

☞ **09hr_JCR-AR_CRule_09-073_pt02a**



(FORM UPDATED: 08/11/2010)

WISCONSIN STATE LEGISLATURE ... PUBLIC HEARING - COMMITTEE RECORDS

2009-10

(session year)

Joint

(Assembly, Senate or Joint)

Committee for Review of Administrative Rules ...

COMMITTEE NOTICES ...

- Committee Reports ... **CR**
- Executive Sessions ... **ES**
- Public Hearings ... **PH**

INFORMATION COLLECTED BY COMMITTEE FOR AND AGAINST PROPOSAL

- Appointments ... **Appt** (w/Record of Comm. Proceedings)
- Clearinghouse Rules ... **CRule** (w/Record of Comm. Proceedings)
- Hearing Records ... bills and resolutions (w/Record of Comm. Proceedings)
(**ab** = Assembly Bill) (**ar** = Assembly Resolution) (**ajr** = Assembly Joint Resolution)
(**sb** = Senate Bill) (**sr** = Senate Resolution) (**sjr** = Senate Joint Resolution)
- Miscellaneous ... **Misc**

* Contents organized for archiving by: Stefanie Rose (LRB) (June 2012)

**ORDER OF THE STATE OF WISCONSIN NATURAL RESOURCES BOARD
REPEALING AND RECREATING AND CREATING RULES**

The Wisconsin Natural Resources Board proposes an order to **repeal and recreate** NR 809 – Safe Drinking Water and NR 811 – Design Requirements for Community Water Systems; and to **create** NR 810 – Requirements for the Operation and Maintenance of Public Water Supply Systems.

DG-19-09

Analysis Prepared by the Department of Natural Resources

1. Statute interpreted: chs. 280 and 281, Stats.

2. Statutory authority: chs. 280 and 281, Stats.

3. Explanation of agency authority: s. 280.11, Stats. – The department shall, after a public hearing, prescribe, publish, and enforce minimum reasonable standards and rules and regulations for methods to be pursued in the obtaining of pure drinking water for human consumption and the establishing of all safeguards deemed necessary in protecting the public health against the hazards of polluted sources of impure water supplies intended for human consumption.

s. 281.17(8), Stats. – The department may establish, administer, and maintain a safe drinking water program no less stringent than the requirements of the safe drinking water act, 42 USC 300f to 300j-26.

4. Related statute or rule: None

5. Plain language analysis:

The proposal was triggered by changes in the federal Safe Drinking Water Act. The Stage 2 Disinfection Byproduct Rule was promulgated on 1/04/2006 and revises the monitoring locations and compliance calculation methods for disinfection byproducts. The Long Term 2 Enhanced Surface Water Treatment Rule was promulgated on 1/05/2006 and requires increased source water monitoring with new treatment levels associated with the monitoring results. The Groundwater Rule was promulgated on 11/08/2006 and requires that water systems initiate new monitoring and correct significant deficiencies identified during department inspections in order to protect consumers from viruses. The Short Term Revisions to the Lead and Copper Rule were promulgated on 10/10/2007 and changed the monitoring, reporting and public notification requirements related to lead and copper.

In order to maintain primacy for the Safe Drinking Water Act, Wisconsin must adopt all federal requirements under the Act or have requirements that are more stringent than the Act. In addition to adopting the federal rules, the proposed rules include a requirement for mandatory disinfection at municipal water systems as an enhancement of the federal requirements, updates and clarifications to design standards for community water systems, and creation of a separate administrative rule on operations and maintenance of public water systems in order to improve the usability of the drinking water codes.

The major impact of the rule changes will be related to the Stage 2 Disinfection Byproduct Rule because of the large number of municipal water systems that disinfect (over 500) and the changes to the monitoring requirements and compliance calculations. Additionally, the requirement for mandatory disinfection of all municipal water system will require 71 municipal water systems that do not currently disinfect to do so.

6. Summary of, and comparison with, existing or proposed federal regulation:

The proposed rules will make state regulations compatible with federal regulations, satisfying the primacy requirements of the Safe Drinking Water Act and will update and clarify other state requirements.

7. Comparison with similar rules in adjacent states (Illinois, Iowa, Michigan and Minnesota):

A significant portion of the rule changes are based on changes to the federal rules. The adjacent states are in the process of adopting the federal rule changes. The changes to design standards are not based on federal rule changes. The adjacent states all have design standards based on the "Recommended Standards for Water Works" published by the Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers. These standards are updated on a 5 year cycle. Wisconsin is represented on the Water Supply Committee for development of the standards. The rule changes for design standards are the same or similar to the published standards. The federal rules do not require mandatory disinfection of groundwater systems. Illinois currently requires disinfection of all community water systems. All of the other adjacent states have mandatory disinfection for community water systems using groundwater based on their vulnerability to contamination by bacteria. All of the adjacent states will be evaluating disinfection at public water systems as part of the federal Groundwater Rule adoption and will be expanding disinfection requirements to systems vulnerable to fecal contamination.

8. Summary of factual data and analytical methodologies used and how any related findings support the regulatory approach chosen:

The bulk of the rule changes are based on federal rule changes, changes to nationally recognized design standards, and clarification or updating comments gathered during a series of stakeholder meetings. The rule change associated with mandatory disinfection of municipal water systems served by groundwater stems in part from the federal Groundwater Rule and in part from research in Wisconsin on virus occurrence, illness related to viruses in drinking water, and the impact of disinfection on reducing viral related illness. The research studies considered were a Wisconsin Water and Health Trial for Enteric Risk (WAHTER) study conducted by the Marshfield Clinic Research Foundation and "An Assessment of Virus Presence and Potential Virus Pathways in Deep Municipal Wells" conducted by the Wisconsin Geological and Natural History Survey. The WAHTER study investigated the relationship between virus occurrence and illness rates in 14 Wisconsin communities using undisinfected and disinfected groundwater. The assessment study evaluated the occurrence of viruses in the deep wells serving the City of Madison. These studies support the following conclusions:

1. Use of alternate parameters, as proposed by the Groundwater Rule, is inadequate to predict virus occurrence or the vulnerability of wells to contamination by viruses.
 2. Viruses occur in municipal wells that are not vulnerable using current assessment tools.
 3. Illness attributable to viruses is occurring at municipal water systems supplied by groundwater.
 4. Disinfection reduces the illness rates attributable to viruses at municipal water systems supplied by groundwater.
- It is proposed to require mandatory disinfection of all municipal water systems served by groundwater based on the intent of the Groundwater Rule to reduce illness rates attributable to viruses at groundwater systems and conclusions drawn from a review of studies conducted on viral illness and virus occurrence in Wisconsin.

9. Analysis and supporting documents used to determine the effect on small business or in preparation of an economic impact report:

An analysis of the effect of the proposed rules on small business was not performed since the primarily impacted systems are community water systems serving municipal water systems, which are not small businesses.

10. Effect on small business:

These rules should not have a significant impact on small business since the water systems operated by small businesses such as taverns and restaurants are already subject to the inspection and deficiency correction requirements included in the rule modifications.

11. Agency contact person:

Lee Boushon, Chief
Public Water Supply Section
(608) 266-0857
lee.boushon@wi.gov

SECTION 1. NR 809 is repealed and recreated to read:

**Chapter NR 809
SAFE DRINKING WATER**

NR 809.01	Purpose.
NR 809.02	Departmental justification.
NR 809.03	Applicability.
NR 809.04	Definitions.
NR 809.05	Coverage.
NR 809.06	General requirements.

Subchapter I — Maximum Contaminant Levels, Monitoring and Analytical Requirements for Primary Drinking Water Contaminants

NR 809.07	Maximum contaminant level goals for primary contaminants.
NR 809.09	Applicability of primary maximum contaminant levels to water sources.
NR 809.11	Inorganic chemical maximum contaminant levels and BATs.
NR 809.113	Sample collection and analytical requirements for inorganic contaminants.
NR 809.115	Monitoring requirements for inorganic contaminants.
NR 809.117	Compliance requirements for inorganic contaminants.
NR 809.118	Sodium monitoring, reporting and notification requirements.
NR 809.119	Materials identification for corrosivity characteristics.
NR 809.20	Synthetic organic contaminant maximum contaminant levels and BATs.
NR 809.203	Analytical requirements for synthetic organic contaminants.
NR 809.205	Monitoring requirements for synthetic organic contaminants.
NR 809.207	Compliance requirements for synthetic organic contaminants.
NR 809.24	Volatile organic contaminant maximum contaminant levels and BATs.
NR 809.243	Analytical requirements for volatile organic contaminants.
NR 809.245	Monitoring requirements for volatile organic contaminants.
NR 809.247	Compliance requirements for volatile organic contaminants.
NR 809.25	Special monitoring and reporting for selected organic contaminants and sulfate.
NR 809.30	Distribution System microbiological contaminant maximum contaminant levels.
NR 809.31	Distribution system microbiological contaminant monitoring requirements.
NR 809.311	Analytical requirements for microbiological contaminants.
NR 809.312	Compliance reporting for microbiological contaminants.

- NR 809.32 Groundwater microbiological source water monitoring - General requirements.
- NR 809.323 Analytical requirements for groundwater source microbiological contaminants.
- NR 809.325 Groundwater source microbial monitoring requirements.
- NR 809.327 Compliance requirements for groundwater source microbiological monitoring.
- NR 809.328 Treatment technique compliance for groundwater source microbiological contaminants.
- NR 809.329 Reporting and recordkeeping requirements for groundwater public water systems.
- NR 809.33 Surface water microbiological organisms and indicators.
- NR 809.331 Surface water source monitoring.
- NR 809.332 Sampling schedules for surface water source water monitoring.
- NR 809.333 Sampling locations for surface water source water monitoring.
- NR 809.334 Analytical methods for surface water source water monitoring.
- NR 809.335 Approved laboratories for surface water source monitoring.
- NR 809.336 Reporting source water monitoring results.
- NR 809.35 Sanitary survey requirements for all public water systems.
- NR 809.50 Maximum contaminant levels, compliance dates and BATs for radionuclides.
- NR 809.51 Beta particle and photon radioactivity from man-made radionuclides maximum contaminant levels.
- NR 809.52 Analytical methods for radionuclides.
- NR 809.53 Radionuclide monitoring frequency and compliance requirements for community water systems.

Subchapter II — Control of Lead and Copper

- NR 809.54 General requirements for the control of lead and copper.
- NR 809.541 Monitoring and analytical requirements for lead and copper.
- NR 809.542 Applicability of corrosion control treatment steps for small, medium and large-size water systems.
- NR 809.543 Description of corrosion control treatment requirements.
- NR 809.544 Source water treatment requirements for corrosion control.
- NR 809.545 Lead service line replacement requirements.
- NR 809.546 Public education and supplemental monitoring requirements.
- NR 809.547 Monitoring requirements for lead and copper in tap water.
- NR 809.548 Monitoring requirements for water quality parameters.
- NR 809.549 Monitoring requirements for lead and copper in source water.
- NR 809.55 Reporting requirements for lead and copper.

