The permissible rate of filtration shall be determined after consideration of factors such as raw water quality, degree of pretreatment provided, filter media, water quality control parameters, competency of operating personnel, and other factors required by the department. If effective coagulation, flocculation, sedimentation, and filtration processes are to be utilized with relatively clean water sources, the following filtration rates may be approved:

Filtration Rate	Filter Media Type
2 gpm/ft^2	Single Media
3 gpm/ft^2	Dual Media
4 gpm/ft^2	Tri Media

In all cases, the filtration rate shall be proposed and justified by the design engineer and shall be approved by the department prior to the preparation of final plans and specifications. ~~Higher~~ The department may approve higher rates than indicated in this paragraph ~~may be approved~~ with sufficient justification by pilot testing under s. NR 811.44 or the design engineer.

(f) 6. b. Gravel, when used as the supporting media, shall consist of hard, rounded silica particles and may not include flat or elongated particles. The coarsest gravel shall be 2.5 inches in size when the gravel rests directly on the strainer system, and shall extend above the top of the perforated laterals or strainer nozzles. Not less than ~~4~~3 layers of gravel, in addition to the layer of torpedo sand, shall be provided in accordance with the following size and depth distribution when used with perforated laterals or strainer nozzles. Reduction of gravel depths may be considered upon justification to the department when proprietary filter bottoms are specified.

(j) 1. Sampling faucets on the individual and combined influent and effluent lines. Combined filter effluent sample faucets shall be located upstream of subsequent treatment processes.

SECTION 74. NR 811.49 (1) (k) 9. is created to read:

NR 811.49 (1) (k) 9. The backwash discharge shall terminate above a collection basin with a free air break. Backwash discharges may not be directly piped to a wastewater collection unless a breather pipe is installed that provides adequate backflow prevention.

SECTION 75. NR 811.495 is created to read:

NR 811.495 Filtration – pressure. A pressure filter may not be used in the filtration of surface water, polluted waters, or following lime-soda softening as provided under s. NR 811.57. A pressure filter shall meet all of the following requirements:

(1) NUMBER. At least 2 filter units or cells shall be provided. Provisions shall be made to meet the plant design capacity at the approved filtration rate with one filter out of service. If only 2 units or cells are provided, each shall be capable of meeting the plant design capacity, normally the projected maximum daily demand.

(2) RATE OF FILTRATION. The rate of filtration shall not exceed 4 gallons per minute per square foot of filter area except when pilot testing under s. NR 811.44 or full-scall testing as approved by the department has demonstrated adequate contaminant removal rates at the higher filtration rates, as determined by the department.

(3) FILTER MATERIAL. The filter media material shall meet the requirements under s. NR 811.49 (1) (f).

(4) DESIGN DETAILS. A filter shall be designed to provide for all of the following:

(a) Loss of head gauges on the inlet and outlet pipes of each filter.

(b) An easily readable meter of flow indicator on each battery of filters.

Note: A flow indicator is recommended for each filtering unit.

(c) Piping that allows filtration and backwashing of each filter individually.

(d) Minimum side wall shell height of 5 feet. A reduction in side wall height may be approved by the department when proprietary filter bottoms permit reduction of the gravel depth.

(e) The top of the wash water collectors to be at least 18 inches above the surface of the media.

(f) The underdrain system to efficiently collect the filtered water and to uniformly distribute the backwash water at a rate not less than 15 gallons per minute per square foot of filter area.

(g) Backwash flow indicators and controls that are easily readable while operating the control valves.

(h) An air release valve on the highest point of each filter cell. The discharge line from the relief valve shall be metal and terminate downward facing with a 24−mesh corrosion resistant screen, at least 24 inches above the floor.

(i) An accessible manhole to facilitate inspection and repairs for each filter cell.

(j) Means to observe the wastewater during backwashing.

(k) Construction to prevent cross connection.

SECTION 76. NR 811.50 (3) is amended to read:

NR 811.50 (3) PILOT TESTING. Prior to initiating the design of a membrane treatment facility, pilot testing under s. NR 811.44 shall be conducted. The pilot plant study shall be designed to identify the best membrane to use, need for pre- treatment, type of post- treatment, cold and warm water flux, backwash optimization, chemical cleaning optimization, fouling potential, operating and transmembrane pressure, integrity testing procedures, bypass ratio, amount of reject water, system recovery, process efficiency, particulate or organism removal efficiencies, and other design and monitoring considerations, each where applicable. The duration of the pilot testing shall be 9 to 12 months for microfiltration and ultrafiltration ~~on surface water supplies~~ and 2 to 7 months for reverse osmosis and nanofiltration ~~on groundwaters~~. The pilot testing shall be operated for a minimum of 3 clean in-place cycles unless an alternate operation schedule is approved by the department. The general protocol and sampling schedule shall follow the ~~US EPA~~ U.S. Environmental Protection Agency Membrane Filtration Guidance Manual, EPA 815-R-06-009, November 2005 Table 6.2, which is incorporated by reference, unless the department approves an alternative sampling schedule.

SECTION 77. NR 811.50 (3) (Note) is created to read:

Note: U.S. Environmental Protection Agency Membrane Filtration Guidance Manual, EPA 815-R-06-009 is the U.S. Environmental Protection Agency guidance for membrane filtration published on November 5, 2005. A copy of the U.S. Environmental Protection Agency standard is available for inspection at the legislative reference bureau and may be obtained from the U.S. Environmental Protection Agency, https://www.epa.gov.

SECTION 78. NR 811.51 (1) (c), (2) (a) and (3) (h) are amended to read:

NR 811.51 (1) (c) Unsealed storage units for fluorosilicic acid shall be vented to the atmosphere at a point outside the building. The vent piping shall terminate a minimum of 24 inches above grade with a down-turned U-bend. The vent pipe opening shall be covered with a 24-mesh corrosion resistant screen.

(2) (a) All chemical feed equipment, solution tanks, and acid containers shall be housed in a separate room within the pumphouse away from controls, electrical contacts, and other equipment subject to damage. Fluoride chemical feed installations shall be installed in a room separate from all other chemicals.

(3) (h) Provide soft water for fluoride saturator makeup water. A meter shall be provided on the water fill line to a fluoride saturator.

SECTION 79. NR 811.52 (1) (d) (intro.) is renumbered NR 811.52 (1) (d) and amended to read:

NR 811.52 (1) (d) *Rapid rate pressure filters*. Use of rapid rate pressure filters as well as gravity filters may be considered for iron and manganese removal. ~~Use, however, is subject to the following conditions:~~ Rapid rate pressure filters for iron and manganese shall meet the requirements under s. NR 811.49.

