WISCONSIN DEPARTMENT OF NATURAL RESOURCES
NOTICE OF FINAL GUIDANCE & CERTIFICATION

Pursuant to ch. 227, Wis. Stats., the Wisconsin Department of Natural Resources has finalized and hereby certifies the following guidance document.

DOCUMENT ID

DG-19-002-C

DOCUMENT TITLE

Chapter 3 Public Water Supply Operations Handbook – Water System Operational Oversight

PROGRAM/BUREAU

Drinking Water & Groundwater

STATUTORY AUTHORITY OR LEGAL CITATION

Chapters 809 – 812, Wis. Adm. Code, and chapters 280 and 281, Wis. Stats.

DATE SENT TO LEGISLATIVE REFERENCE BUREAU (FOR PUBLIC COMMENTS)

September 16, 2019

DATE FINALIZED

November 6, 2019

DNR DISCLAIMER

This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

DNR CERTIFICATION

I have reviewed this guidance document or proposed guidance document and I certify that it complies with sections 227.10 and 227.11 of the Wisconsin Statutes. I further certify that the guidance document or proposed guidance document contains no standard, requirement, or threshold that is not explicitly required or explicitly permitted by a statute or a rule that has been lawfully promulgated. I further certify that the guidance document or proposed guidance document contains no standard, requirement, or threshold that is more restrictive than a standard, requirement, or threshold contained in the Wisconsin Statutes.

11/6/19

Signature Date

3 WATER SYSTEM OPERATIONAL OVERSIGHT

3.1 General

3.1.1 Responsibilities (10/22/2007 D)

Regional DG WS Specialists and Engineers – Review all aspects of operation. As part of the annual inspection and sanitary surveys at municipal water systems review ordinances (well abandonment, cross connection, and mandatory connection), plans (monitoring, emergency response, and wellhead protection), and agreements (e.g., extended well abandonment). As part of the general duties review at least monthly the operating reports and water quality data for completeness, MCL violations, and data falsification.

Regional DG Supervisors– At least annually, review with Regional DG Staff the level of oversight to be provided to water system operation. Ensure statewide consistency in review of water system operations. As part of DGMT develop statewide guidance on procedures for water system operational oversight. Ensure quality of review by Regional DG Staff.

Regional EnPAs– Enter regulatory related data on the DWS.

Central Office Staff– Assist DGMT in guidance development and rule interpretation.

Public Water Supply Section Chief - At least annually, review with Regional DG Supervisors the level of oversight to be provided to water system operation. Ensure statewide consistency in review of water system operations. As part of DGMT develop statewide guidance on procedures for water system operational oversight.

Well Abandonment Ordinance Review (10/22/2007 D, 12/08/2010)
As part of the sanitary survey inspection Regional DG staff should be reviewing the operational procedures of a water system including the private well abandonment program. As part of this review the actual ordinance should be reviewed for compliance with NR 810.16. A copy of a model ordinance is provided in Section 3.2.5, below, as a basis for comparison.

3.2.1 Coverage (10/22/2007 D)

Municipal water systems are required to have ordinances related to well abandonment for all premises served by their system. Many municipal water systems have service areas larger than the area currently connected to the water system. The well abandonment ordinance requirements apply to only those premises that are connected to the municipal water system and are using the connection as their source of water.

3.2.1a Geothermal Wells (10/22/2007 D)

There are three basic types of geothermal systems: pump and dump, horizontal closed loop systems, and vertical closed loop systems. Of the three, two use wells the pump and dump and the vertical closed loop systems. Because of the similarity to a standard private well the wells used for pump and dump geothermal systems would be subject to the municipal well

abandonment ordinance requirements. The abandonment of vertical closed loop geothermal wells is managed by the Private Water Supply Section and the wells are not subject to the municipal well abandonment ordinance.

3.2.2 Fees (10/22/2007 D, 12/08/2010)

No fees are set in NR 810.16. If consistent with their general authority municipalities may charge fees for the permits required by the well abandonment ordinance. The level of the fee is at the discretion of the municipality. However, excessively high fees established with the intent of excluding private wells from a municipal service area could be challenged by private well owners.

3.2.3 Increased Monitoring (10/22/2007 D, 12/08/2010)

The minimum level of monitoring of the private wells is established in NR 810.16(2). Municipalities may require additional monitoring or increased frequency of monitoring. However, as with fees, excessive monitoring established with the intent of excluding private wells from a municipal service area could be challenged by private well owners.

3.2.4 Permit Cycle (10/22/2007 D, 12/08/2010)

The minimum permit cycle is specified in NR 810.16(2). Municipalities may establish a shorter permit cycle.

3.2.5 Model Well Abandonment Ordinance

Well Abandonment and Well Operation Permit Ordinance

WHEREAS, s. NR 810.16, Wisconsin Administrative Code, directs suppliers of water for municipal water systems to require the abandonment of all unused, unsafe or noncomplying wells located on the premises served by their system, and to provide a permit system to allow retention of safe and code complying wells, by local ordinance or water utility rule, to eliminate sources of unsafe water and to prevent such wells from becoming channels for vertical movement of contaminated water and to eliminate all existing cross-connections and prevent all future cross- connections.

NOW THEREFORE, the [gov body] of the [City, Village or Town] of [name], County, Wisconsin, does ordain as follows:

Section 1: Purpose

To protect public health, safety and welfare and to prevent contamination of groundwater by assuring that unused, unsafe or noncomplying wells or wells which may act as conduits for contamination of groundwater or wells which may be illegally cross-connected to the municipal water system, are properly maintained or abandoned.

Section 2: Applicability

This Ordinance applies to all wells located on premises served by the [name] municipal water system. Utility customers outside the jurisdiction of the municipal

system may be required under contract agreement or utility rule to adopt and enforce equivalent ordinances within their jurisdictions for purpose stated in Section 1 above.

Section 3: Definitions

"Municipal water system" means a community water system owned by a city, village, county, town, town sanitary district, utility district, public inland lake and rehabilitation district, municipal water district or a federal, state, county, or municipal owned institution for congregate care or correction, or a privately-owned water utility serving the foregoing.

"Noncomplying" means a well or pump installation which does not comply with s.NR 812.42, Wisconsin Administrative Code, Standards for Existing Installations, and which has not been granted a variance pursuant to s. NR 812.43, Wisconsin Administrative Code.

"Pump installation" means the pump and related equipment used for withdrawing water from a well, including the discharge piping, the underground connections, pitless adapters, and pressure tanks, pits, sampling faucets and well seals or caps

"Unsafe" well or pump installation means one which produces water which is bacteriologically contaminated or contaminated with substances which exceed the drinking water standards of chs. NR 140 or 809, Wisconsin Administrative Code, or for which a Health Advisory has been issued by the Department of Natural Resources.

"Unused" well or pump installation means one which is not used or does not have a functional pumping system.

"Well" means a drill hole or other excavation or opening deeper than it is wide that extends more than 10 feet below the ground surface constructed for the purpose of obtaining groundwater.

"Well Abandonment" means the proper filling and sealing of a well according to the provisions of s. NR 812.26, Wisconsin Administrative Code.

Section 4: Abandonment Required

All wells on premises served by the municipal water system shall be properly abandoned in accordance with Section 6 of this ordinance by (date) or not later than (days) [90 days to 1 year] from the date of connection to the municipal water system, unless a valid well operation permit has been issued to the well owner by (municipality) under terms of Section 5 of this ordinance.

Section 5: Well Operation Permit

Owners of wells on premises served by the municipal water system wishing to retain their wells for any use shall make application for a well operation permit for each well no later than (days) [90 days to 1 year] after connection to the municipal water system. The (municipality name) shall grant a permit to a well owner to operate a well for a period not to exceed 5 years providing all conditions of this section are met. A well

operation permit may be renewed by submitting an application verifying that the conditions of this section are met. The (municipality) or its agent, may conduct Inspections and water quality tests or require inspections and water quality tests to be conducted at the applicant's expense to obtain or verify information necessary for consideration of a permit application or renewal. Permit applications and renewals shall be made on forms provided by the Clerk. [(optional) All initial and renewal applications must be accompanied by a fee of ()].

The following conditions must be met for issuance or renewal of a well operation permit:

1) The well and pump installation shall meet the Standards for Existing Installations described in s. NR 812.42, Wisconsin Administrative Code.

2) The well and pump shall have a history of producing safe water evidenced by at least 1 coliform bacteria sample. In areas where the Department of Natural Resources has determined that groundwater aquifers are contaminated with
3) substances other than bacteria, additional chemical tests may be required to document the safety of the water.

4) There shall be no cross-connections between the well's pump installation or distribution piping and the municipal water system.

5) The water from the private well shall not discharge into a drain leading directly to
6) a public sewer utility unless properly metered and authorized by the sewer utility.

7) The private well shall have a functional pumping system.

8) The proposed use of the private well shall be justified as reasonable in addition to water provided by the municipal water system.