Subchapter III — Maximum Contaminant Levels, Maximum Residual Disinfectant Levels, Monitoring, Analytical Requirements and Control of Disinfection Byproducts, Disinfection Residuals, Stage 1 DBP and Stage 2 DBP rules

- NR 809.561 Maximum residual disinfectant level goals (MRDLGs), and maximum contaminant levels (MCLs) for disinfection byproducts, maximum residual disinfectant levels (MRDLs) and best available treatment.
- NR 809.562 General requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
- NR 809.563 Analytical requirements for disinfection byproducts and disinfection residuals for Stage 1 DBP and Stage 2 DBP.
- NR 809.565 Monitoring requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
- NR 809.566 Compliance requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
- NR 809.567 Reporting and recordkeeping requirements for disinfection byproducts and disinfection residuals for Stage 1 DBP.
- NR 809.569 Treatment techniques for control of disinfection byproduct (DBP) precursors.
- NR 809.60 General requirements for Stage 2 DBP disinfection byproducts control.
- NR 809.61 Routine monitoring for Stage 2 DBP.

- NR 809.62 Monitoring plan for Stage 2 DBP.
- NR 809.63 Requirements for reduced and increased monitoring for Stage 2 DBP.
- NR 809.64 Additional disinfection byproducts requirements for consecutive systems under Stage 2 DBP.
- NR 809.65 Operational evaluation levels for disinfection byproducts under Stage 2 DBP.
- NR 809.66 Requirements for remaining on reduced TTHM and HAA5 monitoring based on disinfection byproducts Stage 1 DBP results.
- NR 809.67 Requirements for remaining on increased TTHM and HAA5 monitoring based on disinfection byproducts Stage 1 DBP results.
- NR 809.68 Reporting and recordkeeping requirements for Stage 2 DBP.

Subchapter IV — Miscellaneous Chemical Monitoring Requirements, Raw Surface Water Standards, and Certified Laboratories

- NR 809.70 Secondary inorganic chemical and physical standards.
- NR 809.71 Sampling and analytical requirements for secondary standards.
- NR 809.73 Sampling and analytical requirements for other chemicals.
- NR 809.74 Additional requirements for public water systems which chlorinate or fluoridate water.
- NR 809.75 Raw surface water standards.
- NR 809.76 Laboratory Certification.
- NR 809.77 Monitoring of consecutive public water systems.

Subchapter V — Reporting, Consumer Confidence Reports and Record Keeping

- NR 809.80 Reporting requirements.
- NR 809.82 Record maintenance.
- NR 809.83 Consumer confidence report applicability and deadlines.
- NR 809.833 Content of consumer confidence reports.
- NR 809.835 Required additional health information for consumer confidence reports.
- NR 809.837 Consumer confidence report delivery and recordkeeping.

Subchapter VI — Conditional Waivers and Variances

- NR 809.90 Conditional waivers.
- NR 809.905 Conditional waivers from the maximum contaminant levels for uranium .
- NR 809.91 Nitrate variances.

Subchapter VII — Public Notification of Drinking Water Violations

- NR 809.950 General public notification requirements.
- NR 809.951 Tier 1 public notice--form, manner, and frequency of notice.
- NR 809.952 Tier 2 public notice--form, manner, and frequency of notice.
- NR 809.953 Tier 3 public notice--form, manner, and frequency of notice.
- NR 809.955 Notice to new billing units or new customers.
- NR 809.956 Special notice of the availability of unregulated contaminant monitoring results.
- NR 809.957 Special notice for exceedance of the secondary maximum contaminant level for fluoride.
- NR 809.958 Special notice for nitrate exceedances above MCL by non-community water systems, where granted permission by the department under s. NR 809.11 (3).

- NR 809.959 Public notice by the department on behalf of the public water system.
- NR 809.960 Special notice for significant deficiencies or source groundwater fecal contamination.
- NR 809.970 Special notice for repeated failure to conduct monitoring of the source water for Cryptosporidium and for failure to determine bin classification or mean Cryptosporidium level.

Subchapter VIII – Initial Distribution System Evaluation

- NR 809.97 Initial Distribution System Evaluations.
- NR 809.971 Standard monitoring.
- NR 809.973 System specific studies.

- NR 809.974 40/30 certification.
- NR 809.975 Very small public water system waivers.
- NR 809.976 Compliance monitoring location recommendations.

NR 809.01 Purpose. The purpose of this chapter is to establish minimum standards and procedures for the protection of the public health, safety and welfare in the obtaining of safe drinking water. This chapter is adopted under the authority granted in chs. 280 and 281, Stats.

Note: See chs. NR 108, 114, 810, 811 and 812 for other requirements pertaining to public and private drinking water systems.

NR 809.02 Departmental justification. (1) Where the department exercises discretion allowed under this chapter to require a water supplier for a public water system to perform construction, repairs, monitoring or other activities which would necessitate expenditure of resources, the department shall explain in writing the reasons for the requirements.

(2) A decision by the department to grant a waiver shall be made in writing and shall set forth the basis for the determination. The waiver determination may be initiated by the department or upon an application by the water supplier for a public water system.

NR 809.03 Applicability. The provisions of this chapter shall apply to all new and existing public water systems and water suppliers.

NR 809.04 Definitions. In this chapter:

- (1) "Action level" is the concentration of lead or copper in water which determines, in some cases, the treatment requirements that a public water system is required to complete.
- (2) "Best available technology" or "BAT" means the best technology treatment techniques, or other means which the U.S. environmental protection agency finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available, taking cost into consideration.
- (3) "Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.
- (4) "Combined distribution system" means an interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.
- (5) "Community water system" or "CWS" means a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. Any public water system serving 7 or more homes, 10 or more mobile homes, 10 or more apartment units, or 10 or more condominium units shall be considered a community water system unless information is available to indicate that 25 year-round residents will not be served.
- (6) "Compliance cycle" means the 9-year calendar year cycle during which public water systems shall monitor. Each compliance cycle consists of 3, 3 year compliance periods. The first compliance cycle begins January 1, 1993

and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

(7) "Compliance period" means a 3 year calendar year period within a compliance cycle. Each compliance cycle has 3, 3-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.

(8) "Comprehensive performance evaluation" or "CPE" means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. For purposes of compliance with this chapter, the comprehensive performance evaluation shall consist of at least the following components: Assessment of plant performance; evaluation of major unit processes; identification and prioritization of performance limiting factors; assessment of the applicability of comprehensive technical assistance; and preparation of a CPE report.

(9) "Confirmed presence" means the presence of coliform bacteria in a water sample confirmed by a total coliform-positive repeat sample.

(10) "Confluent growth" means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

(11) "Consecutive System" means a public water system that receives some or all of its finished water from one or more wholesale systems through a master metering system. This public water system may also be known as a wholesale purchaser or wholesale customer. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

(12) "Conventional filtration treatment" means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.

(13) "Contaminant" means any physical, chemical, biological, or radiological substance or matter in water.

(14) "Corrosion inhibitor" means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

(15) "CT" or "CT_{calc}" is the product of the residual disinfectant concentration (C) in mg/l determined before or at the first customer, and the corresponding disinfectant contact time (T) in minutes, i.e., "C" x "T". If a public water system applies disinfectants at more than one point prior to the first customer, it shall determine the CT of each disinfectant sequence before or at the first customer, to determine the total percent inactivation or "total inactivation ratio." The inactivation ratio for a single disinfectant sequence is:

$$\frac{CT_{calc}}{CT_{table}}$$

where "CT_{table}" is the CT value required for the target organism and the target level of inactivation as contained in ss. NR 810.47 to 810.61. The sum of the inactivation ratios, or total inactivation ratio for a series of disinfection sequences is:

$$\sum \frac{(CT_{calc})}{CT_{table}}$$

and is calculated by adding together the inactivation ratio for each disinfection sequence. In determining the total inactivation ratio, the water supplier shall determine the residual disinfectant concentration of each sequence and corresponding contact time before any subsequent disinfection application points. A total inactivation ratio equal to or greater than 1.0 is assumed to provide the target level of disinfection of the target organism.

(16) "Department" means the department of natural resources.

(17) "Diatomaceous earth filtration" means a process resulting in substantial particulate removal in which:

- (a) A pre-coat cake of diatomaceous earth filter media is deposited on a support membrane (septum); and
- (b) While the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

(18) "Direct filtration" means a series of processes including coagulation and filtration, but excluding sedimentation, resulting in substantial particulate removal.

(19) "Disinfectant contact time" ("T" in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration ("C") is measured. Where only one "C" is measured, "T" is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or where residual disinfectant concentration ("C") is measured. Where more than one "C" is measured, "T" is:

(a) For the first measurement of "C", the time in minutes that it takes for water to move from the first or only point of disinfectant application to a point before or at the point where the first "C" is measured; and

(b) For subsequent measurements of "C", the time in minutes that it takes for water to move from the previous "C" measurement point to the "C" measurement point for which the particular "T" is being calculated. Disinfectant contact time in pipelines shall be calculated based on "plug flow" by dividing the internal volume of the pipe by the maximum hourly flow rate through the pipe. Disinfectant contact time within mixing basins and storage reservoirs shall be determined by tracer studies or other department approved equivalent demonstration.

(20) "Disinfection" means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

(21) "Disinfection profile" means a summary of daily *Giardia lamblia* inactivation through the treatment plant. The procedure for developing a disinfection profile is contained in s. NR 810.32.

(22) "Distribution system" means all pipes or conduits by which water is delivered to consumers except piping and fixtures inside buildings served, water services and private water mains as defined in ch. Comm 81.

(23) "Domestic or other non-distribution system plumbing problem" means a coliform contamination problem in a public water system with more than one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

(24) "Dose equivalent" means the product of the absorbed dose for ionizing radiation and such factors as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the international commission on radiological units and measurements (ICRUM).

(25) "Dual sample set" means a set of two samples collected at the same time and same location, with one sample analyzed for total trihalomethanes (TTHM) and the other sample analyzed for Haloacetic acids five (HAA5).

(26) "Enhanced coagulation" means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.

(27) "Enhanced softening" means the improved removal of disinfection byproduct precursors by precipitative softening.

(28) "Effective corrosion inhibitor residual" means a concentration sufficient to form a protective coating on the interior walls of a pipe.

(29) "Entry point" means a location in the public water system after treatment or chemical addition, if any, but prior to the distribution system. A sample collected in the distribution system may be considered an entry point sample if the department has determined it is more representative of the water sources.

(30) "Environmental protection agency" or "EPA" means the agency of the United States federal government ultimately responsible for establishing and enforcing national primary drinking water regulations.

(31) "Filter profile" means a graphical representation of individual filter performance, based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.

(32) "Filtration" means a process for removing particulate matter from water by passage through porous media.

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

(34) "First draw sample" means a one-liter sample of tap water that has been standing in plumbing pipes at least 6 hours and is collected without flushing the tap.

(35) "Flocculation" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

(36) "4 log treatment of viruses" means a treatment process or a combination of treatment processes that provides inactivation or removal of 99.99% of viruses.

(37) "GAC10" means granular activated carbon filter beds with an empty-bed contact time of 10 minutes based on average daily flow and a carbon reactivation frequency of every 180 days.

(38) "Gross alpha particle activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.

(39) "Gross beta particle activity" means the total radioactivity due to beta particle emission as inferred from measurements on a dry sample.

(40) "Groundwater under the direct influence of surface water"(GWUDI) means any water beneath the surface of the ground with:

(a) Occurrence of insects or other macroorganisms, algae or large diameter pathogens such as *Giardia lamblia* or *Cryptosporidium*, in greater than or equal to 10% of representative source water samples collected over a period of 6 months, immediately prior to the first or only point of disinfectant application, or

(b) Evidence of relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions where the department determines that these shifts are indications of the potential for contamination of the groundwater by the organisms identified in par. (a).