SECTION 80. NR 811.52 (1) (d) 1., 2., and 3. are repealed.

SECTION 81. NR 811.52 (3) (d) is amended to read:

NR 811.52 (3) (d) The normal backwash rate shall be 8 to 10 gallons per minute per square foot for manganese greens and media and 15 to 20 gallons per minute per square foot for manganese coated media. Lesser backwash rates may be used if justified to the department through pilot studies under s. NR 811.44 or by filter vessel manufacturers.

SECTION 82. NR 811.53 (2) (e) 7. is amended to read:

NR 811.53 (2) (e) 7. Any water passed through the tower shall be continuously disinfected ~~and provided with a minimum of 30 minutes of post-aeration contact time~~. If raw water has bacteriological issues, the department may require a minimum of 4-log inactivation of viruses as determined by the department on a case-by-case basis.

SECTION 83. NR 811.54 (2) (d) 2. is amended to read:

NR 811.54 (2) (d) 2. The filter before the compressor shall be of the coalescing type and be capable of removing all particles larger than 10 microns in diameter. The filter before the dryer shall be of the coalescing type and be capable of removing all particles larger than ~~5~~0.3 microns in diameter. The filter after the dryer shall be of the particulate type and be capable of removing all particles larger than ~~0.5~~ 0.1 microns in diameter or a size specified by the generator manufacturer.

SECTION 84. NR 811.55 (2) (c) is amended to read:

NR 811.55 (2) (c) Aerators used for radon removal shall comply with ~~ss~~. NR 811.45~~ and 811.53~~.

SECTION 85. NR 811.56 (1) (f) is repealed.

SECTION 86. NR 811.57 (2), (j) 3. and 4. are amended to read:

NR 811.57 (2) ~~ION~~ CATION EXCHANGE PROCESS. Iron, manganese or a combination of both in the oxidized state or unoxidized state may cause resin fouling in the ion exchange process. Pretreatment shall be required whenever the content of iron, manganese, or a combination of both is one milligram per liter or more. In specific instances, the department may also require pretreatment where lesser amounts exist. ~~In addition~~ All of the following requirements shall be satisfied unless the department determines sufficient justification for alternative operational parameters is provided by the vessel manufacturer or demonstrated through pilot testing under s. NR 811.44:

(j) 3. It shall be properly covered and equipped with manholes having overlapping watertight covers to prevent entry of surface runoff where applicable.

4. Overflows and vents shall be designed in accordance with s. NR 811.64 (4) and (8), respectively, where applicable.

SECTION 87. NR 811.57 (2) (j) 7. (Note) is repealed.

SECTION 88. NR 811.57 (2) (j) 8. and 9. are created to read:

NR 811.57 (2) (j) 8. Pipes and contact materials shall be resistant to the aggressiveness of salt. Steel and concrete shall be coated with a non-leaching protective coating that is compatible with salt and brine and is certified by ANSI/NSF standard 61, dated January 5, 2016, which is incorporated by reference.

Note: A copy of ANSI/NSF standard 61 dated January 5, 2016 is available for inspection at the legislative reference bureau and may be obtained for personal use from NSF International, https://www.nsf.org

9. Bagged salt and dry bulk salt storage shall be enclosed and separated from other operating areas to prevent damage to equipment.

SECTION 89. NR 811.575 is created to read:

NR 811.575 Anion exchange. The water system shall pretreat water when the content of iron, manganese, or a combination of both is 0.5 milligram per liter or more. The department may require a

water system pretreat water when the content of iron, manganese, or a combination of both is less than 0.5 milligram per liter but pretreatment is necessary to protect public health. The water system shall satisfy all of the following requirements unless the department determines sufficient justification for alternative operational parameters is provided by the anion exchange vessel manufacturer or demonstrated through pilot testing under s. NR 811.44:

(1) The anion exchange units shall be of pressure type, downflow design, using automatic or manual regeneration. A manual override shall be provided for all automatic controls.

Note: The department recommends automatic regeneration for small municipal water systems.

(2) Treatment systems designed for the removal of acute contaminants may not include a bypass for the anion exchange units. When an anion exchange unit is bypassed, a totalizing meter and a proportioning or regulating device or flow regulating valves shall be installed on the bypass line.

(3) The design capacity of the regeneration process shall be in accordance with the specifications of the resin manufacturer. For nitrate removal, the design capacity shall not exceed 10,000 grains per cubic foot when the resin is regenerated at 15 pounds of salt per cubic foot of resin.

(4) Water systems treating for acute contaminants shall use at least 2 anion exchange units. The treatment capacity of each unit shall be capable of producing the maximum day water demand at a level below the maximum contaminant level for the contaminant of concern.

(5) The anion exchange resin shall have high selectivity for the contaminant of concern.

(6) Flow rates through the anion exchange units shall be justified through pilot testing under s. NR 811.44 or by appropriate justification by the resin manufacturer.

(7) The freeboard design of the anion exchange unit shall be based upon the specific gravity of the media and the direction of water flow.

(8) The bottoms, strainer systems, and support for anion exchange materials shall conform to requirements for rapid rate gravity filters under s. NR 811.49 (1).

(9) Brine storage tanks shall conform to all of the following requirements:

(a) Each tank shall be designed to hold at least 1.5 times the volume of salt delivered to permit refill before the tank is completely empty. The volume of both salt and brine storage to be provided

depends upon the size of the plant, the proximity and assuredness of the salt source, and the method of delivery.

(b) Each tank shall be isolated from possible sources of contamination.

(c) Each tank shall be properly covered and equipped with manholes having overlapping watertight covers to prevent entry of surface runoff, where applicable. If the brine tanks are located outside of the pumphouse, the access manways shall meet the design requirements under s. NR 811.64 (7) (a).

(d) Each tank shall contain overflows and vents that are designed in accordance with s. NR 811.64 (4) and (8), when applicable.

(e) The water for filling the tank shall be distributed over the entire surface of the tank by pipes at least 2 pipe diameters above the maximum liquid level in the tank or be protected from back-siphonage.

(f) The underdrain collection system shall be covered with a screen or perforated plate to allow brine but not salt to pass through.

(g) The brine discharge line shall have a sampling tap so that the concentration of brine may be determined. A suitable means for measuring the volume of brine used for regeneration shall be provided.

(h) Pipes and contact materials shall be resistant to the aggressiveness of salt. Steel and concrete shall be coated with an ANSI/NSF standard 61 certified, non-leaching protective coating that is compatible with salt and brine.

Note: A copy of ANSI/NSF standard 61 dated January 5, 2016 is available for inspection at the legislative reference bureau and may be obtained for personal use from NSF International, https://www.nsf.org.