Section 6: Abandonment Procedures

1) All wells abandoned under the jurisdiction of this ordinance shall be done according to the procedures and methods of s. NR 812.26, Wisconsin Administrative Code. All debris, pumps, piping, unsealed liners and any other obstructions which may interfere with sealing operations shall be removed prior to abandonment.

2) The owner of the well, or the owner's agent, [(optional) may be required to obtain a well abandonment permit prior to any well abandonment] and shall notify the clerk at least 48 hours in advance of any well abandonment activities. The abandonment of the well may be observed or verified by personnel of the municipal system.

3) An abandonment report form, supplied by the Department of Natural Resources, shall be submitted by the well owner to the Clerk and the Department of Natural Resources within 30 days of the completion of the well abandonment.

Section 7: Penalties

Any well owner violating any provision of this ordinance shall upon conviction be

punished by forfeiture of not less than_____or more than_____and the cost of prosecution. Each day of violation is a separate offense. If any person fails to comply with this ordinance for more than 30 days after receiving written notice of the violation, the municipality may impose a penalty and cause the well abandonment to be performed and the expense to be assessed as a special tax against the property. 1/09/2002

3.3 Monthly Operations Report Review (9/10/2013)

In 2010, the Bureau of Drinking and Groundwater began development of an on-line tool for reporting monthly pumpage, chemical addition and treatment at public water systems. The project goals were to: satisfy the operational reporting requirements of section NR 810.07, Wisconsin Administrative Code, provide a standard reporting process and form for water systems statewide, reduce duplicate reporting of pumpage and provide a database for large-scale data gathering.

The Electronic Monthly Operating Report system, or EMOR, went on-line statewide for municipal water systems in January 2013.

The reference materials for EMOR are found in Chapter 7 and include:

- Instructions for setting up new water systems for on-line reporting.
- Instructions for modifying existing system setups when new wells, chemicals or treatment processes added or modified

3.3.1 Authority (9/10/2013)

The requirement to submit monthly reports is found in NR 810.07(1). NR 108.06(4) requires reports regarding the operation of waterworks during the preceding month to be submitted to the Department not later than the 10th day of each month. The type of information to be submitted can be found in NR 810.07. Additional reporting requirements may be established as part of the plan approval process.

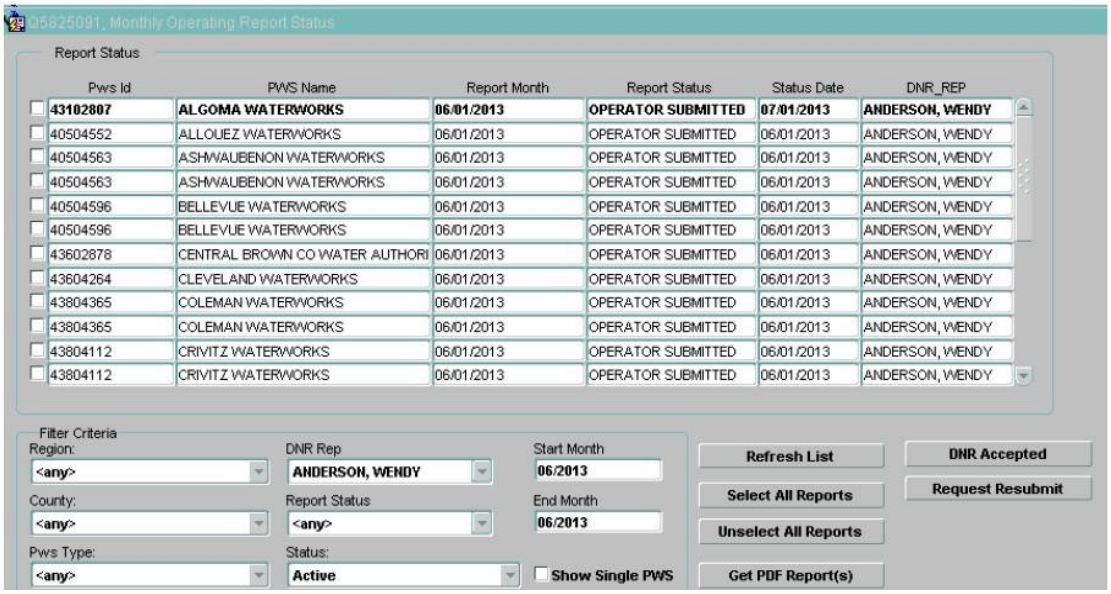
3.3.2 Monthly Pumpage Report Review Responsibilities (9/10/2013)

Each month it is the regional DG staff responsibility to review the operational reports submitted. The review is to evaluate the water system operation in relation to Administrative Code requirements, plan approval requirement, current standard operating practices and past system history in order to ensure an adequate supply of safe drinking water is being provided to the public. All data on the monthly reports can be significant in indicating different types of problems. Data can be significant when used over a time span where trends can be observed.

NOTE: Extended absences of a DNR REP for more than 14 days requires access to these systems in EMOR by the person covering for the review of the monthly reports. Regional EnPAs can make this change.

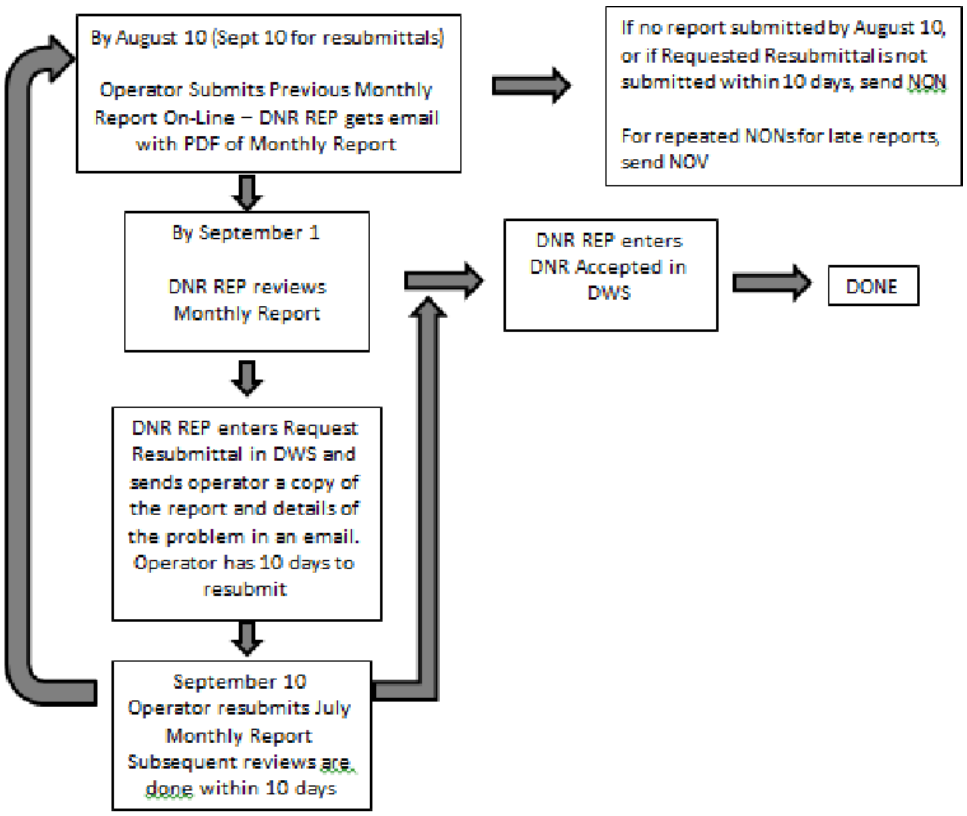
All monthly reports shall be reviewed by the DNR REP prior to acceptance. The assigned DNR REP is responsible for reviewing and accepting the report by the first of the following month.

EMOR is set up so that once the operator Completes the data entry for each Inventory Item, the Submit button will appear. Once the operator clicks Submit, both the operator and the DNR REP receive a PDF copy of the monthly report by email. There is an advantage to the DNR REP if they wait at least 72 hours before reviewing the report because, often times, the operator will notice an error when they print their report and will resubmit. Once the report has been reviewed, the DNR REP shall mark the report DNR Accepted or Request Resubmit in the DWS EMOR screen (remember to save). If the DNR REP requests the report to be resubmitted, the DNR REP shall email the report and the reason for the request to the operator and require the operator to resubmit the report within one week. DNR REP has an additional 10 days to review and accept or request another resubmittal. Ideally this means that there would be no report in the system that has not been reviewed within 60 days of the end of the reporting month.