(41) "Haloacetic acids (five)" or "HAA5" means the sum of the concentrations in milligrams per liter of the haloacetic acid compounds (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid and dibromoacetic acid), rounded to 2 significant figures after addition.

(42) "Holding time" means the period from time of sampling to time of analysis.

(43) "Initial compliance period" means the first full 3-year compliance period which begins at least 18 months after promulgation of the federal regulations. For monitoring contaminants in ss. NR 809.11 (2) (b) and 809.20 (1)(b), the initial compliance period means January 1993 - December 1995 for public water systems with 150 or more service connections and January 1996 - December 1998 for public water systems having fewer than 150 service connections.

(44) "Initial Distribution System Evaluation or "IDSE" means an evaluation using monitoring to determine locations with representative high TTHM and HAA5 concentrations throughout the distribution system of a public water system.

(45) "Large water system" means, for the purpose of monitoring lead and copper, a public water system that serves more than 50,000 persons.

(46) "Lead service line" means a service line made of lead which connects the water main to the building inlet and any lead pigtail, gooseneck or other fitting which is connected to such lead line.

(47) "*Legionella*" means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires disease.

(48) "Locational running annual average" or "LRAA" means the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

(49) "Long term 2 surface water treatment rule" or "LT2" means the monitoring and requirements under the federal rule 40 CFR part 141 Subpart W.

(50) "Man-made beta particle and photon emitters" means all radionuclides emitting beta particles or photons, or both, listed in Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium-232, uranium-235 and uranium-238.

(51) "Maximum contaminant level" or "MCL" means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

(52) "Maximum contaminant level goal" or "MCLG" means the maximum level of a contaminant in drinking water at which no known or anticipated adverse affect on the health of persons would occur, and which allows an adequate margin of safety. Maximum contaminant level goals are non-enforceable health goals, unless the department determines that action is necessary to protect public health.

(53) "Maximum residual disinfectant level" or "MRDL" means a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects.

(54) "Maximum residual disinfectant level goal" or "MRDLG" means the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are nonenforceable health goals and do not reflect the benefit of the addition of the chemical for control of waterborne microbial contaminants.

(55) "Medium-size water system" means, for the purpose of monitoring lead and copper, a public water system that serves greater than 3,300 and less than or equal to 50,000 persons.

(56) "Near the first service connection" means at one of the 20% of all service connections in the entire distribution system that are nearest the water supply treatment facility or water supply source, as measured by water transport time within the distribution system.

(57) "Non-community water system" or "NCWS" means a public water system that is not a community water system. A non-community water system is either a non-transient non-community water system or a transient non-community water system.

(58) "Non-transient non-community water system" or "NTNCWS" means a non-community water system that regularly serves at least 25 of the same persons over 6 months per year.

Note: Examples of non-transient non-community water systems include those serving schools, day care centers and factories.

(59) "Optimal corrosion control treatment" means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the public water system to violate any national primary drinking water regulations as listed in part 141 of the code of federal regulations CFR 40.

(60) "Person" means an individual, corporation, company, association, cooperative, trust, institution, partnership, state, municipality, or federal agency.

(61) "Picrocurie" or "pCi" means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

(62) "Plant" means any facility for the obtainment of potable water, whether from surface water or groundwater sources, for a community water system.

(63) "Point-of-disinfectant application" is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface runoff.

(64) "Point-of-entry treatment device" or "POE" is a water treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

(65) "Point-of-use treatment device" or "POU" is a water treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.

(66) "Primary maximum contaminant levels" means those maximum contaminant levels which represent minimum public health standards.

(67) "Public water system" or "PWS" means a system for the provision to the public of piped water for human consumption through pipes or other constructed conveyances, if the system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. A public water system is either a "community water system" or a "non-community water system." A public water system:

(a) Includes any collection, treatment, storage and distribution facilities under control of the water supplier for the public water system and used primarily in connection with the system.

(b) Includes any collection or pretreatment storage facilities not under the control of the water supplier for the public water system, which are used primarily in connection with the system.

(c) Does not include any "special irrigation district."

Note: The definition of public water system as regulated by this chapter is broader and includes more water systems than those governed by the public service commission under its definition of a public utility in ch. 196, Stats.

(68) "Rem" means the unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. A "millirem" or "mrem" is 1/1000 of a rem.

(69) "Repeat compliance period" means any subsequent compliance period after the initial compliance period.

(70) "Residual disinfectant concentration" ("C" in CT calculations) means the concentration of disinfectant measured in mg/l in a representative sample of water.

(71) "Running annual average" means the sum of 1, 2, 3 or 4 calendar quarter sample results divided by 4. The first sample may be the average of the initial and confirmation sample results. If more than 4 calendar quarters of samples have been collected in more than 4 consecutive calendar quarters, the results from the 4 most recent quarters shall be used. If multiple compliance samples are collected in a single calendar quarter, the sample which yielded the highest concentration shall be used to calculate the running annual average. If a quarterly sample is not taken within a required consecutive quarter then the divisor shall be the number of quarterly samples that have been analyzed within the required time period.

(72) "Sanitary survey" means an on-site inspection of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of the source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

(73) "Secondary drinking water standards" means those standards for aesthetic parameters which represent minimum public welfare concerns but do not represent health standards.

(74) "Sedimentation" means a process for removal of solids before filtration by gravity or separation.

(75) "Service line sample" means a one-liter sample of water that has been standing for at least 6 hours in a service line.

(76) "Significant deficiency" includes, but is not limited to, defects in design, operation, or maintenance of a public water system, or a failure or malfunction of the water sources, treatment, storage or distribution system of a public water system that the department determines to be causing the introduction of contamination into the water delivered to consumers or when the department determines that a health risk exists to consumers of the water.

(77) "Single family structure" means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

(78) "Slow sand filtration" means a process involving passage of raw water through a bed of sand at low velocity, generally less than 0.4 m/h, resulting in substantial particulate removal by physical and biological mechanisms.

(79) "Small water system" means, for the purposes of monitoring lead and copper, a public water system that serves 3,300 persons or fewer.

(80) "Special irrigation district" means an irrigation district in existence prior to May 18, 1994 that provides primarily agricultural service through a piped water system with only incidental residential or similar use where the system or the residential or similar users of the system are supplied with water that meets all maximum contaminant levels of subch. I.

(81) "Stage 1 Disinfection Byproducts" or "Stage 1 DBP" means the compliance requirements under the federal rule 40 CFR part 141 Subpart L.

(82) "Stage 2 Disinfection Byproducts" or "Stage 2 DBP" means the compliance requirements under the federal rule 40 CFR part 141 Subpart U.

(83) "Surface water" means all water which is open to the atmosphere and subject to surface runoff.

(84) "Surface water systems" means public water systems using surface water or groundwater under the direct influence of surface water as a source and that are subject to the requirements of 40 CFR 141, subpart H, which contains the national primary drinking water regulations.

(85) "SUVA" means specific ultraviolet absorption at 254 nanometers (nm).

Note: SUVA is an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of 254 nm (UV_{254}) (measured in m^{-1}) by its concentration of dissolved organic carbon (DOC) (in mg/L).

(86) "System with a single service connection" means a public water system which supplies drinking water to consumers via a single service line.

(87) "Too numerous to count" means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

(88) "Total organic carbon" or "TOC" means total organic carbon in mg/L measured using heat, oxygen, ultraviolet irradiation, chemical oxidants or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to 2 significant figures.

(89) "Transient non-community water system" or "TNCWS" means a non-community water system that serves at least 25 people at least 60 days of the year but does not regularly serve at least 25 of the same persons over 6 months per year.

Note: Examples of transient non-community water systems include those serving taverns, motels, restaurants, churches, campgrounds and parks.

(90) "Waterborne disease outbreak" means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment or is supplied from a contaminated source, as determined by the department or other local or state agency.

(91) "Water supplier" means any person who owns or operates a public water system.

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

(93) "Virus" means a virus of fecal origin which is infectious to humans by waterborne transmission.

NR 809.05 Coverage. This chapter applies to each public water system, unless the public water system meets all of the following conditions:

(1) Consists only of distribution and storage facilities and does not have any collection or treatment facilities.

(2) Obtains all of its water from, but is not owned or operated by, a public water system to which the regulations in this chapter apply.

(3) Does not sell water to any person.

(4) Is not a carrier which conveys passengers in interstate commerce.

NR 809.06 General requirements. Water suppliers shall conduct the minimum monitoring required by this chapter. The department may increase any monitoring requirements in this chapter, if the department determines that any increase is necessary to protect public health, safety or welfare. The department may decrease any monitoring requirements in this chapter, if the department determines that such a decrease will not adversely affect protection of public health, safety or welfare.

Subchapter 1 — Maximum Contaminant Levels, Monitoring and Analytical Requirements for Primary Drinking Water Contaminants

NR 809.07 Maximum contaminant level goals for primary contaminants. (1) Maximum contaminant level goals (MCLGs) are zero for the following contaminants:

Giardia lamblia

Cryptosporidium

Legionella

Total Coliforms

Fecal Coliforms

Escherichia coli

Lead

Arsenic

Chloroform

Bromodichloromethane

Bromoform

Bromate

Dichloroacetic acid

Combined radium-226 and radium-228
 Beta particle and photon radioactivity
 Gross alpha particle activity (excluding radon and uranium)
 Uranium

(2) Maximum contaminant level goals (MCLGs) which are less than the MCLs are as follows:

Contaminant	MCLG in mg/ L
Acrylamide	0.00001
Alachlor	0.0004
Benzene	0.001
Benzo[a]pyrene	0.000002
Carbon tetrachloride	0.0003
Chlordane	0.00003
Chlorite	0.8
Dibromochloromethane	0.06
Dibromochloropropane	0.00003
Di(2-ethylhexyl)phthalate	0.003
1,2-Dichloroethane	0.0004
1,2-Dichloropropane	0.0005
Epichlorohydrin	0.004
Ethylene Dibromide	0.0000004
Heptachlor	0.000008
Heptachlor Epoxide	0.000004
Hexachlorobenzene	0.00002
Pentachlorophenol	0.0003
Polychlorinated biphenyls (PCBs)	0.000005
2,3,7,8-TCDD (Dioxin)	2×10^{-10}
Tetrachloroethylene	0.0007
Thallium	0.0005
Toxaphene	0.00003
1,1,2-Trichloroethane	0.003
Trichloroethylene	0.003
Vinyl chloride	0.000015

(3) MCLGs which equal the MCLs are as follows:

Contaminant	MCLG in mg/ L
Atrazine, (total chlorinated residue) ¹	0.003
Antimony	0.006
Asbestos	7 Million fibers/L (longer than 10 micrometers)
Barium	2
Beryllium	0.004
Cadmium	0.005
Carbofuran	0.04
Chromium	0.1

Copper	1.3
Cyanide(as free Cyanide)	0.2
2,4-D	0.07
Dalapon	0.2
o-Dichlorobenzene	0.6
para-Dichlorobenzene	0.075
1,1-Dichloroethylene	0.007
cis-1,2-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0.005
Di(2-ethylhexyl)adipate	0.4
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylbenzene	0.7
Fluoride	4.0
Glyphosate	0.7
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Mercury	0.002
Methoxychlor	0.04
Monochlorobenzene	0.1
Nickel	0.1
Nitrate	10 (as Nitrogen)
Nitrite	1 (as Nitrogen)
Nitrate+Nitrite	10 (as Nitrogen)
Oxamyl	0.2
Picloram	0.5
Selenium	0.05
Simazine	0.004
Styrene	0.1
Toluene	1
1,2,4-Trichlorobenzene	0.07
1,1,1-Trichloroethane	0.2

¹ Atrazine, total chlorinated residue includes atrazine and its metabolites, diaminoatrazine, diethylatrazine and deisopropylatrazine.