(i) Bagged salt and dry bulk salt storage shall be enclosed and separated from other operating areas to prevent damage to equipment.

(10) Brine wastes shall meet the requirements under s. NR 811.854.

(11) Smooth-end sampling taps shall be provided for control purposes. Taps shall be located on each raw water source, each treatment unit influent and each treatment unit effluent. Testing equipment shall be provided to adequately control the treatment process at all plants.

(12) Water from ion exchange treatment plants shall be stabilized as required under s. NR 811.58 (4), except when the department determines that the treated water will be non-corrosive.

(13) Prior to start-up of the equipment, the resin shall be regenerated with no less than 2 bed volumes of water containing sodium chloride, or other appropriate regenerant followed by an adequate rinse.

(14) Appropriate test equipment for the target contaminant shall be provided to determine treatment effectiveness.

SECTION 90. NR 811.58 (1) (e) is repealed.

SECTION 91. NR 811.60 (intro.) is amended to read:

NR 811.60 Ultraviolet (UV) Light. Ultraviolet ~~(UV)~~ light technology is a primary disinfectant typically used for *Cryptosporidium* and *Giardia lamblia* inactivation of both surface water and groundwater supplies. The ~~USEPA~~U.S. Environmental Protection Agency Ultraviolet ~~Light~~ Disinfection Guidance Manual ~~(USEPA UVDGM)~~, EPA 815-D-03-007 dated June 2003, which is incorporated by reference, shall be used as the basis for the validation, design, and operation of all ~~UV~~ ultraviolet light systems. Ultraviolet light disinfection systems shall meet the requirements of ANSI/NSF standard 55 Class A dated July 29, 2019, which is incorporated by reference. Water systems ~~which are~~ designed to provide ultraviolet light disinfection shall comply with all of the following:

SECTION 92. NR 811.60 (Note) is created to read:

Note: A copy of the U.S. Environmental Protection Agency Ultraviolet Disinfection Guidance Manual, EPA 815-D-03-007 dated June 2003 is available for inspection at the legislative reference bureau and may be obtained for personal use from the U.S. Environmental Protection Agency, epa.gov. A copy of ANSI/NSF standard 55 Class A dated July 29, 2019 is available for inspection at the legislative reference bureau and may be obtained for personal use from NSF International, nsf.org.

SECTION 93. NR 811.60 (3), and (5) (c) are amended to read:

NR 811.60 (3) VALIDATION. Ultraviolet light treatment devices shall be validated by a third party entity in accordance with the ~~USEPA~~U.S. Environmental Protection Agency Ultraviolet ~~Light~~ Disinfection Guidance Manual ~~(USEPA UVDGM)~~EPA 815-D-03-007 dated June 2003 or another

validation standard as approved by the department. The final installation shall be equivalent or more protective than the validation testing installation.

Note: A copy of the U.S. Environmental Protection Agency Ultraviolet Disinfection Guidance Manual, EPA 815-D-03-007 dated June 2003 is available for inspection at the legislative reference bureau and may be obtained for personal use from the U.S. Environmental Protection Agency, epa.gov.

(5) (c) All ultraviolet lamps shall be housed in type 214 quartz sleeves.

SECTION 94. NR 811.605 is created to read:

NR 811.605 Treatment for other contaminants. A water system shall justify treatment systems designed for the removal of other contaminants not regulated under this chapter or ch. NR 809 through department-approved pilot testing under s. NR 811.44.

SECTION 95. NR 811.61 (7) is amended to read:

NR 811.61 (7) The gross volume, in gallons, of any tank or combination of tanks, shall be at least 10 times the maximum pump capacity ~~of the largest pump~~, rated in gallons per minute, unless the proposed pump motor or motors will be controlled by a variable output control device in a manner intended to reduce the volume of required pressure tank storage in accordance with s. NR 811.34 (6). ~~For a standard installation, the required storage volume is intended to provide a minimum pump run time of 2 to 3 minutes.~~

SECTION 96. NR 811.61 (7) (Note) is created to read:

NR 811.61 (7) Note: The department recommends that the storage volume provides a minimum pump run time of at least 2 minutes.

SECTION 97. NR 811.63 (5) (a) and (b) are amended to read:

NR 811.63 (5) (a) Sewers, drains, fuel storage tanks, standing water, and similar sources of contamination shall be kept a minimum of 50 feet from the ground storage reservoir.

(b) The department may approve gravity or force main sewers within 50 feet of a ground storage reservoir if the sewer or force main is constructed of water main class pipe meeting the requirements ~~of~~under s. NR 811.69 and is pressure tested in place to meet the requirements ~~of~~under s. NR 811.12 (5) (d) 2.

SECTION 98. NR 811.64 (1) (a), (3) (a) 2., 3., (4) (a) 1., 3., and 5. are amended to read:

NR 811.64 (1) (a) *General requirements.* The materials and designs used for finished water storage structures shall provide stability and durability as well as protect the quality of the stored water. Unless the design engineer can justify the use of other materials, the department ~~will~~shall approve only steel, fiberglass, or concrete for use in a water storage facility. Porous materials, including wood and concrete block, may not be used.

(3) (a) 2. ~~Drains~~Reservoir drains may not be directly connected to a storm sewer. ~~The department may approve~~A WPDES permit is required for any discharge with a free air break over a storm sewer manhole or through a valved connection to the overflow piping ~~on a case-by-case basis~~.

3. ~~Drains~~Reservoir drains may not be directly connected to a sanitary sewer. ~~Clear water from drains may not be discharged to a sanitary sewer. The department may approve the temporary discharge of drain wastewater containing sediment and/or chemicals used for cleaning or temporary treatment of a water storage structure to a sanitary sewer on a case-by-case basis~~ Water from drains may not be discharged to a sanitary sewer except on a temporary basis when the drain water contains sediment or chemicals used for cleaning, such as during temporary cleaning of water storage facilities.

(4) (a) 1. 'Discharge.' The overflow pipe of a water storage structure shall ~~be brought down to within~~ terminate downward facing from horizontal, 45-degrees at a minimum of 12 to 24 inches ~~of~~ above the final graded ground surface ~~and shall discharge with a downward opening and~~ with a free air break over a drainage inlet structure, splash pad, or riprap. ~~The department may approve~~A WPDES permit is required for any discharge with a 12 to 24 inch free air break over a storm sewer manhole ~~on a case-by-case basis~~. Overflows may not discharge to a sanitary sewer.

3. 'Pipe material.' The ~~over flow~~ overflow pipe shall be constructed of ductile iron, steel, or stainless steel

5. 'Flapper ~~or rubber duck bill valve~~.' If a metal flapper valve ~~or a rubber duck bill valve~~ is used, a screen shall be provided in accordance with pars. (c) and (d).