Pws Id	PWS Name	Report Month	Report Status	Status Date	DNR_REP
43102807	ALGOMA WATERWORKS	06/01/2013	OPERATOR SUBMITTED	07/01/2013	ANDERSON, WENDY
40504552	ALLOUEZ WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
40504563	ASHWAUBENON WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
40504563	ASHWAUBENON WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
40504596	BELLEVUE WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
40504596	BELLEVUE WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
43602878	CENTRAL BROWN CO WATER AUTHORI	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
43604264	CLEVELAND WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
43804365	COLEMAN WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
43804365	COLEMAN WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
43804112	CRIVITZ WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY
43804112	CRIVITZ WATERWORKS	06/01/2013	OPERATOR SUBMITTED	06/01/2013	ANDERSON, WENDY

For example, the July Monthly Report follows this process:



3.3.3 Monthly Report Review Criteria (9/10/2013)

1. Source Water Service Zone Reporting

   The review should evaluate if the proper residual is being maintained in the distribution system and the residual tests are being performed to the correct frequency.

   a. Chlorine distribution system residual – used to confirm that there is a detectible level throughout the distribution system. See NR 809.74 and NR 810.09 for acceptable chlorine residuals. The sampling locations should not be the bacti sites, unless they represent difficult areas to maintain chlorine.

      i. Minimum requirement is twice a week reporting

      ii. Minimum chlorine residual is always > 0.01 ppm. If they report a 0, make sure that they have made operational changes to increase the chlorine in this area (additional flushing, increased chlorine feed). If this result is from a long dead end with no customers, the location should be changed to the last hydrant near a customer.

      ii. Maximum chlorine residual is always < 4 ppm

      iii. Consecutive systems should have a list of distribution sites (not a formal monitoring plan) where they test and record the chlorine level in their distribution system twice a week. These sites are supposed to be located to demonstrate that chlorine residual is detectible throughout the distribution system. For this reason, the routine bacti sites may not be appropriate. If levels are too low, the consecutive system needs to work with the parent system to modify operations (increase feed or install boosting).

   b. Fluoride distribution system residual. See NR 809.74 and NR 810.09 for acceptable fluoride residuals.

i. Value must be reported for every day there is pumpage
ii. Average fluoride residual is 0.6-0.8 ppm or 1.0 – 1.5 ppm if they have not adopted the 2013 DHS recommended reduction.

c. Orthophosphate/polyphosphate/silicate distribution system residual.
i. Check plan approval for target dose and residual levels for those required to treat for corrosion control
ii. Required twice a week for control
iii. Confirm chlorine is added every day – can't feed a phosphate without chlorine
iv. If a system is adding this to sequestering iron in the source water, they may not feed at all wells. In this case monitor the distribution levels to make sure any variations are not resulting in customer complaints.
v. Some systems feed to sequestering the iron that comes from the old cast iron mains in the distribution system. They should have a consistent residual.

d. pH distribution system residual. If the system has an entry point residual requirement and nothing required for the distribution system, there should be no pH distribution system residual reported. Otherwise check plan approval for target residual.
i. Required twice a week for control

e. Distribution System Water – This will only show up if they have more than one Source Water Service Zone. Review to make sure the percent of water in each Source Water Service Zone is consistent from month to month, otherwise it may be an indicator that the distribution system really is <u>one</u> Source Water Service Zone.

2. Water Reporting
a. Pumping and static water levels reported once a week for each well. For flowing wells, only pumping water level needs to be reported. Follow up only if no levels are reported and an alternative frequency has not been approved. Confirm levels reported are from ground surface (pumping number always greater than static level)
b. Hours rest – optional
c. Pump to waste - If there is a value, make sure the reason is included in the comment section (maintenance or repair)
d. Pumpage –
i. Look for unusually high pumpage amounts that may indicate large system losses unless they have a comment indicating other activities may be occurring (tower inspection, routine hydrant flushing). Make sure they are reporting in 1,000 of gallons and finally make sure it's not a typo.
ii. Do all wells have a total raw pumpage? If not, is this typical?
iii. Compare daily pumpage to maximum possible pumpage which would indicate an additional well or increase in surface water plant capacity may me needed.
e. Backwash – is the percent of total pumped increasing from month to month, which may be indicative of treatment problems.
f. Recycle – must be less than 10 percent of all treated water
g. Recharge – track over time and verify volume meets plan approval limits.

3. Chemicals – General
a. Is the product name the same or have they changed suppliers? If changed, did they get plan approval?
b. Are the bulk and active percentages of each chemical appropriate – are they

diluting and is this in accordance with their approvals? If they use gas, are the bulk and active 100? Is the fluoride 19.8?

c. Under each chemical there must be a value under Amount Used for every day that water was pumped.
d. Is the calculated dose appropriate? Does it match the target level in the plan approval? If not, did they have a siphon incident or a pump failure that they identified in their comments?
e. Confirm all calculated doses/entry point residuals are below NSF Max Use. This is critical for Polymers and Coagulants that contain acrylamides. If over, possible treatment technique violation.
f. While EP residuals are not required, it is helpful to see the chemical demand at that location. If they report an EP residual, is it close to the calculated dose or is there a valid reason the variation is acceptable. For example, chlorine calculated dose is 4 ppm, EP residual is 1.2 ppm due to a chlorine demand in the well.

4. Chemicals – Chlorine

Chlorine:Ammonia ratio should be between 3:1 and 5:1. Higher levels like 6:1 or 7:1 are common in the summer. This reduces the free ammonia, which can cause nitrification during the warmer months.

5. Chemicals – Fluoride - Beginning in January 2013 the optimal level recommended by DHF was changed to 0.7 ppm. Not all systems have made this change due to desire or a restriction under their current ordinance.

a. Entry point residuals reported? This is typically done when a natural fluoride level is present in order to make sure the dose doesn't exceed the recommended value. The dose will vary from well to well.
b. Due to the varying natural fluoride levels, systems that fluoridate may have one or more well that doesn't have fluoride added.
c. Dilution – some systems do this to make it easier to pump, or if they need to supplement their natural fluoride. Statewide, the active percent of undiluted fluoride ions systems should be using is 19.8% by weight. If a system dilutes,the percent active fluoride ions by weight will need to be calculated. In the example below, the system will enter 19.8 for the bulk and 3.9 for the active.

<u>Example (diluting 1 gal of hydrofluorosilic acid (19.8% by weight) to 5 gallons of water)</u>

% Bulk = **19.8% fluoride ions**
Dilution ratio = (1 / (1+5)) x 100 = **16.7%**
Density of Solution = .833(8.34 lbs/gal) + .167(10.24 lbs/gal) = **8.66 lbs/gal**
% Active = (19.8% x .167 x 10.24 lbs/gal) / (8.66 lbs/gal) = **3.91% Fl ions**

6. Chemicals – poly/ortho/total phosphates. The two main phosphates used in drinking water are straight polyphosphate, which is used for sequestering metals like iron and manganese by keeping them in their dissolved state, and straight ortho-phosphate which is used as an inhibitor for corrosion control by coating the inside of water mains to prevent pipe corrosion. Phosphates used as an inhibitor for corrosion control can be a blended phosphate (poly/ortho) because, in order to achieve corrosion control, sequestering must be completed first. This blend will have a percentage of poly to sequester and the remainder is ortho to address corrosion. Reporting in EMOR requires that you know the percent active of the ortho or poly. For example. AquaMag, as a product, is 34.5 percent active by weight. The poly/ortho blend is 70 percent poly and 30 percent ortho of the

active percentage. If the system is measuring the amount of product used, but measuring the poly or ortho at the entry point, the calculated dose must be in whichever compound they are measuring - poly or ortho. In this example, the percent active for poly is 24 (34.5 x 0.7) and the percent active for ortho is 10 (34.5 x 0.3).

- Orthophosphate EP Residual – should be similar to calculated dose
- Orthophosphate EP Residual – confirm that it isn't being overfed
- Total Phosphate EP Residual – requires digestion in a lab so this is infrequently used

If a system is adding polyphosphate for sequestering only, the percent active, recorded in EMOR, is total phosphate. Typically the system would monitor for total phosphate (laboratory analyses) a few times a year to confirm their dose is appropriate and any time they receive unusual red/black water complaints. These results should be entered on the EMOR sheet under Phosphate (total) EP Residual.
They may routinely monitor for orthophosphate to make sure their product is still fresh and consists primarily of polyphosphate - this monitoring should be recorded on their bench sheets.

7. Chemicals – Silicates Meet plan approval dose?

8. Chemicals – pH
   For pH adjustment chemicals, does the EP pH meet plan approval?

9. Chemicals – Polymers. Must always verify the calculated dose is less than the NSF Max Use for chemicals that contain acrylamides. IF the dose exceeds the NSF Max Use, this is a treatment technique. Also, the percent active must always be 100 since we are looking at the calculated dose of the product.