(4) If a contaminant is not detected in a sample and if the limit of detection is higher than the MCLG, the MCLG shall be considered not to have been exceeded.

(5) Notwithstanding any other provisions of this chapter, if a contaminant listed in sub. (2) is detected at a concentration above the MCLG but below the MCL for that contaminant, the following shall apply:

(a) The water supplier shall collect a confirmation sample to verify the presence of the contaminant, unless collected by the department.

(b) Based upon verified results and following a determination by the department on the need for further action as specified in par. (c), the water supplier shall provide public information to its customers indicating the analytical results achieved and the health effects of ingesting the substance at the concentration found.

(c) The department may require the water supplier to prepare and submit a report which does all of the following:

1. Assesses the cause and significance of the problem.
2. Analyzes the cost, effectiveness and feasibility of alternatives for treating the water or developing alternative water sources.

(d) If, based on the conclusions of the report if required under par. (c), the department determines that action is necessary to protect public health, it may require the water supplier to treat or replace the water source.

NR 809.09 Applicability of primary maximum contaminant levels to water sources. Except as otherwise allowed in this chapter, no water source exceeding any primary maximum contaminant level in this chapter may be connected to a public water system unless blending or treatment is provided such that the primary maximum contaminant level is not exceeded upon entry to the distribution system.

NR 809.11 Inorganic chemical maximum contaminant levels and BATs. (1) APPLICABILITY The following requirements apply to all of the maximum contaminant levels for inorganic contaminants:

- (a) The maximum contaminant levels for nitrate and nitrite apply to both community water systems and non-community water systems, except as provided in sub. (3).
- (b) The maximum contaminant level for fluoride only applies to community water systems.
- (c) The maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, mercury, nickel, selenium and thallium apply to community water systems and non-transient, non-community water systems.
- (d) Compliance with maximum contaminant levels for inorganic chemicals is calculated under s. NR 809.117.

(2) MCLS FOR INORGANICS. The following are the maximum contaminant levels for inorganic contaminants:

Contaminant	MCL in mg/L
Antimony	0.006
Arsenic	0.010
Asbestos	7 Million fibers/Liter (longer than 10 um)
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cyanide(as free Cyanide)	0.2
Fluoride	4.0
Mercury	0.002
Nickel	0.1
Nitrate	10 (as Nitrogen)
Nitrite	1 (as Nitrogen)
Total Nitrate Nitrite	10 (as Nitrogen)
Selenium	0.05
Thallium	0.002

(3) OPERATION WITH NITRATES NOT EXCEEDING 20 MG/L. At the discretion of the department, nitrate as nitrogen levels not to exceed 20 mg/l may be allowed in a non-community water system if the water supplier demonstrates all of the following to the satisfaction of the department:

- (a) The water will not be available to children under 6 months of age.
- (b) The water supplier meets the public notification requirements under s. NR 809.958, including continuous posting of the fact that nitrate as nitrogen levels exceed 10 mg/l and the potential health effects of exposure.
- (c) Local and state public health authorities will be notified annually of nitrate as nitrogen levels that exceed 10 mg/l.
- (d) A supply of bacteriologically safe drinking water, containing less than 10 mg/l nitrate as nitrogen, is provided for infants under 6 months of age.
- (e) No adverse health effects will result.

(4) BEST AVAILABLE TREATMENT. The best available treatment technologies for inorganic contaminants are as follows:

(a) The best available technologies or BATs for achieving compliance with the maximum contaminant levels for the inorganic contaminants listed in sub. (2), except for fluoride, are as follows:

Contaminant	BAT(s)
Antimony	2,7
Arsenic ⁴	1,2,5,6,7,9,12 ⁵
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6 ² ,7
Cyanide	5,7,10
Mercury	2 ¹ ,4,6 ¹ ,7 ¹
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2 ³ ,6,7,9
Thallium	1,5

¹BAT only if influent Hg concentration

²BAT for Chromium III only.

³BAT for Selenium IV only.

⁴BATs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

⁵To obtain high removals, iron to arsenic ratio must be at least 20:1.

Key to BATs in Table:

1 = Activated Alumina

2 = Coagulation/Filtration (not BAT for public water systems < 500 service connections)

3 = Direct and Diatomite Filtration

4 = Granular Activated Carbon

- 5 = Ion Exchange
- 6 = Lime Softening (not BAT for public water systems < 500 service connections)
- 7 = Reverse Osmosis
- 8 = Corrosion Control
- 9 = Electrodialysis
- 10 = Oxidation (Chlorine)
- 11 = Ultraviolet
- 12 = Oxidation/Filtration

(b) A water supplier may use an alternative treatment not listed in par. (a) if it is demonstrated to the department, using pilot studies or other means, that the alternative treatment is sufficient to achieve compliance with the MCLs in sub. (2).

(5) SMALL WATER SYSTEM COMPLIANCE TECHNOLOGIES FOR ARSENIC. (a) The EPA identifies the following table as the affordable technology, treatment technique, or other means available to public water systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant level for arsenic:

Small Water System Compliance Technologies¹ for Arsenic²
Small water system compliance technology Affordable for listed small water system categories³

Activated Alumina (centralized)	All size categories
Activated Alumina (Point-of-Use) ⁴	All size categories
Coagulation/Filtration ⁵	501-3,300, 3,301-10,000
Coagulation-assisted Microfiltration	501-3,300, 3,301-10,000
Electrodialysis reversal ⁶	501-3,300, 3,301-10,000
Enhanced coagulation/filtration	All size categories
Enhanced lime softening (pH > 10.5)	All size categories
Ion Exchange	All size categories
Lime Softening ⁵	501-3,300, 3,301-10,000
Oxidation/Filtration ⁷	All size categories
Reverse Osmosis (centralized) ⁶	501-3,300, 3,301-10,000
Reverse Osmosis (Point-of-Use) ⁴	All size categories

¹ Section 1412(b)(4)(E)(ii) of the Safe Drinking Water Act or SDWA specifies that small water system compliance technologies must be affordable and technically feasible for small systems.

² Small water system compliance technology for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.

³ Section 1412(b)(4)(E)(ii) of the Safe Drinking Water Act or SDWA specifies 3 categories of small water systems: (i) those serving 25 or more, but fewer than 501, (ii) those serving more than 500, but fewer than 3,301, and (iii) those serving more than 3,300, but fewer than 10,001.

⁴ When POU or POE devices are used for compliance, programs to ensure proper long-term operation, maintenance, and monitoring must be provided by the water supplier to ensure adequate performance.

⁵ Unlikely to be installed solely for arsenic removal. May require pH adjustment to optimal range if high removals are needed.

⁶ Technologies reject a large volume of water—may not be appropriate for areas where water quantity may be an issue.

⁷ To obtain high removals, iron to arsenic ratio must be at least 20:1.

(b) The department may allow Point of Use (POU) treatment only if the department determines that treatment prior to entry to the distribution system is not feasible.

NR 809.113 Sample collection and analytical requirements for inorganic contaminants. (1) ANALYTICAL METHODS. Analyses conducted to determine compliance with s. NR 809.11 shall be made in accordance with methods listed in Table A.

**TABLE A
Approved Methodology for Primary Inorganic Contaminants**

Contaminant	Methodology ¹³	EPA	ASTM ³	SM ⁴ (18th, 19th ed.)	SM ⁴ (20th ed.)	SM Online ²¹	Other
1. Alkalinity	Titrimetric		D1067-92, 02 B	2320 B	2320 B	2320 B-97	
	Electrometric titration					I-1030-85 ⁵	
2. Antimony	Inductively Coupled Plasma (ICP)—Mass Spectrometry	200.8 ²					
	Hydride-Atomic Absorption		D3697-92, 02				
	Atomic Absorption; Platform	200.9 ²					
3. Arsenic ¹⁴	Atomic Absorption; Furnace			3113 B		3113 B-99	
	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
	Atomic Absorption; Furnace		D2972-97, 03 C	3113 B		3113 B-99	
4. Asbestos	Hydride Atomic Absorption		D1972-97, 03 B	3114 B		3114 B-97	
	Transmission Electron Microscopy	100.1 ⁹					
	Transmission Electron Microscopy	100.2 ¹⁰					
5. Barium	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Direct			3111D		3111 D-99	
	Atomic Absorption; Furnace			3113 B		3113 B-99	
6. Beryllium	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
	Atomic Absorption; Furnace		D3645-97, 03 B	3113 B		3113 B-99	
7. Cadmium	Inductively Coupled Plasma	200.7 ²					
	ICP-Mass Spectrometry	200.8 ²					

	Atomic Absorption; Platform	200.9 ²					
	Atomic Absorption; Furnace			3113 B		3113 B-99	
8. Calcium	EDTA titrimetric		D511-93, 03 A	3500-Ca D	3500-Ca B	3500-Ca B-97	
	Atomic Absorption; Direct Aspiration		D511-93, 03 B	3111 B		3111 B-99	
	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
	Ion Chromatography		D6919-03				
9. Chromium	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
	Atomic Absorption; Furnace			3113 B		3113 B-99	
10. Copper	Atomic Absorption; Furnace		D1688-95, 02 C	3113 B		3113 B-99	
	Atomic Absorption; Direct Aspiration		D1688-95, 02 A	3111 B		3111 B-99	
	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
	ICP-Mass spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
11. Conductivity	Conductance		D1125-95 (Reapproved 1999) A	2510 B	2510 B	2510 B-97	
12. Cyanide	Manual Distillation followed by		D2036-98 A	4500-CN ⁻ C	4500-CN ⁻ C		
	Spectrophotometric, Amenable		D2036-98 B	4500-CN ⁻ G	4500-CN ⁻ G	4500-CN ⁻ G-99	
	Spectro-photometric Manual		D2036-98 A	4500-CN ⁻ E	4500-CN ⁻ E	4500-CN ⁻ E-99	I-3300-85 ⁵
	Spectro-photometric Semi-automated	335.4 ⁶					
	Selective Electrode			4500-CN ⁻ F	4500-CN ⁻ F	4500-CN ⁻ F-99	
	UV, Distillation, Spectrophotometric						Kelada-01 ¹⁶
	Micro Distillation, Flow Injection, Spectrophotometric						QuikChem 10-204-00- 1-X ¹⁷
	Ligand Exchange and Amperometry ²⁰		D6888-04				OIA-1677, DW ¹⁹
13. Fluoride	Ion Chromatography	300.0 ⁶ , 300.1 ¹⁸	D4327-97, 03	4110 B	4110 B	4110 B-00	