SECTION 99. NR 811.64 (4) (a) 6. and 7. are created to read:

NR 811.64 (4) (a) 6. 'Rubber duckbill valve.' If a rubber duck bill valve is used, a screen is not required. Provisions shall be included to prevent the duckbill from freezing shut.

7. 'Overflow location.' An internal overflow pipe on an elevated storage tank shall be located in the access tube and discharge in accordance with par. (a). Internal overflows are prohibited on standpipes, ground storage reservoirs, and ground level storage tanks.

SECTION 100. NR 811.64 (4) (c) 1. is repealed.

SECTION 101. NR 811.64 (4) (c) 2. is renumbered NR 811.64 (4) (c).

SECTION 102. NR 811.64 (4) (d) 1., (7) (a), (b) and (8) (c) are amended to read:

NR 811.64 (4) (d) *Ground level structures*. 1. Overflow pipes shall terminate downward facing 90-degrees at a minimum of 12 to 24 inches above the final graded ground surface ~~in a manner to prevent the backflow of water into the reservoir~~.

(7) (a) *Elevated storage structures and reservoirs covered by inhabitable structures.* Manholes on elevated tanks, standpipes and reservoirs covered by inhabitable structures shall be framed a minimum of 4 inches above the surface of the roof. Manhole openings shall be fitted with a solid watertight cover ~~which overlaps~~. Manhole covers for elevated tanks shall overlap the framed opening and ~~extends~~extend down around the frame a minimum of 2 inches. A compressible gasket shall be ~~attached to the bottom side of the cover~~ provided so that when the cover is closed it will provide a water tight seal around the manhole opening.

(b) *Ground storage structures.* On ground level structures, manholes shall be elevated no less than 24 inches above the top or covering sod. Manhole openings shall be fitted with a solid watertight cover ~~which~~that overlaps the framed opening and extends down around the frame a minimum of 2 inches. A compressible gasket shall be ~~attached to the bottom side of the cover~~ provided so that when the cover is closed it will provide a water tight seal around the manhole opening.

(8) (c) *Elevated tanks and standpipes.* Vents installed on elevated tanks and standpipes shall terminate ~~in a U-bend or~~ with a mushroom cap constructed with the opening at least 4 inches above the roof and ~~covered~~ shall be provided with a 4-mesh outer screen and 4- to 24-mesh inner screen constructed of corrosion resistant ~~screen~~ material installed within the pipe ~~or cap~~ at a location protected from the environment. ~~Mushroom caps~~The mushroom cap shall be provided with an automatically resetting pressure-vacuum relief ~~"~~frost-proof~~"~~ mechanism. The skirted sides of mushroom caps shall totally cover any screens when viewing the cap from the side.

SECTION 103. NR 811.64 (8) (f) 4. is created to read:

NR 811.64 (8) (f) 4. Inner pallet screens of frost-proof mushroom cap vents shall be constructed of corrosion resistant material.

SECTION 104. NR 811.64 (10) (i) is amended to read:

NR 811.64 (10) (i) *Exposed reinforced poured-in-place flat concrete roofs.* Reinforced poured-in-place flat concrete roofs exposed to the environment shall be provided with a minimum roof slope of 0.015 feet per foot to facilitate drainage and a minimum 0.060 inch thick flexible waterproofing membrane installed over the roof. Department approval of the specific membrane proposed is required. The installation of stone ballast over the membrane is optional.

SECTION 105. NR 811.64 (10) (i) (Note) and (16) (b) are repealed.

SECTION 106. NR 811.64 (16) (c) is amended to read:

NR 811.64 (16) (c) *Valve vaults and above grade enclosures.* Valve vaults and above grade enclosures installed at the base of storage facilities shall be protected against freezing and provided with floor drainage ~~facilities discharging~~ . Floor drains may be connected to a sanitary sewer, where available, if the floor elevation is at least one foot above the rim elevation of the nearest upstream sanitary sewer manhole. If a sanitary sewer is available but a manhole is not located nearby or the manhole does not comply with the upstream location or the one foot requirement, the department may require installation of an additional manhole on the sanitary sewer main or on the sanitary building sewer. The facility may discharge to the ground surface by gravity, if possible, or else by a floor sump with a sump pump permanently installed. If constructed outside of the storage facility, the entrance to the vault or enclosure shall be locked to prevent unauthorized access.

SECTION 107. NR 811.64 (16) (d) is created to read:

NR 811.64 (16) (d) *Condensate platform drains.* Condensate platform drains shall not be directly connected to the overflow piping. The condensate platform drain shall be a minimum 2-inch diameter pipe and shall be brought down to within 12 to 24 inches of the ground surface and discharge downward facing with a free air break over a drainage inlet structure, splash pad, or riprap.

SECTION 108. NR 811.68 (2) and (3) are amended to read:

NR 811.68 (2) MUNICIPALLY OWNED MAINS ON PRIVATE PROPERTY. All water mains and other distribution system components owned by a municipal water system on private property shall be installed in permanent easements.

(3) PRIVATELY OWNED LOOPED MAINS AND PRIVATE WATER SERVICES REQUIRING CHECK VALVES. Water mains and water services to be connected to the publicly owned distribution system at more than one point may be privately owned and maintained provided that a check valve is installed on the water main at each point of connection to the distribution system to prevent water from flowing back into the distribution system. Each check valve shall be located in a manhole or vault and shall be immediately preceded and followed by a buried or exposed shut-off valve on the main. The water supplier shall have access to the manholes and valves for inspection purposes.

SECTION 109. NR 811.685 is created to read:

NR 811.685 Interconnections with other water sources. Water systems shall obtain department approval prior to any interconnections between a public water supply system and another source of water in accordance with s. NR 810.15 (2), including interconnections solely for emergency backup purposes.

SECTION 110. NR 811.69 (1) and (3) are amended to read:

NR 811.69 (1) ACCEPTABLE MATERIAL. All pipe used for water main installations shall be cast iron, ductile iron, steel, reinforced concrete, polyvinyl chloride, high density polyethylene, copper, or materials specially approved by the department for restricted or experimental use. If a restricted or experimental use approval is issued, the department may require special precautions until a satisfactory use record has been established. For polyvinyl chloride pipe, the pipe must have a maximum dimension ratio of 18 and only joints with elastomeric gaskets or butt fusion welds shall be used.

(3) LEAD FREE. Any pipe, pipe fittings, solder, or flux used in the installation or repair of any public water system shall be lead free. Lead free is defined, with respect to solders and flux, as containing not more than 0.2~~%~~ percent lead and, with respect to pipes and pipe fittings, as containing not more than ~~8.0%~~0.25 percent lead. Repairs to lead joints shall be made using alternative methods, if possible. For ductile iron pipe, the use of lead tipped gaskets is prohibited.