10. Treatment
    a. Iron Filtration
       i. Raw iron – Common is once a week for control
       ii. EP iron – Minimum twice per week
       iii. EP iron – should be <0.1 ppm and never over 0.3 ppm
    b. Manganese Filtration – some don't do any field monitoring because of worker safety as the reagent can be considered a haz waste. If this is the case, they must report the iron levels and periodically send a sample for lab analysis for the manganese.
       i. Raw Mn – Common is once a week for control
       ii. EP Mn – Minimum twice per week
       iii. EP Mn – should be < 0.03 ppm and never over 0.05 ppm
    c. Selective Resin
       i. Bypass water percentage – if allowed at all, does it meet plan approval requirement?
    d. Anion Exchange
       i. Bypass water percentage – meets plan approval requirement?
       ii. Water treated between regens appropriate?
       iii. Nitrate lab result similar to nitrate analyzer result – if not, they need to recalibrate analyzer
       iv. Are nitrate or Arsenic levels reliably below MCL? If not follow up to see if additional capacity or operational changes are necessary.
    e. Cation Exchange or Zeolite Softening

i. Bypassed Water percentage meet the approved blending ratio for Radium removal?
ii. Raw hardness – Common is once a week for control
iii. EP hardness – Minimum twice a week for control. For Radium removal minimum daily, M-F.
iv. If treatment is used for radium removal, does the EP hardness meet plan approval?

f. Lime Softening
i. Raw Hardness - Common is once a week for control
ii. EP Hardness – Daily or more frequently for process control.
iii. EP Alkalinity – required only if plan approval has a target for optimizing corrosion control
iv. pH Settled – Daily or more frequently for process control
v. pH Entry Point – required only if plan approval has a target for optimizing corrosion control; minimum daily

g. Reverse Osmosis
i. Bypass water percentage – meets plan approval requirement?
ii. Reject water volumes consistent> If not, follow up to see if additional capacity or operational changes are needed.
iii. Nitrate lab result similar to nitrate analyzer result – if not, they need to recalibrate analyzer
iv. EP Hardness - Minimum twice a week for control. For Radium and Nitrate removal, minimum daily, M-F.
v. EP Iron – Minimum twice a week for control. For Radium and Nitrate removal, minimum daily, M-F.
vi. EP Mn – Minimum twice per week for control. For Radium and Nitrate removal, minimum daily, M-F. If they don't do Mn, they must do Iron or Hardness.

h. Blending
i. Make sure ratio meets plan approval requirements
ii. Nitrate lab result similar to nitrate analyzer result – if not, they need to recalibrate analyzer
iii. Are nitrate or Arsenic levels reliably below MCL? If not follow up to see if additional capacity or operational changes are necessary.

i. HMO
i. Calculated dose meet target in plan approval?
ii. Raw iron – Common is once a week for control
iii. EP iron – Minimum twice a week for control. For Radium removal minimum daily, M-F.
iv. EP iron – should be <0.1 ppm and never over 0.3 ppm
v. Raw Mn – Common is once a week for control
vi. EP Mn – Minimum twice per week unless iron is used instead.
vii. EP Mn – should be < 0.03 ppm and never over 0.05 ppm

j. Oxidation
i. Raw iron – Common is once a week for control
ii. EP iron – Minimum twice a week for control. For Radium removal minimum daily, M-F.
iii. EP iron – should be <0.1 ppm and never over 0.3 ppm
iv. Raw Mn – Common is once a week for control
v. EP Mn – Minimum twice per week unless iron is used instead.
vi. EP Mn – should be < 0.03 ppm and never over 0.05 ppm

11. Enhanced Disinfection – It is very important to review the data they report for accuracy because any violation of the inactivation ratio must be immediately reported to the DNR and may be a treatment technique violation. For surface water plants, the system requirements are found in the Surface Water Treatment Rule Compliance Summary. Larry Landsness developed these in 2012 and sent them to all surface water plants and operators. They are updated as necessary and look like this:

Removal/Inactivation Credits			
Process	Giardia	Viruses	Cryptosporidium
Coagulation & filtration	2.5 logs1	2 logs1	3.0 logs1
Ozone & Chloramine CT	1.0 logs2	2.0 logs3	0 logs
GAC filtration	0 logs	0 logs	0.5 logs4
Free chlorine CT5	0.5 logs6	2.0 logs6	0 logs
Total provided	3.0 or 3.5 logs	4.0 logs	3.5 logs
Required	3.0 logs	4.0 logs	3.0 logs

1 Credit based on meeting IESWTR turbidity requirements.
2 Credit based on meeting 1-log giardia CT tables for ozone & chloramines
3 Credit based on meeting 2-log virus CT values for ozone & chloramines
4 Credit for GAC based on 100% of finished water flow through GAC
5 Only used if ozone out of service
6 Credit based on meeting required 0.5-log giardia CT tables for free chlorine

If multiple segments of treatment are used to achieve the required removal /inactivation, then multiple inventory items (SWTR Treatment Series) must be added and set up. The operator will enter the target inactivation and the CR Required value will pulled from the table for the target inactivation (using the appropriate Temp, pH, chlorine residual). This will result in an inactivation ratio of < 1. The DNR REP must make sure that the sum of the inactivation ratios for the water system is > 1.

For example, a system will achieve the 0.5 log giardia inactivation by chlorine CT using three different processes. The monthly value on all three Inventory Items that are set up as a SWTR Treatment Series, will have the Target Inactivation Value for Chlorine CT as 0.5 log giardia. The values entered under the CT Required column of the monthly report will be from the 0.5 log inactivation column on the appropriate CT Value for Inactivation of Giardia Cysts by Free Chlorine using the recorded daily pH, temperature and chlorine concentration. Note the CT Required column on each

Inventory Item - SWTR Treatment Series may be different because of the pH, temperature and chlorine concentrations. Because only a portion of the inactivation is being achieved at each plant, the Inactivation Ratio will be <1.

a. Chlorine enhanced disinfection – In general, meeting a 0.5 log inactivation for giardia will result in an inactivation > 2 for viruses.
   i. Are they using the correct CT table (giardia vs. virus)
   ii. Are they using the CT table correctly (using pH, temp, etc.). If they aren't interpolating they must use the next lower temperature, next higher chlorine residual and next lower pH table.
   iii. Is the T10 calculated correctly (baffle factor times max flow rate/volume)? This will change daily based on the max flow for that day. Baffle factor and volume are constant.
   iv. Total inactivation ratio ≥1?

b. Ozone enhanced disinfection
   i. Is there a value for minimum initial ozone? This is important because this is the ozone concentration at the outlet from the first chamber or cell. The first cell can receive 1-log virus inactivation credit with an outlet residual of 0.1 mg/l and a 0.5-log giardia inactivation credit with an outlet residual of 0.3 mg/l.
   ii. Are they using the CT table correctly? If they do not interpolate, then they must use the next lower temperature table.
   iii. EP ozone must be 0.
   iv. Total inactivation ratio ≥1?

c. UV enhanced disinfection
   i. Dose ratio (minimum delivered dose/regulatory dose) ≥1?
   ii. Sensor check done monthly?
   iii. Amount of out of spec water must be ≤ 0.1 percent
   iv. Is UVT level? the minimum validated level?

12. Surface Water Treatment – The system requirements are found in the Surface Water Treatment Rule Compliance Summary. Larry Landsness developed these in 2012 and sent them to all surface water plants and operators. They are updated as necessary.
   a. Conventional
      i. Chlorine residual, entry point – this must always be above 0.2 mg/l
      ii. Filter runs between backwashes – this should change seasonally, watch for large swings that indicate a filter is out of service for an extended period
      iii. Total number of combined filter effluent (CFE) turbidity measurements – this must be between 168 (28 days) and 186 (31 days) since CFE is required to be measured/recorded every four hours. Some systems may measure every 2 hours so this may be 336-372. This is not the turbidity measurements at each of the sand filters that are reported further down the list. If less than 168-186, possible treatment technique violation.
      iv. Total number of combined filter effluent turbidity measurements meeting standard – this must be the same as the number in section iii, above. This is the number of measurements below 0.3 NTU. If less than the number in iii, above, possible treatment technique violation.
      v. Percentage of turbidity measurements meeting 0.3 NTU – must be ≥ 95 for the month or may be a treatment technique violation
      vi. Max turbidity allowable exceeded – must be N. The maximum allowable CFE turbidity is 1 NTU. If Y, they must report the date and value in the comment box. Immediately follow up on Y, as necessary. Possible treatment technique violation.
      vii. Individual filter turbidity recorded every 15 minutes – must be Y. All plants have continuous monitors with the value recorded every 15 minutes. If N, they must report the date and reason in the comment box. Immediately follow up on N unless adequate reason included in comment section. Possible treatment technique violation.
      viii. Individual filter turbidity exceeded – must be N. This will be Y and a possible treatment technique violation if any of the following occur:
         1. Any individual filter turbidity was greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart.
         2. Any individual filter turbidity was greater than 0.5 NTU in 2 consecutive measurements taken 15 minutes apart at the end of the first 4 hours of operation after backwash.
         3. Any individual filter turbidity was greater than 1.0 NTU in 2 consecutive

measurements taken 15 minutes apart in each of three consecutive months.