	Manual Distill., Color. SPADNS			4500-F B, D	4500-F B, D	4500-F B, D- 97	
	Manual Electrode		D1179-93, 99 B	4500-F C	4500-F C	4500-F C-97	
	Automated Electrode						380- 75WE ¹¹
	Automated Alizarin			4500-F E	4500-F E	4500-F E-97	129-71W ¹¹
	Capillary Ion Electrophoresis						D6508, Rev. 2 ²²
14. Lead	Atomic Absorption; Furnace		D3559-96, 03 D	3113 B		3113 B-99	
	ICP-Mass spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
	Differential Pulse Anodic Stripping Voltametry						Method 1001 ¹⁵
15. Magnesium	Atomic Absorption		D511-93, 03 B	3111 B		3111 B-99	
	ICP	200.7 ²		3120 B	3120 B	3120 B-99	
	Complexation Titrimetric Methods		D511-93, 03 A	3500-Mg E	3500-Mg B	3500-Mg B-97	
	Ion Chromatography		D6919-03				
16. Mercury	Manual, Cold Vapor	245.1 ²	D3223-97, 02	3112 B		3112 B-99	
	Automated, Cold Vapor	245.2 ¹					
	ICP-Mass Spectrometry	200.8 ²					
17. Nickel	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
	Atomic Absorption; Direct			3111 B		3111 B-99	
	Atomic Absorption; Furnace			3113 B		3113 B-99	
18. Nitrate	Ion Chromatography	300.0 ⁶ 300.1 ¹⁸	D4327-97, 03	4110 B	4110 B	4110 B-00	B-1011 ⁸
	Automated Cadmium Reduction	353.2 ⁶	D3867-90 A	4500-NO3 F	4500-NO3 F	4500-NO3 F- 00	
	Ion Selective Electrode			4500-NO3 D	4500-NO3 D	4500-NO3 D- 00	601 ⁷
	Manual Cadmium Reduction		D3867-90 B	4500-NO3 E	4500-NO3 E	4500-NO3 E- 00	
	Capillary Ion Electrophoresis						D6508, Rev. 2 ²²
19. Nitrite	Ion Chromatography	300.0 ⁶ 300.1 ¹⁸	D4327-97, 03	4110 B	4110 B	4110 B-00	B-1011 ⁸
	Automated Cadmium Reduction	353.2 ⁶	D3867-90 A	4500-NO3 F	4500-NO3 F	4500-NO3 F- 00	
	Manual Cadmium		D3867-90 B	4500-NO3 E	4500-NO3 E	4500-NO3 E-	

	Reduction					00	
	Spectrophotometric			4500-NO2 B	4500-NO2 B	4500-NO2 B-00	
	Capillary Ion Electrophoresis						D6508, Rev. 2 ²²
20. Ortho-phosphate ¹²	Colorimetric, Automated, Ascorbic Acid	365.1 ⁶		4500-P F	4500-P F		
	Colorimetric, ascorbic acid, single reagent		D515-88 A	4500-P E	4500-P E		
	Colorimetric Phosphomolybdate;						I-1601-85 ⁵
	Automated-segmented flow;						I-2601-90 ⁵
	Automated Discrete						I-2598-85 ⁵
	Ion Chromatography	300.0 ⁶ 300.1 ¹⁸	D4327-97, 03	4110 B	4110 B	4110 B-00	
	Capillary Ion Electrophoresis						D6508, Rev. 2 ²²
21. pH	Electrometric	150.1, 150.2 ¹	D1293-95, 99	4500-H ⁺ B	4500-H ⁺ B	4500-H ⁺ B-00	
22. Selenium	Hydride-Atomic Absorption		D3859-98, 03 A	3114 B		3114 B-97	
	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
	Atomic Absorption; Furnace		D3859-98, 03 B	3113 B		3113 B-99	
23. Silica	Colorimetric, Molybdate Blue						I-1700-85 ⁵
	Automated-segmented Flow						I-2700-85 ⁵
	Colorimetric		D859-94, 00				
	Molybdosilicate			4500-Si D	4500-SiO2 C	4500-SiO2 C-97	
	Heteropoly blue			4500-Si E	4500-SiO2 D	4500-SiO2 D-97	
	Automated for Molybdate-reactive Silica			4500-Si F	4500-SiO2 E	4500-SiO2 E-97	
	Inductively Coupled Plasma	200.7 ²		3120 B	3120 B	3120 B-99	
24. Sodium	Inductively Coupled Plasma	200.7 ²					
	Atomic Absorption; Direct Aspiration			3111 B		3111 B-99	
	Ion Chromatography		D6919-03				
25. Temperature	Thermometric			2550	2550	2550-00	

26. Thallium	ICP-Mass Spectrometry	200.8 ²					
	Atomic Absorption; Platform	200.9 ²					
27. Turbidity	Nephelometric	180.1 ²³		2130 B			
	Great Lakes Instrument						Instruments Method 2 ²⁴

Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800-426-4791, or go to:
http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

¹“Methods for Chemical Analysis of Water and Wastes,” EPA/600/4-79/020, March 1983. Available at NTIS, PB84-128677.

²“Methods for the Determination of Metals in Environmental Samples—Supplement 1,” EPA/600/R-94/111, May 1994. Available at NTIS, PB95-125472.

³ *Annual Book of ASTM Standards*, 1994, 1996, 1999, or 2003, Vols. 11.01 and 11.02, ASTM International; any year containing the cited version of the method may be used. The previous versions of D1688-95A, D1688-95C (copper), D3559-95D (lead), D1293-95 (pH), D1125-91A (conductivity) and D859-94 (silica) are also approved. These previous versions D1688-90A, C; D3559-90D, D1293-84, D1125-91A and D859-88, respectively are located in the *Annual Book of ASTM Standards*, 1994, Vol. 11.01. Copies may be obtained from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

⁴ *Standard Methods for the Examination of Water and Wastewater*, 18th edition (1992), 19th edition (1995), or 20th edition (1998). American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. The cited methods published in any of these three editions may be used, except that the versions of 3111 B, 3111 D, 3113 B and 3114 B in the 20th edition may not be used.

⁵Method I-2601-90, Methods for Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediment, Open File Report 93-125, 1993; For Methods I-1030-85; I-1601-85; I-1700-85; I-2598-85; I-2700-85; and I-3300-85 See Techniques of Water Resources Investigation of the U.S. Geological Survey, Book 5, Chapter A-1, 3rd edition., 1989; Available from Information Services, U.S. Geological Survey, Federal Center, Box 25286, Denver, CO 80225-0425.

⁶“Methods for the Determination of Inorganic Substances in Environmental Samples,” EPA/600/R-93/100, August 1993. Available at NTIS, PB94-120821.

⁷The procedure shall be done in accordance with the Technical Bulletin 601 “Standard Method of Test for Nitrate in Drinking Water,” July 1994, PN 221890-001, Analytical Technology, Inc. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.

⁸Method B-1011, “Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography,” August 1987. Copies may be obtained from Waters Corporation, Technical Services Division, 34 Maple Street, Milford, MA 01757, Telephone: 508/482-2131, Fax: 508/482-3625.

⁹Method 100.1, “Analytical Method For Determination of Asbestos Fibers in Water,” EPA/600/4-83/043, EPA, September 1983. Available at NTIS, PB83-260471.

¹⁰Method 100.2, “Determination of Asbestos Structure Over 10- μ m In Length In Drinking Water,” EPA/600/R-94/134, June 1994. Available at NTIS, PB94-201902.

¹¹Industrial Method No. 129-71W, “Fluoride in Water and Wastewater,” December 1972, and Method No. 380-75WE, “Fluoride in Water and Wastewater,” February 1976, Technicon Industrial Systems. Copies may be obtained from Bran & Luebbe, 1025 Busch Parkway, Buffalo Grove, IL 60089.

¹²Unfiltered, no digestion or hydrolysis.

¹³Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2x preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis (i.e., no sample digestion) will be higher. For direct analysis of cadmium and arsenic by Method 200.7, and arsenic by Method 3120 B, sample preconcentration using pneumatic nebulization may be required to achieve lower detection limits. Preconcentration

may also be required for direct analysis of antimony, lead, and thallium by Method 200.9; antimony and lead by Method 3113 B; and lead by Method D3559-90D, unless multiple in-furnace depositions are made.

¹⁴If ultrasonic nebulization is used in the determination of arsenic by Methods 200.7, 200.8, or SM 3120 B, the arsenic must be in the pentavalent state to provide uniform signal response. For Methods 200.7 and 3120 B, both samples and standards must be diluted in the same mixed acid matrix concentration of nitric and hydrochloric acid with the addition of 100 µL of 30% hydrogen peroxide per 100 mL of solution. For direct analysis of arsenic with Method 200.8 using ultrasonic nebulization, samples and standards must contain 1 mg/L of sodium hypochlorite.

¹⁵The description for Method Number 1001 for lead is available from Palintest, LTD, 21 Kenton Lands Road, P.O. Box 18395, Erlanger, KY 41018. Or from the Hach Company, P.O. Box 389, Loveland, CO 80539.

¹⁶The description for the Kelada-01 Method, "Kelada Automated Test Methods for Total Cyanide, Acid Dissociable Cyanide, And Thiocyanate," Revision 1.2, August 2001, EPA # 821-B-01-009 for cyanide is available from the National Technical Information Service (NTIS), PB 2001-108275, 5285 Port Royal Road, Springfield, VA 22161. The toll free telephone number is 800-553-6847.

Note: A 450-W UV lamp may be used in this method instead of the 550-W lamp specified if it provides performance within the quality control (QC) acceptance criteria of the method in a given instrument. Similarly, modified flow cell configurations and flow conditions may be used in the method, provided that the QC acceptance criteria are met.

¹⁷The description for the QuikChem Method 10-204-00-1-X, "Digestion and distillation of total cyanide in drinking and wastewaters using MICRO DIST and determination of cyanide by flow injection analysis," Revision 2.1, November 30, 2000, for cyanide is available from Lachat Instruments, 6645 W. Mill Rd., Milwaukee, WI 53218. Telephone: 414-358-4200.

¹⁸"Methods for the Determination of Organic and Inorganic Compounds in Drinking Water," Vol. 1, EPA 815-R-00-014, August 2000. Available at NTIS, PB2000-106981.

¹⁹Method OIA-1677, DW "Available Cyanide by Flow Injection, Ligand Exchange, and Amperometry," January 2004. EPA-821-R-04-001, Available from ALPKEM, A Division of OI Analytical, P.O. Box 9010, College Station, TX 77842-9010.

²⁰Sulfide levels below those detected using lead acetate paper may produce positive method interferences. Test samples using a more sensitive sulfide method to determine if a sulfide interference is present, and treat samples accordingly.

²¹Standard Methods Online are available at <http://www.standardmethods.org>. The year in which each method was approved by the Standard Methods Committee is designated by the last two digits in the method number. The methods listed are the only online versions that may be used.

²²Method D6508, Rev. 2, "Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte," available from Waters Corp, 34 Maple St, Milford, MA, 01757, Telephone: 508/482-2131, Fax: 508/482-3625.

²³"Methods for the Determination of Inorganic Substances in Environmental Samples", EPA-600/R-93-100, August 1993, Available at NTIS, PB94-121811

²⁴GLI Method 2, "Turbidity", November 2, 1992, Great Lakes Instruments, Inc., 8855 North 55th Street, Milwaukee, Wisconsin 53223.

(2) **SAMPLE COLLECTION.** Sample collection for the inorganic contaminants under s. NR 809.11(2) shall be conducted using the sample preservation, containers and maximum holding time procedures specified in Table B. In all cases, samples should be analyzed as soon after collection as possible.