SECTION 111. NR 811.70 (1), (4) and (9) are amended to read:

NR 811.70 (1) GENERAL. Water mains and water distribution systems shall be designed and operated to maintain point-of-entry water quality. Special consideration shall be given to distribution

main sizing, providing multidirectional flow where possible, providing an adequate number of shut-off valves for distribution system control, providing an adequate number of fire hydrants where fire protection will be provided, and providing for adequate flushing throughout the system. Systems shall be designed to maximize turnover, to minimize the number of dead ends, and to minimize residence times while delivering code complying pressures and flows.

(4) PRESSURE. All water mains, including transmission mains and those not designed to provide fire protection, shall be sized after a hydraulic analysis based on flow demands and pressure requirements. The minimum and maximum normal static pressure in the distribution system shall be 35 psi and 100 psi, respectively, at ground level. The system shall be designed and operated to maintain a minimum residual pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow.

(9) VALVING. Sufficient valves shall be provided on water mains so that inconvenience or sanitary hazard to water users will be minimized during maintenance and construction. Valves shall be located at not more than ~~500-foot intervals in commercial districts and at not more than one block or~~ 800-foot intervals ~~in other districts~~ for distribution system mains. Valves shall not be located at more than 1-mile intervals for transmission mains and shall be located immediately on each side of a distribution system branch.

SECTION 112. NR 811.71 (1), (5) and (7) are amended to read:

NR 811.71 (1) LOCATION. Fire hydrants shall be provided at each street intersection and at intermediate points between intersections. ~~Generally, fire~~ Fire hydrant spacing ~~may range from 350 to~~ shall be no more than 600 feet ~~depending on the type of area being served and the individual fire hose length and fire fighting practices utilized by each system~~between fire hydrants.

(5) AUXILIARY VALVES ON HYDRANT LEADS. Auxiliary valves shall be installed ~~in~~ on all hydrant leads ~~off transmission water mains, off water mains in commercial and industrial districts and off all water mains 12 inches and larger~~.
~~Note: The department recommends that auxiliary valves be installed in all hydrant leads. Also, hydrants of the type that remain closed when the barrels are broken off are recommended~~.

(7) FLUSHING HYDRANTS. Flushing hydrants or blow-off installations shall be installed at all dead ends and at intermediate locations as necessary in order to remove sediment and optimize water quality for all water systems that do not provide fire protection. Flushing hydrants shall be sized to provide a minimum velocity of ~~2.5~~3.0 feet per second in the water main being flushed. Flushing hydrants shall

allow frost-proof operation. If necessary, flushing hydrants shall be pumped out prior to freezing weather.

SECTION 113. NR 811.72 (1) and (2) (c) are amended to read:

NR 811.72 (1) AIR-RELIEF FACILITIES. If possible, water mains shall be constructed to avoid high points at which air can accumulate. Permanent provisions shall be installed to remove the air by means of air relief valves, hydrants, or blow-offs when high points cannot be avoided. Automatic air-relief valves may not be used in situations where flooding of the manhole or chamber may occur. The open end of an air-relief pipe shall be extended to the top of a manhole or chamber and have a screened, downward facing elbow equipped with a 24-mesh corrosion resistant screen. If a chamber vent pipe is installed, the vent pipe shall be metal, terminate downward facing a minimum of 24 inches above grade, and be covered with a rodent screen.

(2) (c) *Installation requirements.* If not installed in the road right-of-way or if installed in the road right-of-way in areas with minimal risk from damage due to traffic and maintenance equipment, larger below grade facilities or below grade facilities housing pumps and other electrical equipment shall meet the applicable booster pumping station requirements of s. NR 811.84. In addition, if installed in vulnerable areas of the road right-of-way, the facilities may be constructed with a gasketed, watertight, bolt-down cover at grade if approved by the department. ~~All structures shall be vented to the atmosphere.~~

SECTION 114. NR 811.73 (2) (e) is amended to read:

NR 811.73 (2) (e) *Cover.* Sufficient earth or other suitable cover shall be provided over mains to prevent freezing. A minimum cover of 5 ~~to 7~~ feet is required unless determined by the department to be unnecessary in specific cases. Insulation may be required at some installations to prevent freezing.

SECTION 115. NR 811.73 (2) (e) (Note) is created to read:

Note: The department recommends a minimum depth of cover of 6.5 feet. To assure water mains are installed to prevent freezing, consideration should be given to site specific conditions, such as water demand in the area, frost and groundwater depth, and water mains constructed under streets, highways, or other non-soil surfaces.

SECTION 116. NR 811.75 (1) (a) is renumbered NR 811.75 (1) (ar) and amended to read.

NR 811.75 (1) (ar) Eight feet between a water main and a POWTS holding, treatment, or dispersal component, sanitary sewer lift-station ~~or~~, grave site, stormwater detention pond, retention pond, or infiltration basin.

SECTION 117. NR 811.75 (1) (ag) is created to read:

NR 811.75 (1) (ag) Three feet between a water main and a stormwater collection system treatment unit, such as a bioswale or permeable paver system.

SECTION 118. NR 811.75 (1) (c) is amended to read:

NR 811.75 (1) (c) Fifty feet between a water main and a sanitary landfill or agricultural, industrial, commercial, or municipal wastewater treatment plant treatment unit, lagoon, or storage structure.

SECTION 119. NR 811.84 (9) is amended to read:

NR 811.84 (9) Underground stations shall be equipped with heating, ventilation, and dehumidification equipment. Sump and sump pump equipment shall be provided unless a discharge to the ground surface can be provided. Access manways shall terminate a minimum of 24 inches above grade with an overlapping, gasketed, watertight, locking cover. Sump pump discharge and vent pipes shall be metal and terminate a minimum of 24 inches above grade in a downward facing U-bend with a 24-mesh corrosion resistant screen. Chemical addition equipment may not be installed in underground stations.