4. Any individual filter turbidity was greater than 2.0 NTU in 2 consecutive measurements taken 15 minutes apart in each of two consecutive months.

ix. Distribution system disinfectant residual V – cannot exceed 5 percent in one month for any two consecutive months. See Form 3300-223. Immediately follow up on all results > 0. Possible treatment technique violation.

x. Treated water coliform – entries in negative column should all be > 0, entries in positive should be 0, if not, may be a treatment technique violation. The actual number in the negative column will vary from plant to plant.

xi. Alkalinity and pH – optional. Some systems will track and report this weekly.

xii. Turbidity, raw – optional

xiii. Turbidity, max filter effluent – must always be less than 1 NTU.

b. Membrane

i. Air hold test every 8 hours – must be Y. If N, possible treatment technique violation.

ii. Backwash interval – make sure this is not increasing over time, which may indicate treatment problems

iii. Maintenance wash interval – if they didn't do any this month, this can be zero. If they do maintenance washes, make sure this isn't always zero.

iv. CIP interval - if they didn't do any this month, this can be zero. Make sure it isn't always zero.

v. Number of fibers repaired – If they failed an air hold test they will likely have a number here. See if any of their daily Air Hold Test Result (max) is greater than their alarm setting, which means they took the rack off line and did a bubble/sonic test.

vi. Distribution system disinfectant residual V – cannot exceed 5 percent in one month for any two consecutive months. See form 3300-223. Immediately follow up on all results > 0. Possible treatment technique violation.

vii. Treated water coliform – entries in negative column should all be > 0, entries in positive should be 0, if not, may be a treatment technique violation. The actual number in the negative column will vary from plant to plant.pH – optional. Some systems will track and report this weekly.

viii. Turbidity, raw – optional

ix. Turbidity, pre-membrane – optional, used for post strainers or pretreatment.

x. Turbidity, max combined permeate – must be always less than 0.1 NTU. If it is greater, they need to have contacted the DNR on the day of the occurrence. Possible treatment technique violation. Each system has an alarm level set point and a plant shut down set point for max turbidity on the combined permeate. Compare these values to the daily max and make sure there is a reasonable explanation in the comment section.

xi. Particle counts, max combined permeate – optional

xii. Max f low for any one membrane –

xiii. Max TMP for any one membrane – check for wide variation

xiv. Air hold test – max is the most important one

xv. Log removal value – minimum is the most important one. This value is calculated based on air hold test results, water temperature and flow. Each system has an alarm level set point (normally 4.3-log) and a plant shut down set point (normally 4.0-log) for air hold test and min LRV.

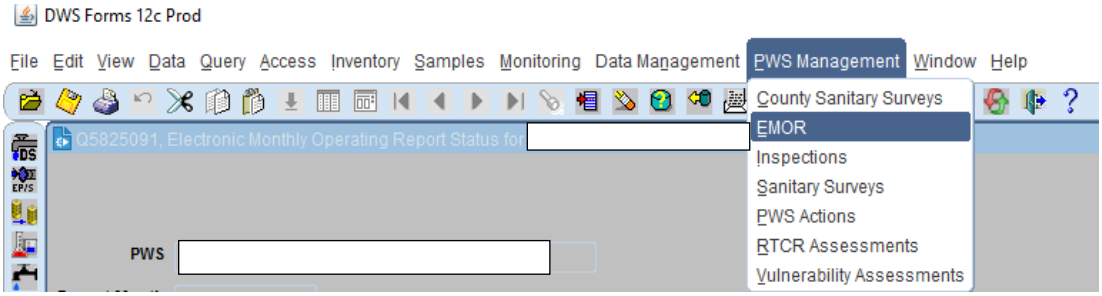
13. Intake Treatment for zebra mussel control - Is the amount used reasonable and is it stable over time. Unstable would mean they are changing the feed rate – which should stay the same.

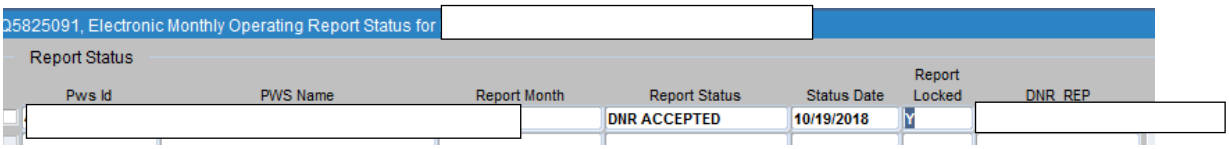
3.3.4 Enforcement of Late Monthly Reports

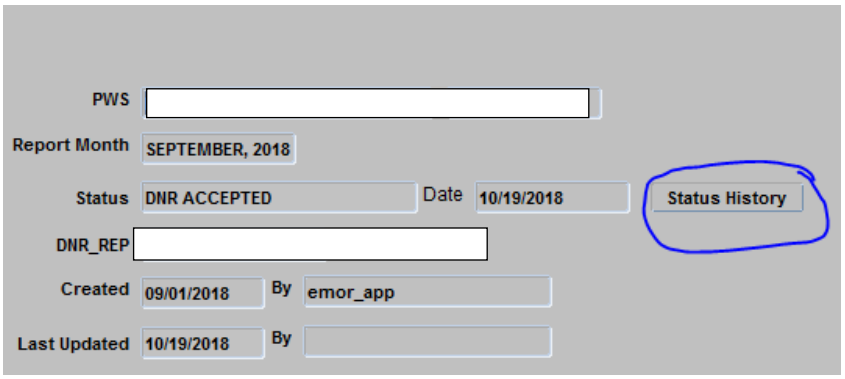
DNR REP will send a Notice of Noncompliance (NON) to each system with monthly reports not received by the 10th of the month following the reporting period. This applies to systems that submit on the 11th or later.

A late monthly report is a violation of state rule requirements and is considered a monitoring and reporting violation, NR 108.06(4) and 810.07. As such, if a system has three missed or late reports within any 12-month period (consecutive or otherwise), the DNR may consider escalating enforcement. In such cases, as appropriate, the DNR REP will complete a request for secondary enforcement and request a Notice of Violation and enforcement conference. DNR Reps may consult with their supervisor for further guidance.

The DWS will generate a violation on the 11th of each month if a report has not been submitted. In situations where the operator submitted the report on or before the 10th, then went back in and made updates, but failed to click on the submit button again, a violation will <u>not</u> generate. The DNR REP can confirm whether this was done by opening the status history in the DWS. To do this, double click on the line containing the appropriate month in the EMOR screen.







Report Status History

Status Desc	Status Date	Last Update User Name
DNR ACCEPTED	19-OCT-2018	
OPERATOR SUBMITTED	11-OCT-2018	

If a report is received late or not at all, the following Notice of Noncompliance will be sent by the DNR Rep.

Subject: Notice of Noncompliance - Failure to Submit a Monthly Operating Report [on Time]

Dear [owner]:

Wis. Adm. Code § NR 810.07, requires all suppliers of water for municipal water systems to submit monthly reports to the appropriate regional office of the Department. Wis. Adm. Code § NR 108.06(4), requires reports regarding the operation of waterworks during the preceding month to be submitted to the Department not later than the 10th day of each month.

Choose one of the following paragraphs

LATE: The Department received the [month] monthly operating report from [system name] on [date submitted]. This report was due on or before [month] 10. Please ensure that future reports are submitted to the Department on or before the 10th day of the following month.

MISSING: The Department has not received a monthly operating report from [system name] for [month]. Please submit the monthly operating report for [month] within three (3) business days and ensure that future reports are submitted to the Department on or before the 10th day of the following month.

This is the [first or second] late monthly report in the last 12 months. In the future, failure to submit the preceding month's report by the 10th of the month may result in additional enforcement action.

If you have any questions concerning this matter, please contact me at [DNR Rep phone].

Sincerely,

[DNR Rep Name]

ecc: FILE
[OIC]

Note, NR 810.015, allows the department to approve "alternative criteria", where it has been demonstrated that compliance is impracticable in any specific case, or where an alternative proposed by a water system has additional benefits with adequate safeguards.

Under NR 810.015(1), if a water system determines that compliance with the requirement to submit a timely monthly operating report is impracticable, the owner may submit in writing to the department a request to use alternative criteria. The request must contain the reasons that compliance with the criteria is impracticable and alternative criteria for which department approval is sought and all pertinent facts, data, reports and studies supporting the proposed alternative. Under NR 810.015(2), if the department determines that compliance is impracticable in a specific case, or that an alternative proposal has additional benefits with adequate safeguards, then the department may approve alternative criteria which are in substantial compliance with requirements. The DNR Rep will coordinate decision on “alternative criteria” proposals in consultation with

3.3.4 Report Storage and Retention

The monthly reports are retained in the new data system EMOR. Copies are generally kept on the hard drives of most Regional DG staff. It is recommended that these reports be kept a minimum of ten years.