TABLE B
Sample Preservation, Containers and Maximum Holding Times for Inorganic Parameters

Parameter	Preservation ¹	Container ²	Holding Time ³
METALS			
Aluminum	HNO ₃	P or G	6 months

Antimony	HNO ₃	P or G	6 months
Arsenic	Conc. HNO ₃ to pH<2	P or G	6 months
Barium	HNO ₃	P or G	6 months
Beryllium	HNO ₃	P or G	6 months
Cadmium	HNO ₃	P or G	6 months
Copper	HNO ₃	P or G	6 months
Chromium	HNO ₃	P or G	6 months
Iron	HNO ₃	P or G	6 months
Lead	HNO ₃	P or G	6 months
Manganese	HNO ₃	P or G	6 months
Mercury	HNO ₃	P or G	28 days
Nickel	HNO ₃	P or G	6 months
Selenium	HNO ₃	P or G	6 months
Silver	HNO ₃	P or G	6 months
Thallium	HNO ₃	P or G	6 months
Zinc	HNO ₃	P or G	6 months
OTHER PARAMETERS			
Asbestos	Cool, 4°C	P or G	48 hours ⁴
Bromate	Ethylenediamine	P or G	28 days
Chloride	None	P or G	28 days
Chlorite	50 mg/L EDA, Cool to 4°C	P or G	14 days
Color	Cool, 4°C	P or G	48 hours
Cyanide	Cool, 4°C+NaOH to pH>12	P or G	14 days
Fluoride	None	P or G	28 days
Foaming Agents	Cool, 4°C	P or G	48 hours
Nitrate (as N)			
Chlorinated	Cool, 4°C	P or G	14 days
Non-Chlorinated	Cool, 4°C	P or G	48 hours ⁵
Nitrite (as N)	Cool, 4°C	P or G	48 hours
Nitrate + Nitrite ⁶	Conc. H ₂ SO ₄ to pH<2	P or G	14 days
Odor	Cool, 4°C	G	48 hours
pH	None	P or G	Analyze Immediately
Solids (TDS)	Cool, 4°C	P or G	7 days
Sulfate	Cool, 4°C	P or G	28 days
Turbidity	Cool, 4°C	P or G	48 hours

¹ If HNO₃ cannot be used because of shipping restrictions, sample may be initially preserved by icing and immediately shipping it to the laboratory. Upon receipt in the laboratory, the sample must be acidified with conc HNO₃ to pH < 2. At time of analysis, sample container should be thoroughly rinsed with 1:1 HNO₃; washings should be added to sample.

² P = plastic, hard or soft. G = glass, hard or soft.

³ In all cases, samples should be analyzed as soon after collection as possible.

⁴ Instructions for containers, preservation procedures and holding times as specified in Method 100.2 must be adhered to for all compliance analyses including those conducted with Method 101.1.

⁵ If the sample is chlorinated, the holding time for an unacidified sample kept at 4°C is extended to 14 days.

⁶ Nitrate-nitrite refers to a measurement of total nitrate.

(3) **LABORATORY CERTIFICATION.** Analyses under this section shall only be conducted by laboratories that have received certification under ch. NR 149 or approval by EPA.

(a) To receive certification to conduct analyses for antimony, arsenic, asbestos, barium, beryllium, cadmium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium and thallium, a laboratory shall carry out annual analyses of performance evaluation samples approved by the department or EPA.

(b) For each contaminant that has been included in the performance evaluation sample and for each method for which a laboratory desires certification, the laboratory shall achieve quantitative results that are within the following acceptance limits:

Contaminant	Acceptance limit
Antimony	±30% at ≥0.006 mg/L
Arsenic	±30% at ≥0.003 mg/L
Asbestos	2 standard deviations based on study statistics
Barium	±15% at ≥0.15 mg/L
Beryllium	±15% at ≥0.001 mg/L
Cadmium	±20% at ≥0.002 mg/L
Chromium	±15% at ≥0.01 mg/L
Cyanide	±25% at ≥0.1 mg/L
Fluoride	±10% at ≥1 to 10 mg/L
Mercury	±30% at ≥0.0005 mg/L
Nickel	±15% at ≥0.01 mg/L
Nitrate	±10% at ≥0.4 mg/L
Nitrite	±15% at ≥0.4 mg/L
Selenium	±20% at ≥0.01 mg/L
Thallium	±30% at ≥0.002 mg/L

(4) **COMPOSITE SAMPLING.** Composite sampling for inorganic contaminants shall meet the following requirements:

(a) The department may reduce the total number of samples a public water system is required to analyze by allowing the use of compositing. Compositing shall only be permitted for entry points within a single public water system. Composite samples from a maximum of 5 entry points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL.

(b) Compositing of samples shall be done in the laboratory.

(c) If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic contaminant, a follow-up sample shall be taken from each entry point included in the composite and analyzed within 14 days. These samples shall be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample.

(d) If duplicates of the original sample taken from each entry point used in the composite are available and the holding time listed in sub. (2) Table B has not been exceeded, the water supplier may use these instead of resampling. The duplicates shall be analyzed and the results reported to the department within 14 days of the composite analysis.

(e) The following are detection limits that laboratories shall use for each analytical method and MCLs for inorganic contaminants specified in this section and s. NR 809.11:

Table C

Detection Limits for Inorganic Contaminants

Contaminant	MCL (mg/l)	Methodology	Detection limit (mg/l)
Antimony	0.006	Atomic Absorption; Furnace	0.003
		Atomic Absorption; Platform	0.0008 ⁵
		ICP-Mass Spectrometry	0.0004
Arsenic	0.010	Hydride-Atomic Absorption	0.001
		Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform—Stabilized Temperature	0.0005 ⁶
		Atomic Absorption; Gaseous Hydride	0.001
Asbestos	7 MFL ¹	ICP-Mass Spectrometry	0.0014 ⁷
		Transmission Electron Microscopy	0.01 MFL
Barium	2	Atomic Absorption; furnace technique	0.002
		Atomic Absorption; direct aspiration	0.1
		Inductively Coupled Plasma	0.002 (0.001)
Beryllium	0.004	Atomic Absorption; Furnace	0.0002
		Atomic Absorption; Platform	0.00002 ⁵
		Inductively Coupled Plasma ²	0.0003
		ICP-Mass Spectrometry	0.0003
Cadmium	0.005	Atomic Absorption; furnace technique	0.0001
		Inductively Coupled Plasma	0.001
Chromium	0.1	Atomic Absorption; furnace technique	0.001
		Inductively Coupled Plasma	0.007 (0.001)
Cyanide	0.2	Distillation, Spectrophotometric ³	0.02
		Distillation, Automated, Spectrophotometric ³	0.005
		Distillation, Amenable, Spectrophotometric ⁴	0.02
		Distillation, Selective Electrode ^{3, 4}	0.05
		UV, Distillation, Spectrophotometric ⁹	0.0005
		Micro Distillation, Flow Injection, Spectrophotometric ³	0.0006
Mercury	0.002	Ligand Exchange with Amperometry ⁴	0.0005
		Manual Cold Vapor Technique	0.0002
Nickel	xl	Automated Cold Vapor Technique	0.0002
		Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform	0.0006 ⁵
		Inductively Coupled Plasma ²	0.005
Nitrate	10 (as N)	ICP-Mass Spectrometry	0.0005
		Manual Cadmium Reduction	0.01
		Automated Hydrazine Reduction	0.01

		Automated Cadmium Reduction	0.05
		Ion Selective Electrode	1
		Ion Chromatography	0.01
		Capillary Ion Electrophoresis	0.076
Nitrite	1 (as N)	Spectrophotometric	0.01
		Automated Cadmium Reduction	0.05
		Manual Cadmium Reduction	0.01
		Ion Chromatography	0.004
		Capillary Ion Electrophoresis	0.103
Selenium	0.05	Atomic Absorption; furnace	0.002
		Atomic Absorption; gaseous hydride	0.002
Thallium	0.002	Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform	0.0007 ⁵
		ICP-Mass Spectrometry	0.0003

¹MFL = million fibers per liter >10 μm .

²Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.

³Screening method for total cyanides.

⁴Measures "free" cyanides when distillation, digestion, or ligand exchange is omitted.

⁵Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

⁶The MDL reported for EPA method 200.9 (Atomic Absorption; Platform—Stablized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses (*i.e.*, no sample digestion) will be higher. Using multiple depositions, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/L.

⁷Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.

⁸Measures total cyanides when UV-digester is used, and "free" cyanides when UV-digester is bypassed.

NR 809.115 Monitoring requirements for inorganic contaminants. (1) GENERAL. Water suppliers shall conduct monitoring for the contaminants listed in s. NR 809.11(2) for the purpose of determining compliance with the maximum contaminant levels shall be conducted as follows:

(a) Groundwater sources shall be sampled under normal operating conditions at every entry point to the distribution system which is representative of each well being used after treatment, beginning in the initial compliance period. Each sample shall be taken at the same location unless conditions make another location more representative of each source or treatment plant.

(b) Surface water sources or combined surface water and groundwater sources shall be sampled under normal operating conditions, at every entry point to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment, beginning in the initial compliance period. Each sample shall be taken at the same location unless conditions make another location more representative of each source or treatment plant.

(c) If a public water system draws water from more than one source and the sources are combined before distribution, the public water system shall be sampled at an entry point to the distribution system during periods of normal operating conditions when water is representative of all sources being used.

(d) Water suppliers for all new public water systems or for public water systems that use a new source of water that begin operation after January 22, 2004 shall demonstrate compliance with the MCLs specified in s. NR 809.11 (2) in accordance with the requirements in this section. The water supplier shall also comply with the initial sampling frequencies specified by the department to ensure a water supplier can demonstrate that the public water supply is in compliance with the MCLs. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements of this section.

(2) **MONITORING FREQUENCY FOR ASBESTOS.** Water suppliers shall monitor public water systems to determine compliance with the maximum contaminant level for asbestos specified in s. NR 809.11 (2) at the following frequencies :

(a) *Initial and routine monitoring.* Each community and non-transient, non-community water system shall monitor for asbestos during the first 3-year compliance period of each 9-year compliance cycle beginning in the compliance period starting January 1, 1993, unless a waiver is granted under par. (d).

(b) *Waiver request.* If the water supplier believes the public water system it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, the water supplier may apply to the department for a waiver of the monitoring requirement in par. (a).

(c) *Waiver evaluation.* The department may grant a waiver based on a consideration of all the following factors:

1. Potential asbestos contamination of the water source.
2. The use of asbestos-cement pipe for finished water distribution.
3. The corrosive nature of the water.

(d) *Waiver conditions.* The department may grant a waiver if the conditions in par. (b) and (c) are satisfied. A waiver remains in effect until the completion of the 3-year compliance period. Water suppliers for public water systems that do not receive a waiver shall monitor in accordance with the provisions of par. (a).

(e) *Monitoring frequency with waiver.* If the department grants the waiver, the water supplier is not required to monitor under par. (a).

(f) *Sample location for vulnerable public water systems.*

1. A public water system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall be sampled once at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

2. A public water system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall be sampled once at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

(g) *Sample frequency for public water systems with vulnerable source water.* A public water system vulnerable to asbestos contamination due solely to source water shall be monitored in accordance with the provisions in par. (a).

(h) *Monitoring when an MCL is exceeded.* A public water system which exceeds the MCL as determined in s. NR 809.117 shall be monitored quarterly beginning in the next quarter after the violation occurred. The department may decrease the quarterly monitoring requirement to one sample as specified in par. (a) if the department has determined that the public water system is reliably and consistently below the maximum contaminant level. In no case may the department make this determination unless a groundwater system takes a minimum of 2 quarterly samples and a surface water system or a combined surface water and groundwater system takes a minimum of 4 quarterly samples.