SECTION 120. NR 811.85 is renumbered NR 811.815 (intro.) and amended to read:

NR 811.85 General. ~~The discharge of pollutants from a waterworks facility into the waters of the state or into a publicly owned treatment works, as those terms are defined in s. 283.01, Stats., shall conform to all the applicable requirements of ch. 283, Stats., and the rules adopted under ch. 283, Stats.~~ Provisions shall be made for proper disposal of all wastes from waterworks facilities~~. Wastes may be~~ including wastes from sanitary facilities, laboratories, ~~or~~ and treatment plants. ~~If new methods are proposed or the treatment results are uncertain, the department may require laboratory, pilot, or full scale testing to establish design parameters. Sections NR 811.853 to 811.862~~ All waterworks facilities shall meet the general requirements of this section and the relevant sections of this subch., which contain ~~general~~ standards to be utilized in meeting the requirements of ch. 283, Stats. ~~System owners proposing discharges other than to already permitted wastewater treatment plants shall obtain a WPDES permit.~~ The

discharge of specific types of wastes shall be limited to those methods listed in this subch.. If other treatment or disposal methods are proposed or the treatment results are uncertain, the department may require laboratory testing, pilot testing under s. NR 811.44, or full-scale testing to establish design parameters. In addition, water system waste disposal must meet all of the following requirements:

SECTION 121. NR 811.85 (1) and (2) are created to read:

NR 811.85 (1) DISCHARGE REQUIREMENTS. Waterworks wastewater that is not recycled within the waterworks or disposed of in a licensed landfill shall meet all of the following provisions. The following provisions are also required for sludge and solid wastes generated in the drinking water treatment process:

(a) *Discharge to a sanitary sewer*. 1.The indirect discharge of any pollutant from a waterworks facility into a publicly owned treatment works shall conform to all the applicable requirements under ch. NR 211.

2. An equalization tank or lagoon shall be provided if it is necessary to prevent overloading the sewers or interference or pass through at the publicly or privately owned treatment works.

(b) *Discharge to a water of the state*. 1. The discharge of any pollutant from a water treatment plant to a water of the state shall be in accordance with the limitations and terms contained within a WPDES permit issued for the discharge. The discharge of solely sanitary wastes to a POWTS, as allowed under s. NR 811.851, is exempt from this requirement.

Note: The department's wastewater program in the bureau of water quality is responsible for the issuance of WPDES permits for discharges from waterworks to a water of the state. Waterworks owners should contact the department's district wastewater staff for WPDES permit application and administration.

2. The radionuclide content of the wastewater, including waste sludge, shall comply with s. NR 811.856. Any proposed land treatment system shall comply with the applicable requirements under ss. NR 204.07 and 214.18.

3. Land application of wastewater and sludge shall comply with the applicable requirements under s. NR 204.07 and ch. NR 214. Under s. NR 214.02 (3) (k), uncontaminated lime sludges applied in accordance with s. NR 518.04 (3) are exempt from this requirement.

Note: Uncontaminated lime sludge excludes any sludge containing radium-226, radium-228, or uranium and other contaminants that are regulated under a WPDES permit under ch. 283, Stats.

4. The discharge of wastewater to a water of the state shall be separated from a well in accordance with the applicable separation distances under s. NR 811.12 (5) (d) 6. and 8. The department may apply additional limitations to the location of a discharge on a case-by-case basis if necessary for adequate protection of a groundwater or surface water source.

(c) *Discharge to a holding tank*. 1. All wastewater discharged to a holding tank shall be regularly pumped and hauled to a permitted wastewater treatment plant.

2. The indirect discharge of any pollutant from a waterworks facility into a publicly owned treatment works shall conform to all the applicable requirements under ch. NR 211. The discharge shall not interfere with the operation of and effluent quality from a privately owned treatment works.

(2) PLAN APPROVAL. With the exception of facilities defined solely as plumbing under s. 145.01 (10), Stats., a wastewater conveyance, treatment, storage, equalization, or discharge facility shall be reviewed and approved by the department prior to construction under s. 281.41, Stats. A wastewater conveyance, treatment, storage, or equalization structure shall meet the design requirements under this chapter and ch. NR 213. A land treatment system shall also meet applicable design requirements under ch. NR 214.

Note: The department's wastewater section in the bureau of water quality is responsible for the review of plans for wastewater facilities. Plans for such alterations should be submitted to both the wastewater section and the public water engineering section.

SECTION 122. NR 811.851 is amended to read:

NR 811.851 Sanitary wastes. Wastes from toilet facilities shall be discharged to a sanitary sewer system. The floor elevation ~~to~~ of a building from which there is a discharge shall be constructed at least one foot above the rim of the nearest sanitary sewer manhole in accordance with s. NR 811.25 (1) (h) to prevent contamination from sewer backup. Where a sanitary sewer system is not available, the ~~installation of~~ department may approve the discharge to a holding tank or an individual POWTS ~~may be approved by the department~~ if the installation meets ch. SPS 383 requirements and if the POWTS separation distances to a community water system well ~~shall~~ comply with the requirements ~~of~~under s. NR 811.12 (5) (d). A holding tank or POWTS shall meet the requirements under s. NR 811.25 (1) (h) 2. c.

SECTION 123. NR 811.853 (intro.) is created to read:

NR 811.853 Backwash wastewater from iron and manganese filters. Iron and manganese filter backwash shall be discharged according to one of the following methods:

SECTION 124. NR 811.853 (1), (2) (a) and (d) are amended to read:

NR 811.853 (1) DISCHARGE TO A SANITARY SEWER. Backwash wastewater from iron and manganese removal filters may be discharged to a sanitary sewer ~~if the discharge will not overload the facilities or adversely affect the wastewater treatment process. The radionuclide content of the wastewater shall comply with s. NR 811.856. An equalization tank shall be provided when it is necessary to prevent overloading the sewers or wastewater treatment plant~~ subject to the requirements under s. NR 811.85 (1) (a).

(2) (a) Filters shall be designed for a maximum rate of 35 gallons per square foot per day except if testing indicates that higher rates will not cause excessive plugging of the media and a quality effluent can be maintained. Sufficient surface area shall be provided so that during any filtration cycle the wastewater depth over the media does not exceed 2 feet. The filters shall be sized to handle the entire backwash volume from all of the iron and manganese filters at the treatment plant unless the iron and manganese filters are washed on a rotating schedule.

(d) An adequate underdrainage collection system shall be provided. Provision shall be made to allow for sampling the filter effluent.

SECTION 125. NR 811.853 (2) (g) is repealed and recreated to read:

NR 811.853 (2) (g) The filtrate shall be discharged to a sanitary sewer, water of the state, or holding tank and shall meet the provisions under s. NR 811.85 (1).

SECTION 126. NR 811.853 (3) (b) is amended to read:

NR 811.853 (3) (b) Lagoon length shall be 4 times the width, and the width shall be at least 3 times the depth. The minimum useable depth shall be 3 feet.

SECTION 127. NR 811.853 (3) (d) is repealed and recreated to read:

NR 811.853 (3) (d) Lagoons shall be designed to comply with ch. NR 213.