3.4 Data Falsification Review

3.4.1 Monthly Operating Reports

With the increase in number and complexity of SDWA regulations, there are increased incentives for systems to submit invalid compliance data. Data falsification does not appear to be a major problem. The Regional DG staff are responsible for reviewing the operating reports including evaluation of the data quality and accuracy. Ask the waterworks or water system operator to demonstrate how samples are collected and analyzed. If the operator cannot answer, or answers incorrectly, this could be evidence that data is invalid or falsified. Turbidity testing, or fluoride or chlorine residual testing would be good checks. Also, make sure the testing equipment is operating properly, and is capable of producing results that are reported. When reviewing the reports, the Regional DG staff should look for the items listed below. These may indicate that data is invalid or falsified.

- Identical results day after day
- Unusual patterns or repeats of data sets
- Results that are beyond the capability of the instruments used for testing

3.4.2 Water Quality Monitoring Data

As part of the sanitary survey the Regional DG staff should investigate data quality. Water systems must maintain records of all bacteriological and chemical sampling results. Check the laboratory slips for evidence of manipulation, and compare results with the laboratories own records, and the information on the DWS, if necessary.

Be aware of sampling history and correspondence with a system before conducting the inspection. The validity of data should be questioned if the system submits results that

demonstrate substantial improvement in water quality after an enforcement action, and there have been no changes to the system (e.g. all lead results are “no detect” after exceeding the lead action level, and the system has no corrosion control treatment).

3.4.3 Response Alternatives

There is a significant degree of latitude in responding to identified data falsification. As a minimum, Regional DG staff should inform the waterworks or water system operator and the water system owner of the potential for sanctions. The sanctions would be against the operator's certification and can include a letter of reprimand, suspension of the operator's certification, or revocation of the operator's certification. The specific options and procedures are contained in NR 114.14. Regional DG staff should consult with the Regional DG supervisor and the Central Office operator certification program coordinator prior to initiating action.

3.5 Cross Connections and Interconnections Ordinance and Written Plan

As part of the sanitary survey inspection Regional DG staff should be reviewing the cross-connection ordinance adopted by the municipality, the description of the overall program in their written plan, and the records of inspections. The requirements related to cross connections are contained in NR 810.15. A copy of a model ordinance is provided in 3.5.5 as a basis for comparison.

3.5.1 Inspection Frequency

The inspection frequency is specified in NR 810.15(1)(c). Because the frequency for industrial and commercial facilities is a recommendation, municipalities may elect to reduce the frequency but in no case may the inspection occur at a frequency less than for residential inspections. For residential inspections some municipalities have sought to tie the inspections to the water meter replacement frequency which can be as long as 20 years. Unless there are unique compelling circumstances DG staff should not authorize extended inspection frequencies for residential inspections. The approval of the Regional DG supervisor is required for extending the inspection frequency.

3.5.2 Inspector Qualifications

There are no minimum qualifications specified in NR 810.15. Municipalities should document the qualifications of inspectors in the description of the program required by NR 810.15(1)(c).

3.5.3 Contract Inspections

There are no requirements related to delegation of inspections in NR 810.15. Municipalities may contract all or a portion of the inspections. The qualifications of the contract inspectors, the reporting mechanisms, and the enforcement mechanisms should be documented in the description of the program required by NR 810.15(1)(c).

3.5.4 Inspection Fees

There are no inspection fees specified in NR 810.15. If consistent with their general

authority municipalities may establish fees for cross connection inspections. The fees should be documented in the description of the program required by NR 810.15(1)(c).

3.5.5 Comprehensive Program

According to NR 810.15(1) a cross connection control program shall be comprehensive. In order for the program to be comprehensive it must include all aspects of all facilities. The program can use public education in lieu of inspections at low hazard portions of residential and commercial facilities.

3.5.6 Model Cross Connection Ordinance

ORDINANCE FOR CROSS CONNECTION CONTROL ORDINANCE NO.

TO PROVIDE A PROGRAM FOR PROTECTING THE PUBLIC WATER SYSTEM FROM CONTAMINATION DUE TO BACKFLOW OF CONTAMINANTS THROUGH THE WATER SERVICE CONNECTION INTO THE PUBLIC WATER SYSTEM.

WHEREAS, Chapters NR 810 and DSPS 382, Wisconsin Administrative Codes require protection for the public water system from contaminants due to backflow of contaminants through the water service connection; and

WHEREAS, the Wisconsin Departments of Natural Resources and Commerce require the maintenance of a continuing program of cross-connection control which will systematically and effectively prevent the contamination of all potable water systems; now, therefore,

BE IT ORDAINED by the (council or board) of the (city, village, township) of [name], state of Wisconsin:

Section 1 That a cross connection shall be defined as any physical connection or arrangement between two otherwise separate systems, one of which contains potable water from the (city, village or township) of water system, and the other, water from a private source, water of unknown or questionable safety, or steam, gases, or chemicals, whereby there may be a flow from one system to the other, the direction of flow depending on the pressure differential between the two systems.

Section 2 That no person, firm or corporation shall establish or permit to be established or maintain or permit to be maintained any cross connection. No interconnection shall be established whereby potable water from a private, auxiliary or emergency water supply other than the regular public water supply of (city, village or township) of [name] may enter the supply or distribution system of said municipality, unless such private, auxiliary or emergency water supply and the method of connection and use of such supply shall have been approved by the [water utility] and by the Wisconsin Department of Natural Resources in accordance with Section NR 811.09(2), Wisconsin Administrative Code.

Section 3 That is shall be the duty of the [name of water utility] to cause inspections to be made of all properties served by the public water system where cross connections with the public water system is deemed possible. The frequency of inspections and reinspections based on potential health hazards involved shall be established by the and as approved by the Wisconsin Department of Natural Resources.

Section 4 That upon presentation of credentials, the representative of the [name of local inspection agency] shall have the right to request entry at any reasonable time to examine any property served by a connection to the public water system of (city, village, or township) of [name] for cross connections. If entry is refused, such representative shall

obtain a special inspection warrant under s. 66.122, Wisconsin Statutes. On request the owner, lessee or occupant of any property so served shall furnish to the inspection agency any pertinent information regarding the piping system or systems on such property.

Section 5 That the [name of water utility] is hereby authorized and directed to discontinue water service to any property wherein any connection in violation of this ordinance exists, and to take such other precautionary measures deemed necessary to eliminate any danger of contamination of the public water system. Water service shall be discontinued only after reasonable notice and opportunity for hearing under Chapter 68, Wisconsin Statutes, except as provided in Section 6. Water services
to such property shall not be restored until the cross connection(s) has been eliminated in compliance with the provisions of this ordinance.

Section 6 That if it is determined by the [name of water utility] that a cross connection or an emergency endangers public health, safety or welfare and requires immediate action, and a written finding to that effect is filed with the clerk of the (city, village or township) of [name] and delivered to the customer's premises, services may be immediately discontinued. The customer shall have an opportunity for hearing under Chapter 68, Wisconsin Statutes, within 10 days of such an emergency discontinuance.

Section 7 That the (city, village or township) of [name] adopts by reference the State Plumbing Code of Wisconsin being SPS 382, Wisconsin Administrative Code.

Section 8 That this ordinance does not supersede the State Plumbing Code and (city, village or township) of [name] plumbing ordinance No._____, but is supplementary to them.

Section 9 This ordinance shall take effect and be in force from and after the [number] day of [month], 20[year].

3.5.7 Cross Connection Surveys Reporting (12/10/13)

The following form can be used by systems to document their cross connection control inspections according to the requirements of NR 810.15(1).

2013 WATER SUPPLY CROSS CONNECTION SURVEY ANNUAL REPORT

NR 810.15 Wisconsin Administrative Code requires municipal water systems to provide the department with an annual report including the total number of all service connections by category and indicating the number of surveys completed in each category for that year. This form fulfills that annual report requirement.

A. Name of water system:_____PWSID_____County _____

B. If system is using an alternative survey schedule, DNR approval date_____

C. If providing public education and partial surveys in lieu of full residential surveys, date(s) of last mailing _____

D. If system is providing public education and partial surveys in lieu of full commercial surveys, date(s) of last mailing _____

E	F	G	H	I	J
Service Category	***Survey Frequency***	***Total Number of Customer Connections in Use***	***Total Number of Surveys Completed During the Year***	***Total Number of Surveyed Customers Non-Compliant at End of Year***	***Total Number of Non-Compliant Customers Carried Over From Previous Reporting Year***
Residential					
CIP (similar as					
Commercial	2 year				
Industrial	2 year				
Public Authority	2 year				

Note: CIP – Commercial, Industrial, and Public Authority

K. Information submitted by:

Name:_____ Title:_____Date: _____

Return this completed form to the appropriate Department of Natural Resources regional Water Supply Engineer by [insert date].

For regional DNR office addresses, visit www.dnr.wi.gov/contact/.

Instructions for Completing the Water Supply Cross Connection Survey Annual Report

A. General Information Enter the name of the water system, the Public Water System Identification Number and the County the system is located in.

B. Alternate Survey Schedule If system is using an alternate survey schedule, enter date DNR approval was received. An alternate survey schedule is anything other than: 10 years or meter replacement for residential, 10 years or meter replacement for commercial similar to residential, 2 years for commercial, industrial and public authority.