(i) *Grandfathered data.* If monitoring data collected after January 1, 1990 is generally consistent with the requirements of this subsection, then the department may allow water suppliers for public water systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(3) **MONITORING FREQUENCY FOR MCLS OTHER THAN ASBESTOS, NITRATE, AND NITRITE.** The water supplier shall conduct monitoring for each community and non-transient, non-community water system to determine compliance with the MCLs specified in s. NR 809.11 (2) for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium at the following frequencies:

(a) *Initial monitoring.* New public water systems or public water systems with new sources shall demonstrate compliance with the MCLs listed under s. NR 809.11(2) for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium prior to initiating water service. If a waiver from cyanide monitoring has been granted under par. (c) cyanide is not required to be sampled for in the initial monitoring.

(b) *Routine monitoring.* Groundwater sources shall be sampled at each sampling point during each compliance period as determined by the department. Water suppliers for public water systems having surface water sources or combined surface water and groundwater sources shall take one sample annually at each sampling point.

(c) *Waiver request.* The water supplier may apply to the department for a waiver from the monitoring frequencies specified in par. (b). Public water systems that use a new water source are not eligible for a waiver until monitoring from the new source has been conducted in at least three compliance periods except that the department may grant a waiver for monitoring of cyanide beginning with initial monitoring, provided the public water system is not vulnerable to contamination because there is no industrial source of cyanide present.

(d) *Waiver evaluation.* In determining the appropriate reduced monitoring frequency, the department shall consider all of the following:

1. Reported concentrations from all previous monitoring.
2. The degree of variation in reported concentrations.
3. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the public water system's configuration, changes in the public water system's operating procedures, or changes in stream flows or characteristics.

(e) *Waiver conditions.* The department may grant a waiver if surface water systems have been monitored annually for at least 3 years and groundwater systems have been monitored in at least three compliance periods. At least one of the 3 samples shall have been taken since January 1, 1990. Water suppliers for both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Public water systems that use a new water source are not eligible for a waiver until monitoring from the new source has been conducted in at least three compliance periods. A condition of the waiver shall be the collection of a minimum of one sample while the waiver is effective. The term during which the waiver is effective may not exceed 9 years.

(f) *Monitoring frequency when an MCL has been exceeded.* Public water systems which exceed the MCLs in s. NR 809.11(2) shall be monitored quarterly beginning in the next quarter after the violation occurred. The department may decrease the quarterly monitoring requirement to the frequencies specified in pars. (a) and (b) if the department has determined that the public water system is reliably and consistently below the maximum contaminant level. In no case may the department make this determination unless a groundwater system takes a minimum of 2 quarterly samples and a surface water system takes a minimum of 4 quarterly samples.

(4) **MONITORING FREQUENCY FOR NITRATE.** The water supplier for public water systems shall conduct monitoring for the public water systems to determine compliance with the MCL for nitrate specified in s. NR 809.11 (2) at the following frequencies:

(a) *Initial monitoring.* Water suppliers for new public water systems or public water systems with new sources shall demonstrate compliance with the MCLs listed under s. NR 809.11(2) for nitrate prior to initiating water service.

(b) *Routine monitoring.* Each community water system and non-community water system shall be monitored according to the following frequencies:

1. Community water systems and non-transient non-community water systems served by groundwater shall be monitored annually.

2. Community water systems and non-transient non-community water systems served by surface water shall be monitored quarterly.

3. Transient non-community water systems shall be monitored annually.

(c) *Increased monitoring due to detection at one-half the MCL and greater.* For community and non-transient non-community water systems, the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is greater than or equal to 5 mg/L nitrate as nitrogen. The department may reduce a groundwater system's sampling frequency to annual after 4 consecutive quarterly samples are reliably and consistently less than the MCL.

(d) *Timing of samples after increased monitoring is ended.* After quarterly sampling is completed, any community or non-transient non-community water system which is allowed to resume routine monitoring, under par. (b), shall be monitored during the quarter which previously resulted in the highest analytical result.

(e) *Reduction of quarterly monitoring for surface water systems.* The department may reduce a surface water system's sampling frequency to annual if all analytical results from 4 consecutive quarters are less than 5 mg/L nitrate as nitrogen. A surface water system shall return to quarterly monitoring if any one sample is greater than or equal to 5 mg/L nitrate.

(f) *Monitoring if an MCL is exceeded.* Where nitrate sampling results indicate an exceedance of the MCL, the water supplier shall take a confirmation sample as required under sub. (6)(b)

(5) MONITORING FREQUENCY FOR NITRITE. The water supplier shall conduct monitoring for the public water system to determine compliance with the MCL for nitrite specified in s. NR 809.11 (2) at the following frequencies:

(a) *Initial monitoring.* Water suppliers for new public water systems or public water systems with new sources shall demonstrate compliance with the MCLs listed under s. NR 809.11(2) for nitrite prior to initiating water service.

(b) *Routine monitoring.* After the initial sample, water suppliers for public water systems where an analytical result for nitrite is less than 0.5 mg/L nitrite as nitrogen shall monitor at the frequency specified by the department. Community and non-transient non-community water systems shall be sampled at the same frequency as the monitoring required under sub. (3).

(c) *Increased monitoring due to detection at one-half the MCL and greater.* The repeat monitoring frequency shall be quarterly for at least one year following any one sample in which the concentration of nitrite is greater than or equal to 0.5 mg/L nitrite as nitrogen. The department may reduce the sampling frequency to annual after determining the concentration is reliably and consistently less than the MCL. Each subsequent annual sample shall be taken during the quarter which previously resulted in the highest analytical result.

(d) *Monitoring if an MCL is exceeded.* If nitrite sampling results indicate an exceedance of the MCL, the water supplier shall take a confirmation sample as required under sub. (6)(b).

(6) CONFIRMATION SAMPLES. The collection of confirmation samples shall comply with the following requirements:

(a) *Department required confirmation samples.* The department may require the collection of a confirmation sample where sample results indicate an exceedance of the MCL for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium. The confirmation sample shall be collected as soon as possible after the initial sample results were received, but not exceeding 2 weeks, at the same entry point.

(b) *Mandatory confirmation samples.* If nitrate or nitrite sampling results indicate an exceedance of the MCL, the water supplier shall take a confirmation sample within 24 hours of the water supplier's receipt of notification of the analytical results of the first sample. Water suppliers unable to comply with the 24-hour sampling requirement shall immediately notify the consumers served by the public water system in accordance with subch. VII and meet other Tier 1 public notification requirements under subch. VII. Water suppliers exercising this option shall take and analyze a confirmation sample within 2 weeks of notification of the analytical results of the first sample.

(c) *Averaging of confirmation samples.* If a confirmation sample is required for any contaminant, the results of the original and the confirmation sample shall be averaged. The resultant average shall be used to determine the public water system's compliance in accordance with s. NR 809.117 (1).

(7) SAMPLING FREQUENCY. The department may require more frequent monitoring than specified in subs. (2), (3), (4) and (5) and may require confirmation samples for positive and negative results at its discretion.

(8) INCREASED MONITORING. Water suppliers may apply to the department to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

(9) DESIGNATED SAMPLING TIME. Each public water system shall be monitored during the month, quarter or year designated by the department during each compliance period for all monitoring required under subs. (2), (3), (4) and (5).

(10) SAMPLING ERRORS. The department may delete results of obvious sampling errors, or may require the collection of additional samples to determine whether the result is or is not in error.

NR 809.117 Compliance requirements for inorganic contaminants.

(1) COMPLIANCE DETERMINATIONS. Compliance for inorganic contaminants shall be determined based on all of the following:

(a) Compliance with s. NR 809.11 shall be determined based on the analytical results obtained at each entry point. Any contaminant listed in s. NR 809.11 which is detected shall be quantified.

(b) For public water systems which are monitored more frequently than annually, compliance with the MCLs for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average at each entry point. If the average at any sampling point is greater than the MCL, then the public water system is out of compliance. If any one or more samples would cause the annual average to exceed an MCL, then the public water system is out of compliance immediately. Any sample below the reported method detection limit shall be calculated at zero for the purpose of determining the annual average. If a water supplier fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(c) For public water systems which are monitored annually, or less frequently, the public water system is out of compliance with the MCL for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium if the level of a contaminant at any entry point is greater than the MCL. If a confirmation sample is required by the department, compliance shall be based on the average of the 2 samples. If a water supplier fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(d) Compliance with the MCLs for nitrate, nitrite or combined nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels exceed a MCL in the initial sample, a confirmation sample is required in accordance with s. NR 809.115(6)(b). Compliance shall be determined based on the average of the initial and confirmation samples.

(e) Arsenic sampling results shall be reported to the nearest 0.001 mg/L.

(f) Public water systems remain out of compliance with the MCLs for nitrate, nitrite, or combined nitrate and nitrite until the results of 4 consecutive quarterly samples are less than the MCL. The department may specify alternate means for returning to compliance with the MCLs for nitrate, nitrite, or combined nitrate and nitrite. Alternate compliance agreements shall be in writing.

(2) MONITORING AND REPORTING VIOLATIONS. Failure to monitor shall result in a monitoring and reporting violation.

(3) USE OF ANALYTICAL RESULTS. The department may determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

NR 809.118 Sodium monitoring, reporting and notification requirements. (1) GENERAL. The water supplier for a community water system shall collect and analyze one sample per plant at the entry point to the distribution system for the determination of sodium concentration. Samples shall be collected and analyzed annually for public water systems utilizing surface water sources in whole or in part, and at least every 3 years for public water systems utilizing solely groundwater sources. The minimum number of samples required to be taken by the public water system shall be based on the number of plants used by the public water system, except that multiple wells drawing raw water from a single aquifer may, with department approval, be considered one plant for determining the minimum number of samples. The water supplier may be required by the department to collect and analyze water samples for sodium more frequently in locations where the sodium content is variable.

(2) DEPARTMENT NOTIFICATION. The water supplier shall report to the department the results of the analyses for sodium concentration within the first 10 days of the month following the month in which the sample results were received or within the first 10 days following the end of the required monitoring period as stipulated by the department, whichever is first. If more than annual sampling is required, the water supplier shall report the average sodium concentration within 10 days of the month following the month in which the analytical results of the last sample used for the annual average was received.

(3) HEALTH OFFICIALS NOTIFICATION. The water supplier shall notify appropriate local health officials of the sodium concentration by written notice by direct mail within 3 months of receipt of sample results. A copy of each notice required to be provided by this subsection and a list of health officials notified shall be sent to the department within 10 days of its issuance.

(4) ANALYTICAL METHODS. Analyses for sodium shall be performed as prescribed in s. NR 809.113(1), Table A.
Note: A primary maximum contaminant level has not been established for sodium.

NR 809.119 Materials identification for corrosivity characteristics. Suppliers of water for community water systems shall identify whether the following construction materials are present in their distribution system and report their findings to the department:

- (1) Lead from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing.
- (2) Copper from piping and alloys, service lines and home plumbing.
- (3) Galvanized piping, service lines and home plumbing.
- (4) Ferrous piping materials such as cast iron and steel.
- (5) Asbestos cement pipe.
- (6) Vinyl lined asbestos cement pipe.
- (7) Coal tar lined pipes and tanks.

NR 809.20 Synthetic organic contaminant maximum contaminant levels and BATS. (1) APPLICABILITY. The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient non-community water systems.