SECTION 128. NR 811.853 (3) (e) is created to read:

NR 811.853 (3) (e) The lagoon effluent shall be discharged to a sanitary sewer, water of the state, or holding tank and shall meet the provisions under s. NR 811.85 (1) or shall be returned to the water treatment plant in accordance with the requirements under s. NR 811.862.

SECTION 129. NR 811.853 (4) (b) is amended to read:

NR 811.853 (4) (b) ~~Pumps shall be provided to discharge the decant water to a storm sewer or receiving watercourse over approximately a 24-hour period.~~ A convenient means of sampling the effluent shall be provided. ~~Any discharge requires a WPDES permit. The radionuclide content of the wastewater shall comply with s. NR 811.856.~~

SECTION 130. NR 811.853 (4) (c) is repealed and recreated to read:

NR 811.853 (4) (c) The detention tank supernatant shall be discharged to a sanitary sewer, water of the state, or holding tank and shall meet the provisions under s. NR 811.85 (1) or shall be returned to the water treatment plant in accordance with the requirements under s. NR 811.862. If discharged to a water of the state, pumps shall be provided to discharge the supernatant over approximately a 24-hour period.

SECTION 131. NR 811.853 (4) (d) is amended to read:

NR 811.853 (4) (d) Settled sludge removed from detention tanks shall be disposed of at a wastewater treatment plant unless the department approves an alternate disposal location on a case-by-case basis. <u>The disposal of sludge shall meet the applicable requirements under s. NR 811.85 (1).</u>

SECTION 132. NR 811.854 is repealed and recreated to read:

NR 811.854 Brine wastes from ion exchange plants. Brine wastes from ion exchange processes may be discharged to a water of the state subject to the requirements under s. NR 811.85 (1) (b). An equalization tank of sufficient size to allow brine discharge over at least a 24-hour period shall be provided. The department may approve a smaller tank or no equalization if the water system facility demonstrates to the department that reduced equalization is unnecessary to prevent toxicity to aquatic life.

SECTION 133. NR 811.855 is repealed and recreated to read:

NR 811.855 Wastewater from reverse osmosis plants. Reject, backwash, and concentrate wastewaters from reverse osmosis processes may be discharged to a water of the state subject to the requirements under s. NR 811.85 (1) (b). Chemical cleaning waste shall not be discharged to a water of the state. An equalization tank of sufficient size to allow discharge over at least a 24-hour period shall be provided for a surface water discharge. The department may approve a smaller tank or no equalization if the waterworks facility demonstrates to the department that reduced equalization is unnecessary to prevent toxicity to aquatic life.

SECTION 134. NR 811.856 (intro.) is repealed and recreated to read:

NR 811.856 Water treatment plant wastewater radionuclide content compliance with the unity equation. Water treatment plant wastewater containing radium or uranium shall not be discharged to a sanitary sewer or to waters of the state unless all of the following requirements are met:

SECTION 135. NR 811.856 (2) (a) is amended to read:

NR 811.856 (2) (a) Unity ~~Equation~~equation calculations in accordance with sub. (1) shall be performed for water treatment plants treating wells with combined radium-226 and radium-228, uranium, or both, exceeding the maximum contaminant level ~~unless required by the department in individual cases or~~. The department may require unity equation calculations on a case-by-case basis if other ~~less common radionuclide elements~~ radionuclides may be of concern.

SECTION 136. NR 811.857 (1) (title) is created to read:

NR 811.857 (1) RECYCLE.

SECTION 137. NR 811.857 (2) and (3) are amended to read:

NR 811.857 (2) ~~Direct or controlled discharge~~ DISCHARGE TO A SANITARY SEWER. Lime softening backwash water may be discharged to a sanitary sewer system ~~may be allowed by the department if the discharge will not overload the facilities or adversely affect the wastewater treatment process~~ subject to the requirements under s. NR 811.85 (1) (a).

(3) ~~Discharge to surface water.~~ DISCHARGE TO A WATER OF THE STATE. Backwash wastewater from lime softening treatment plants may be discharged to a water of the state subject to the requirements under s. NR 811.85 (1) (b). Suspended solids shall be removed from the filter backwash wastewater ~~before the filter backwash wastewater is discharged to surface water. This will require~~ prior to discharge

by means of settling, and possibly coagulation. ~~Any discharge requires a WPDES Permit.~~ The pH shall be adjusted to within the range of 6.0 and 9.0 prior to surface water discharge.

SECTION 138. NR 811.858 (intro.), (1) (b), (d) and (f) are amended to read:

NR 811.858 Lime softening sludge. Sludge from plants using lime to soften water will vary in quantity and in chemical characteristics depending on the softening process and the chemical characteristics of the water being softened. The department shall ~~determine special~~ impose additional disposal requirements on a case-by-case basis for sludge from plants treating water containing radium-226, radium-228, ~~or~~ uranium, or other radionuclides. These ~~special~~ additional requirements shall modify the requirements for specific disposal methods. The requirements for specific disposal methods are as follows:

(1) (b) Minimum lagoon depth of ~~4 to~~ 5 feet with interior and exterior slopes of 3:1.

(d) ~~Multiple~~ A minimum of 2 cells to provide flexibility in operation. The inlet and outlet structures shall be designed so that the cells may be operated independently.

(f) Means of convenient cleaning ~~where appropriate~~.

SECTION 139. NR 811.858 (1) (g) and (h) are created to read:

NR 811.858 (1) (g) Lagoons shall be designed to comply with ch. NR 213.

(h) Supernatant from lagoon thickening shall be discharged to a sanitary sewer, water of the state, or holding tank, under the applicable requirements of s. NR 811.85 (1). Lime softening sludge supernatant that is discharged to a water of the state shall meet the treatment requirements under s. NR 811.857 (3).

SECTION 140. NR 811.858 (2) is amended to read:

NR 811.858 (2) APPLICATION TO AGRICULTURAL LAND. The department may allow liquid sludge to be applied to agricultural land by tank truck ~~if the solids do not exceed 10 to 12% by weight~~. This method requires proper handling facilities, vehicles, and equipment to allow hauling and spreading ~~which~~that does not create ~~a~~ dust, odors, or other nuisance conditions. Adequate sludge holding facilities are required for use during times that trucks cannot operate. ~~Higher solids content sludges may also be spread. However, prior to increasing the solids content the local department sludge management specialist shall be contacted to evaluate the acceptability of spreading the high solids sludge.~~ Land

application of sludge, including the ~~radium-226~~ radionuclide content, shall comply with ~~the applicable requirements of s. NR 204.07~~ s. NR 811.85 (1) (b).