C. If system is providing Public Education and partial surveys in lieu of full residential surveys, date(s) of last public education mailing A residential cross connection program may include providing public education materials in lieu of surveys of the low hazard portions of residential facilities. Low hazard portions consist of normal kitchen and bathroom fixtures. If public education materials are provided, those materials shall be provided to the customer no less than every 3 years and with every cross connection survey. Enter the date or dates if multiple mailings are used to cover the entire service area.

D. If system is providing Public Education and partial surveys in lieu of full commercial surveys, date(s) of last public education mailing A commercial cross connection program may include providing public education materials in lieu of surveys of the low hazard portions of commercial facilities that are similar to residential. Low hazard portions consist of normal kitchen and bathroom fixtures. If public education materials are provided, those materials shall be provided to the customer no less than every 3 years and with every cross connection survey. Enter the date or dates if multiple mailings are used to cover the entire service area.

E. Service Category. Enter all service categories identified in your cross connection program. If you have service categories with different survey schedules, enter them on the blank lines provided. See the instructions for Section F.

F. Survey Frequency Enter the survey frequency (in years) for each service category as identified in your cross connection program.

Residential Survey Unless otherwise authorized by the department, municipal water systems are to cause a survey to be conducted for every residential customer service a minimum of once every ten years, or on a schedule matching meter replacement. An alternative schedule may be used if it was previously approved by the DNR.

Industrial, Commercial and Public Authority Surveys Unless otherwise authorized by the department, a system's cross connection control program must require that a survey be conducted for every industrial, commercial and public authority service a minimum of once every two years, except that for commercial properties of similar or lesser risk to residential properties, the system may follow the same schedule as residential properties. An alternative schedule may be used if it was previously approved by the DNR.

G. Total Number of Customer Connections In Use Enter the total number of service connections in use to your system in each category. Do not include unused service

connections where buildings have been torn down or have been stubbed into properties for future use.

H. Total Number of Surveys Completed During the Year Enter the total number of surveys that were completed in each category. Do not include follow-up surveys used to verify corrective actions were completed.

I. Total Number of Surveyed Customers Non-Compliant at End of Year Enter the total number of customers that remain in the process of completing corrective actions required in the original survey. These are customers that have not been re-inspected to verify corrective actions were completed or who remain non-compliant following re-inspection.

J. Total Number of Non-Compliant Customers Carried Over From Previous Reporting Year Enter the total number of customers that were non-compliant prior to the reporting year and who remained non-complaint at the end of the reporting year. They may be customers who were never re-inspected to verify corrective actions were completed or who remain non- compliant following re-inspection.

K. Submittal Add the name and title of the person completing the form, date, make a copy for your records and mail it to your regional DNR Water Supply Engineer by March 1st
.

3.6 Emergency Response Plan Review (placeholder)

3.7 Monitoring Plan Review

3.7.1 Microbiological Sampling

3.7.1(a) Authority

The authority for requiring water systems to create a microbiological sample site plan (monitoring plan) is found in NR 809.31(1)(a).

3.7.1(b) Responsibilities

DG Regional Responsibilities Regional DG staff should review monitoring plans and sample location maps at each annual inspection and sanitary survey. If sample locations are changed or determined to be no longer applicable Regional DG staff should make sure that a suitable new location is identified and recorded on the sample location map. Regional DG staff should work with new systems to develop their sample site plan prior to serving water.

For new community water systems the sample site plan must be reviewed as part of the approval to place the facility into service under NR 810.26(1)(a). For new or existing (but new to the PWS) TN and NN systems sample site plans should be discussed during the initial contact with the system and prepared prior to collecting the first coliform sample.

Bacteriological sampling requirements may change when Regional DG EPAs change a population, add treatment, add a new source, or add a new system to the DWS. Regional DG staff are responsible to assure that water system owners are notified of these changes. Typically, owners of municipal, OTM, and nontransient noncommunity water systems are notified when the Regional DG EPA sends a revised drinking water monitoring schedule. Owners of TN water systems are notified by a Regional EPA if they are located in a non-contract county, or by the county representative, if located in a contract county.

Information on sample locations for all SDWA monitoring for each community and nontransient noncommunity water system is maintained in the DWS. Regional DG staff should notify the Regional DG EPAs so they can update the DWS when there is a change to the monitoring site plan. You may access the monitoring site information through the DWS menu – Access\Public Inventory\Monitoring Sites.

DG Central Office Responsibilities NR 809.31(1) establishes initial monitoring frequency for bacteriological sampling. At the beginning of each year, Public Water Supply DG staff send monitoring schedules to all public water systems, except transient noncommunity water systems, notifying them of their bacteriological monitoring requirements.

Public Water Supply DG staff also notify the WI State Laboratory of Hygiene when they need to send slips and/or bottles to water systems that are completing monthly bacteriological monitoring, quarterly bacteriological monitoring, or annual bacteriological monitoring at TN water systems.

Since 2009, all municipal water systems were to electronically report their monitoring site plan to the Department. Systems have been asked to provide locational information on the entry points to their distribution systems, where they collect samples for IOCs, SOCs, VOCs, and Radioactivity. The monitoring site worksheet is available at

http://intranet.dnr.state.wi.us/dg/monitoringsiteplan.html (internal DNR link)

Central Office DG staff review and update monitoring site plan data in DWS.

3.7.1(c) Review of the Monitoring Plan

- Maps: The drawing or schematic of the distribution system is a key part of any monitoring plan and should be reviewed for comprehensiveness. The entire water distribution system and the location of any interconnections with other public water systems should be shown on the drawing or schematic. Review the form to assure that it identifies an address and monitoring point ID code for each routine and repeat sample location. The information should match the monitoring site plan in the DWS. This address and monitoring point ID information should be used by the owner when they complete the Bacteriological Analysis laboratory form (Form 3300-51).

  Also, review the map to confirm that it takes into account the location of the objects listed below. These objects should be present on the map, if applicable, and identified in relation to the distribution mains to assure that the sample sites represent water throughout the distribution system (s. NR 809.31(1)).

  Sources (wells, connection with parent system)

  Treatment plants (If treatment is located at the well, the well and the treatment plant should be shown at the same point. If treatment is at a combined location for multiple wells identify that location as the treatment plant)

  The location of all total coliform (TC) sampling points for all required monitoring should be identified by using a monitoring point ID code. Also, the repeat sample locations should be identified for each TC sample point.

  Entry Points to the water distribution system (Location of sampling point for VOCs, SOCs, and IOCs)

  Storage facilities (include volume)

  Pressure zones

  Spacing of Monitoring Sites: Sample site(s) should be selected carefully so that samples will represent the entire water distribution system. It is especially important to make sure that the sample site plan includes areas that may adversely affect the microbiological quality of the water. With properly located sites, changes in water quality can be identified, along with the possible cause for the changes. Sample sites should reflect the complexity of the water system and include areas of concern (i.e., zones of low pressure, cross-connection hazards, deteriorating water mains, areas susceptible to stagnation due to low water use, or other questionable conditions). The minimum number of samples required by NR 809.31(1)(b)) will likely ensure that the water quality throughout the water

distribution system is sufficiently monitored in a 'simple' water system. A 'simple' water system is generally a water system with one or two sources and a single pressure zone. For complex water systems, the number of samples required by regulation may be less than is necessary to ensure representative sampling of the entire water distribution system. A 'complex' water system is usually a water system that consists of multiple sources and /or multiple pressure zones, has long transmission runs, or extensive distribution piping. Complex water systems should be encouraged to take more than the minimum number of samples required per month, if the minimum number is not sufficient to cover all areas of the water distribution system. When taking multiple samples per month, a water system must sample at regular time intervals throughout the month, (i.e., samples should not all be collected on the same day, but rather on an appropriate daily, weekly, or biweekly schedule (NR 809.31(1)(b))).

3.7.1(d) Acceptability of Monitoring Sites

Routine samples - Routine sample sites should have been selected throughout the distribution system and should represent the varying conditions that exist in the distribution system (NR 809.31(1)(b)). Careful attention should be paid to the selection of sample taps. Use of both customer service connections and dedicated sampling stations are acceptable. Dedicated sampling stations are often more accessible to the water system samplers. If home faucets are to be used, each selected faucet should have been examined carefully by the water system to ensure its suitability. When sites are a customer's service tap it may be affected by conditions existing on the customer's premises and may not accurately reflect the conditions that exist in the water distribution system. Regional DG staff should make sure that sample sites are chosen carefully,
and do not include locations such as swing faucets, or outside hose bibs, which may be suspect if the results are total coliform positive.

Alternate Monitoring Sites - To ensure that samples are representative of the entire distribution system as required under NR 809.31(1), and to be prepared for increased monitoring due to population increase, it is recommended that water systems, whether "simple" or "complex"', identify a greater number of routine sample sites than are required to be collected in each compliance sampling period (monthly, quarterly or annually). For example, water systems that collect one sample per month should have at least three routine sample sites identified. Rotating routine sample sites during the year can help guarantee that sampling is representative of water throughout the distribution system. (For example, one site would be sampled in January, April, July and October; a second site would be sampled in February, May, August and November; and a third site would be sampled in March, June, September and December.) For large systems it is desirable to rotate through each important sample site about four times per year.

Check and Repeat Sites - If any routine sample tests positive for the presence of total coliforms, a water system must collect additional samples to confirm the presence of coliform bacteria (NR 809.31(2)). Samples must come from the following locations when additional taps for sampling are available (NR809.31(2)(b)):

- One sample from the same location as the positive sample (Check sample);
- One sample within 5 service connections upstream (Repeat sample);
- One sample within 5 service connections downstream (Repeat sample); and

All check and repeat samples should be identified on the sample site map and/or by address with sample faucet type and location identified.

3.7.1(e) Documentation

Regional DG staff should ensure that in addition to the sample site plan, each system also has written guidance available for anyone who may be required to collect coliform samples. The guidance should contain information on how to select sites, how to collect and ship samples, and how to complete lab forms.

A person knowledgeable of the water system's distribution facilities and characteristics should prepare, as well as maintain, the monitoring plan. The monitoring plan should, in addition to the map of all sample locations, include the address and the specific sample tap location and faucet types.

Once the monitoring plan is completed, it should be maintained in the water system's files and available to all water system personnel involved with coliform monitoring and DNR staff (NR 809.31(1)). The monitoring plan should be updated as needed to reflect water system or monitoring changes.

3.7.1(f) Records Storage and Retention

Records of bacteriological analyses made shall be kept by the water system owner for not less than 5 years (NR 809.82(1)). Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided that the following information is included (NR 809.82(1)):

1. The date, place, and time of sampling, and the name of the person who collected the sample;
2. Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;
3. Date of analysis;
4. Laboratory and person responsible for performing analysis;
5. The analytical technique/method used; and
6. The results of the analysis.

3.7.2 Lead and Copper (placeholder)

3.7.3 Disinfection/Disinfection Byproducts (D/DBP) (placeholder)

3.8 Extended Well Abandonment Agreements

3.8.1 General

Abandonment of unused community wells is required under NR 811.13(1). As provided in NR 810.22 the department may extend the period for abandonment. Unused wells may pose a threat to the quality of the groundwater due to lack of maintenance, contamination, and flow of water down the open drill hole. Community water systems should be encouraged to abandon unused wells. Given the significant investment

associated with the well and the potential costs associated with abandonment many water systems are reluctant to abandon unused wells. An extended well abandonment agreement can be used to ensure protection of the aquifer and allow the water system additional time to plan for replacement, upgrading, or abandonment of the well.

3.8.2 Responsibilities

Regional DG staff are responsible for:
- Identifying unused community wells.
- Evaluating the potential for groundwater contamination from unused wells.
- Requiring abandonment of the well.
- Entering into an extended well abandonment agreement.
- Periodic review of the condition of the well, the well abandonment agreement, and the conditions of the well abandonment agreement.

3.8.3 Considerations and Evaluation

When evaluating a well for an extended well abandonment agreement and entering into the agreement the following should be considered:
- The well has no acute (bacteria or nitrate) water quality problems.
- The well has no contamination problems that may degrade the surrounding groundwater (Volatile Organics (VOCs), Synthetic Organics (SOCs), etc.).
- The water system agrees to a 5 year cycle of reevaluation.
- A 6 year cycle for water quality monitoring is established.
- Bacteria is monitored quarterly.
- Nitrate is monitored annually.
- The well meets current construction and well pump installation standards.
- The water system will public notice the use of the well if the water quality exceeds the drinking water standards.
- The water system agrees to televise any well in excess of 70 years old at least once every 15 years.
- The water system will restrict the use of the well if the water quality exceeds the drinking water standards to emergency use of no more than two days per quarter. Regional DG staff may authorize an extended period of use for an individual event if contacted by the water system.

3.8.4 Review Period

The condition of the well and the requirements of the agreement should be reviewed every 5 years. This can be accomplished as part of the sanitary survey or an annual inspection. Regional DG staff may extend the agreement so long as the well does not pose a groundwater contamination threat and the conditions of the original agreement have been met.

3.8.5 Sample Extended Well Abandonment Agreement (placeholder)

3.9 Control of Private Well Construction

3.9.1 Private Well Bans

As part of the interaction with water systems DG Staff may come across situations

where municipal water systems have adopted ordinances banning the construction of private wells within their service areas. When DG Staff become aware of these ordinances or where municipalities have modified the standard well abandonment ordinance to ban private wells they should discuss the situation with the Regional DG supervisor, notify the Private Water Supply and Public Water Supply Section Chiefs, and refer the situation to the DG Program attorney for evaluation of the ordinance and response.

3.9.2 Private Well Construction Limitations Based on Drawdown

As part of the interaction with water systems DG Staff may come across situations where municipal water systems have adopted ordinances limiting the construction of private wells within their service areas based on drawdown of the aquifer or potential environmental impacts. When DG Staff become aware of these ordinances they should discuss the situation with the Regional DG supervisor, notify the Private Water Supply and Public Water Supply Section Chiefs, and refer the situation to the DG Program attorney for evaluation of the ordinance and response.

3.10 Mandatory Water System Connection Ordinances

There are no specific requirements on mandatory connection to water systems. Municipalities may adopt ordinances under their authority. The extent and requirements of the ordinance are at the discretion of the municipality so long as they do not conflict with the well abandonment ordinance requirements (Section 3.25) or the control of private well construction (Section 3.9). For instances where a service connection is provided but a private well remains the source of supply the Public Service Commission (PSC) may allow charges to be assessed for a portion of the water costs.

3.11 Water System Supervision (6/19/2018)

3.11.1 Unmanned Operation of Water Treatment Plants

There are no specific requirements on the operation of water system facilities and the presence of an operator. There are requirements for operational reporting and testing (s. NR 811.06(4), NR 811.05(2), and NR 811.05(1). The presence of an operator should be evaluated by DG Regional Staff, the water system, and the operator-in-charge considering the reporting and testing requirements contained in chs. NR 809 and NR 811 and the level of sophistication of the control systems. Wherever automatic testing is used in lieu of on-site sample collection and analysis calibration protocols must be established for routinely testing the sampling and analytical equipment.

3.11.2 Level of Supervision

Water systems are required to provide supervision by means of an operator-in-charge under NR 108.06(2), NR 114.13, and NR 114.31. The qualifications of the operator-in-charge are contained in NR 114.04 and NR 114.30. There are no specific requirements for the amount of time spent by the operator-in-charge at the water supply facilities.

3.11.3 Security

There are no specific requirements on security for unmanned water treatment facilities.

Water systems should ensure that security measures such as locks, fencing, motion sensors, and alarms are installed where appropriate to prevent or detect unauthorized access to facilities. In addition, water systems should consider the security of data and control systems. Security of internet and phone systems should be evaluated as part of the control system design. DG staff should recommend that operational control of critical systems be limited to on site wherever practical.

3.11.4 Requests for Exceptions to Daily Fluoride Residual Testing (6/19/2018)

3.11.4.1 General

In order to reduce costs some water systems are evaluating the need to provide operators on weekends and holidays. As discussed in Section 3.11.2 there are no specific requirements on the level of supervision to be provided at water systems. However, there are daily monitoring and reporting requirements for a variety of parameters including fluoride. With fluoride, as with other parameters, this requirement may be met by the use of automatic residual analyzers. In lieu of installation of analyzers, water systems are requesting an exemption based on the measurements and calculations provided by control systems (SCADA).

3.11.4.2 Authority

The requirements for daily fluoride residual testing and reporting are found in NR 809.74(1). Discussion of the potential reduced fluoride monitoring is found in the note after NR 809.74(1)(b)4. Based on a consultation in April 2018, the CDC concurs with the procedures outlined section 3.11.4.

3.11.4.3 Responsibilities

- **Regional DG Staff** – Review requests for exemptions to the daily testing requirements. Discuss request with DG Supervisor and Public Water Supply Section Chief. If acceptable, issue letter exempting water systems from monitoring requirements.
- **Regional DG Supervisors** – Review Regional Staff decisions on exemptions.
- **Plan Review Staff** – Review and approve any water system modifications necessary to exempt systems from the testing requirements or to meet the requirements with automatic analytical equipment.
- **Public Water Supply Section Chief** – Authorize Regional DG staff to issue exemptions.

3.11.4.4 Exemption Requests

The request should be made to the Regional DG staff person assigned the water system. The request must be made in writing and include:

- The days that the distribution system fluoride residual monitoring would not be conducted.
- The water system facilities involved.
- The design of the control system equipment to be used.
- How the system will determine a theoretical residual.

- The routine maintenance requirements of the control system and equipment.
- The situations that will generate an alarm.
- The proeedures to be followed if an alarm is generated.