SECTION 141. NR 811.858 (2) (Note) is created to read:

NR 811.858 (2) Note: Under s. NR 214.02 (3) (k), uncontaminated lime sludges from water supply treatment facilities shall follow the land spreading requirements under s. NR 518.04 (3). Uncontaminated lime sludges would exclude any sludges containing radionuclide content that are regulated under a WPDES permit under ch. 283, Stats. The department's wastewater program in the bureau of water quality is responsible for the issuance of WPDES permits for discharges from waterworks to a water of the state. Waterworks owners should contact the department's district wastewater staff for WPDES permit application and compliance requirements.

SECTION 142. NR 811.858 (3) is amended to read:

NR 811.858 (3) DISCHARGE TO A SANITARY SEWER. Discharge to sanitary sewer may be ~~utilized~~ approved on a case-by-case basis if a study or experience has shown that problems will not occur in the sewage collection system or at the wastewater treatment plant. ~~An equalization tank may be necessary to even out flows to the sewer system. The radionuclide content of the sludge shall comply with s. NR 811.856.~~ The discharge of lime softening sludge shall meet the requirements under s. NR 811.85 (1) (a). A water system facility shall submit plans to both the department's wastewater section and public water engineering section for a new discharge or an increase in volume or percent solids of lime softening sludge to sanitary sewer for review and approval prior to initiation of the construction or operational change that would result in the new or increased discharge of lime softening sludge.

SECTION 143. NR 811.858 (4) is repealed and recreated to read:

NR 811.858 (4) MECHANICAL DEWATERING. Mechanical dewatering may be utilized if approved by the department after review of the results of pilot testing. Supernatant from mechanical dewatering shall be discharged to a sanitary sewer, water of the state, or holding tank, pursuant to the applicable requirements under s. NR 811.85 (1). Effluent that is discharged to a surface water shall also meet the treatment requirements under s. NR 811.857 (3).

SECTION 144. NR 811.859 (1) (intro.), (a) and (2) are amended to read:

NR 811.859 (1) GENERAL. ~~Spent media from water treatment plants may require special handling and disposal. The department shall evaluate on a case-by-case basis the proper handling and~~

~~disposal techniques for spent media~~. The department may require special handling and disposal for spent media from water treatment plants under any of the following circumstances:

(a) Granular activated carbon shall be evaluated when treating water with volatile organic compounds ~~or~~, radium, uranium, or radon gas.

(2) DISPOSAL APPROVAL. The water system shall contact the department ~~shall be contacted~~ for approval prior to disposal of the medias listed ~~in~~under sub. (1). ~~A~~The water system shall submit a written request indicating the type of media, the volume of media, the contaminants of concern and their concentration in the influent water and the media, the proposed method of transportation, and the proposed method of disposal ~~shall be submitted to the department~~. Landfills that accept spent media from water treatment facilities that treated groundwater containing radium shall comply with the requirements under s. NR 506.12 prior to accepting the spent media waste for disposal.

SECTION 145. NR 811.860 (1) is amended to read:

NR 811.860 (1) RECYCLING. Filter backwash wastewater may be returned to the inlet end of the plant in accordance with the requirements ~~of~~under s. NR 811.862. Membrane filtration plants may not recycle backwash wastewater unless the waste goes through coagulation and settling processes prior to being applied to the membranes. Membrane manufacturers may have specific feed water quality parameter requirements that could limit recycling. Chemical cleaning waste from membrane plants may not be recycled unless specifically approved by the department. ~~All plants~~A plant recycling filter wastewater shall have an alternative means of disposing of wastewater available during ~~challenging~~ periods when raw water quality ~~periods~~ precludes the ability to recycle all or some of the backwash water.

SECTION 146. NR 811.860 (2) and (3) are repealed and recreated to read:

NR 811.860 (2) DISCHARGE TO A SANITARY SEWER. Backwash water may be discharged to a sanitary sewer system subject to the requirements under s. NR 811.85 (1) (a).

(3) DISCHARGE TO A SURFACE WATER. Backwash wastewater from filtration for surface water treatment may be discharged to a surface water of the state subject to the requirements under s. NR 811.85 (1) (b) and all of the following requirements:

(a) Suspended solids shall be removed from the filter backwash wastewater prior to surface water discharge. This will require settling and may require coagulation as determined by the department on a

case-by-case basis. Additional treatment may be necessary to meet the requirements of the WPDES permit.

(b) The solids removed during treatment of backwash water shall be land spread or discharged to a holding tank in accordance with the requirements under s. NR 811.85 (1) (b) and (c).

(c) Chemical cleaning waste from membrane plants may not be discharged to surface water.

SECTION 147. NR 811.861 (1) and (2) are amended to read:

NR 811.861 (1) LAGOONS. The general design criteria for lagoons ~~is in~~ are under s. NR 811.858 (1). The lagoon effluent shall be discharged to a sanitary sewer, water of the state, or holding tank and shall meet the provisions under s. NR 811.85 (1).

NR 811.861 (2) DISCHARGE TO SANITARY SEWERS. ~~Discharge~~ The department may approve the discharge of coagulant sludge to sanitary sewers ~~may be utilized~~on a case-by-case basis if a study or experience has shown that problems will not occur in the sewage collection system or at the sewage treatment plant. ~~A holding tank may be necessary to even out flows to the sewer system. The radionuclide content of the sludge shall comply with s. NR 811.856.~~ The discharge of coagulant sludge shall meet the requirements under NR 811.85 (1) (a). The water system shall submit plans for a new discharge or an increase in volume or percent solids of coagulant sludge to sanitary sewer to the department for review and approval prior to initiation of the construction or operational change that would result in the new or increased discharge of lime softening sludge.

SECTION 148. NR 811.861 (2) (Note) is created to read:

Note: Plans for such an alteration should be submitted to both the department's wastewater section and public water engineering section.

SECTION 149. NR 811.861 (4) (title) is amended to read:

NR 811.861(4) (title) ~~SUPERNATENT~~SUPERNATANT WATER.

SECTION 150. NR 811.862 (1) (b) is amended to read:

NR 811.862 (1) (b) ~~The~~To provide operational flexibility, the tanks shall be of adequate size to contain the total waste washwater from 2 consecutive backwashes~~to provide operation flexibility~~, subject to the design backwash operations.

SECTION 151. EFFECTIVE DATE. This rule takes effect on the first day of the month following publication in the Wisconsin Administrative Register as provided in s. 227.22 (2) (intro.), Stats.

SECTION 152. BOARD ADOPTION. This rule was approved and adopted by the State of Wisconsin Natural Resources Board on [DATE].

Dated at Madison, Wisconsin _____.

STATE OF WISCONSIN

DEPARTMENT OF NATURAL RESOURCES

BY _____

For Preston D. Cole, Secretary