Contaminant	MCL (mg/L)
Alachlor	0.002
Atrazine	0.003
Benzo[a]pyrene	0.0002
Carbofuran	0.04
Chlordane	0.002
2,4-D	0.07
Dalapon	0.2
Dibromochloropropane	0.0002
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylene Dibromide	0.00005

Glyphosate	0.7
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.04
Oxamyl	0.2
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated biphenyls (PCBs)	0.0005
Simazine	0.004
2,3,7,8-TCDD (Dioxin)	3×10^{-8}
Toxaphene	0.003
2,4,5-TP	0.05

(2) BEST AVAILABLE TREATMENT. The following are the BATs available for achieving compliance with the maximum contaminant levels for the organic contaminants listed in sub. (1):

- (a) Central treatment using granular activated carbon, except for glyphosate.
- (b) Packed tower aeration for dibromochloropropane, di(2-ethylhexyl)adipate, ethylene dibromide, and hexachlorocyclopentadiene.
- (c) Oxidation for glyphosate.

(3) ALTERNATIVE TREATMENT. A water supplier may use an alternative treatment not listed in sub. (2) if it is demonstrated to the department, using pilot studies or other means, that the alternative treatment is sufficient to achieve compliance with the MCLs in sub. (1).

NR 809.203 Analytical requirements for synthetic organic contaminants.

(1) DETECTION LIMITS. Detection as used in this section shall be defined as greater than or equal to the following concentrations for each contaminant:

Contaminant	Detection Limit (mg/L)
1. Alachlor	0.0002
2. Aldicarb	0.0005
3. Aldicarb sulfoxide	0.0005
4. Aldicarb sulfone	0.0008
5. Atrazine	0.0001
6. Benzo[a]pyrene	0.00002
7. Carbofuran	0.0009
8. Chlordane	0.0002
9. 2,4-D	0.0001
10. Dalapon	0.001
11. Dibromochloropropane	0.00002

12. Di(2-ethylhexyl)adipate	0.006
13. Di(2-ethylhexyl)phthalate	0.006
14. Dinoseb	0.0002
15. Diquat	0.0004
16. Endothall	0.009
17. Endrin	0.00001
18. Ethylene dibromide	0.00001
19. Glyphosate	0.006
20. Heptachlor	0.00004
21. Heptachlor epoxide	0.00002
22. Hexachlorobenzene	0.0001
23. Hexachlorocyclopentadiene	0.0001
24. Lindane	0.00002
25. Methoxychlor	0.0001
26. Oxamyl	0.002
27. Picloram	0.0001
28. Polychlorinated biphenyls (PCBs as decachlorobiphenyls)	0.0001
29. Pentachlorophenol	0.00004
30. Simazine	0.00007
31. Toxaphene	0.001
32. 2,3,7,8-TCDD (Dioxin)	0.000000005
33. 2,4,5-TP (Silvex)	0.0002

(2) ANALYTICAL METHODS. Analysis for the synthetic organic contaminants listed in s. NR 809.20 shall be conducted using the methods prescribed in Table C.

TABLE C
SDWA Approved Methodology for Synthetic Organic Contaminants

Contaminant	EPA Methods	SM	ASTM	Other
Regulated Parameters:				
Synthetic Organic Chemicals				
2,3,7,8-TCDD (dioxin)		1613 ¹		
2,4-D ² (as acids, salts and esters)	515.2, 555, 515.1, 515.3, 515.4		D5317-93, 98 (Reapproved 2003)	
2,4,5-TP ² (Silvex)	515.2, 555, 515.1, 515.3,		D5317-93, 98	

	515.4		(Reapproved 2003)	
Alachlor	507, 525.2, 508.1, 505 ^a , 551.1			
Atrazine ³	507, 525.2, 508.1, 505 ^b , 551.1			Syngenta ⁴ AG-625
Benzo(a)pyrene	525.2, 550, 550.1			
Carbofuran	531.1	6610 ⁵		
Chlordane	508, 525.2, 508.1, 505			
Dalapon	552.1 515.1, 552.2, 515.3, 515.4, 552.3			
Di(2-ethylhexyl)adipate	506, 525.2			
Di(2-ethylhexyl)phthalate	506, 525.2			
Dibromochloropropane (DBCP)	504.1, 551.1, 524.3 ⁹			
Dinoseb	515.2, 555, 515.1, 515.3			
Diquat	549.2			
Endothall	548.1			
Endrin	508, 525.2, 508.1, 505, 551.1			
Ethylene dibromide (EDB)	504.1, 551.1, 524.3 ⁹			
Glyphosate	547	6651 ⁶		
Heptachlor	508, 525.2, 508.1, 505, 551.1			
Heptachlor Epoxide	508, 525.2, 508.1, 505, 551.1			
Hexachlorobenzene	508, 525.2, 508.1, 505, 551.1			
Hexachlorocyclopentadiene	508, 525.2, 508.1, 505, 551.1			
Lindane	508, 525.2, 508.1, 505, 551.1			
Methoxychlor	508, 525.2, 508.1, 505, 551.1			
Oxamyl	531.1	6610 ⁵		
PCBs (as decachlorobiphenyl)	508A ⁷			
(as Aroclors)	508.1, 508, 525.2, 505			
Pentachlorophenol	515.2, 525.2, 555, 515.1, 515.3, 515.4		D5317-93, 98 (Reapproved 2003)	
Picloram ⁴	515.2, 555, 515.1, 515.3,		D5317-93, 98	

	515.4		s(Reapproved 2003)	
Simazine	507, 525.2, 508.1, 505 ³ , 551.1			
Toxaphene	508, 508.1, 525.2, 505			
Unregulated Parameters:				
Aldicarb	531.1	6610 ⁵		
Aldicarb sulfone	531.1	6610 ⁵		
Aldicarb Sulfoxide	531.1	6610 ⁵		
Aldrin	505, 508, 525.2, 508.1			
Butachlor	507, 525.2			
Carbaryl	531.1	6610 ⁵		
Dicamba	515.1, 555, 515.2			
Dieldrin	505, 508, 525.2, 508.1			
3-Hydroxycarbofuran	531.1	6610 ⁵		
Methomyl	531.1	6610 ⁵		
Metolachlor	507, 525.2, 508.1			
Metribuzin	507, 525.2, 508.1			
Propachlor	507, 525.2, 508.1			

¹ Method 1613, "Tetra- through Octa- Chlorinated Dioxins and Furans by Isotope Dilution. HRGC/HRMS, EPA-821/B-94/005, October 1994, Method 1613 can be used to measure 2, 3, 7, 8-TCDD (dioxin). This method is available from National Technical Information Service, NTIS PB95-104774.

² Accurate determination of the chlorinated esters requires hydrolysis of the sample as described in EPA Methods 515.1, 515.2, 515.3, 515.4 and 555 and ASTM Method D 5317-93, 98 (Reapproved 2003).

³ Substitution of the detector specified in Method 505, 507, 508, or 508.1 for the purpose of achieving lower detection limits is allowed as follows: Either an electron capture or nitrogen phosphorus detector may be used provided all regulatory requirements and quality control criteria are met.

⁴ This method may not be used for the analysis of atrazine in any system where chlorine dioxide is used for drinking water treatment. In samples from all other systems, any result generated by Method AG-625 that is greater than one-half the maximum contaminant level (MCL) (in other words, greater than 0.0015 mg/L or 1.5 µg/L) must be confirmed using another approved method for this contaminant and should use additional volume of the original sample collected for compliance monitoring. In instances where a result from Method AG-625 triggers such confirmatory testing, the confirmatory result is to be used to determine compliance.

⁵ Method 6610 shall be followed in accordance with the "Supplement to the 18th edition of Standard Methods for the Examination of Water and Wastewater", 1994, or with the 19th edition of Standard Methods for the Examination of Water and Wastewater, 1995, APHA; either publication may be used. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552 (a) and 1 CFR Part 51. Copies may be

obtained from the American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C., 20005. Other required analytical test procedures germane to conducting these analyses are contained in Technical Notes on Drinking Water Methods, EPA/600/R-94-173, October 1994, NTIS PB95-104766.

⁶ Method 6651 shall be followed in accordance with the "Standard Methods for the Examination of Water and Wastewater", 18th Edition, 1992, and 19th edition, 1995, American Public Health Association. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552 (a) and 1 CFR Part 51. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, N.W., Washington, D.C., 20005.

⁷ Method 505 or 508 can be used as a screen for PCBs. Method 508A shall be used to quantitate PCBs as decachlorobiphenyl if detected in Method 505 or 508. PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl

⁸ A nitrogen-phosphorus detector should be substituted for the electron capture detector in Method 505 (or a different approved method should be used) to determine alachlor, atrazine and simazine, if lower detection limits are required.

⁹ EPA Method 524.3, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry," June 2009. EPA 815-B-09-009.
http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html.

(3) PCB ANALYSIS. Analysis for PCBs shall be conducted as follows:

(a) Each waters supplier that monitors for PCBs shall have each sample analyzed by a laboratory certified under ch. NR 149 using Method 505, 508, 508.1 or 525.2 as specified in Table C and must achieve the required detection limits in this subsection.

(b) If one or more of 7 PCB Aroclors are detected as designated in this paragraph in any sample analyzed using Methods 505 and 508, the sample shall be reanalyzed using Method 508A to quantitate PCBs as decachlorobiphenyl.

Aroclor	Detection limit (mg/L)
1016	0.00008
1221	0.02
1232	0.0005
1242	0.0003
1248	0.0001
1254	0.0001
1260	0.0002

(c) Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using Method 508A.

(4) SAMPLE COLLECTION. Samples shall be collected using containers, preservatives and holding times specified in Table D. In all cases, samples should be analyzed as soon after collection as possible.

TABLE D
Sample Preservation Requirements and Holding Times for Organic Parameters

Parameter/Met	Preservation	Container	Holding Time
---------------	--------------	-----------	--------------

hod			Sample	Extract
502.1,502.2,503 .1	Sodium Thiosulfate (3 mg) or Ascorbic Acid (25 mg), Cool, 4°C, HCl pH<2	40 mL, G ¹	14 days	-
504	Sodium Thiosulfate (3 mg), Cool, 4°C, HCl pH<2	40 mL, G ¹	28 days	Analyze immediately
505	Sodium Thiosulfate (3 mg), Cool, 4°C	40 mL, G ¹	14 days (Heptachlor=7 days)	Analyze immediately
506	Sodium Thiosulfate (60 mg), Cool, 4°C, dark	1L, Amber G ²	14 days	4°C, dark, 14 days
507	Sodium Thiosulfate (80 mg), Cool, 4°C	1L, Amber G ²	14 days (see method for exceptions)	4°C, dark, 14 days
508	Sodium Thiosulfate (80 mg), Cool, 4°C	1L, G ²	7 days (see method for exceptions)	4°C, dark 14 days
508A	Cool, 4°C	1L, G ²	14 days	30 days
515.1	Sodium Thiosulfate (80 mg), Cool, 4°C	1L, Amber G ²	14 days	4°C, dark, 28 days
524.1, 524.2	Ascorbic Acid (25 mg), HCl pH<2, Cool, 4°C,	40 mL, G ¹	14 days	
524.3 ³	Ascorbic Acid (25 mg) and Maleic Acid (200 mg), pH<2 before sample collection. If foaming occurs, collect new sample with no preservative. If sampling only for TTHMs, sodium thiosulfate may be used. Sodium Thiosulfate (3mg) before sample collection. Do not add ascorbic or maleic acid when employing this preservation option.	40 mL, G ¹	14 days	
		40 mL, G ¹	24 hours	
		40 mL, G ¹	14 days	
525.1	Sodium Sulfit (40-50 mg) or Sodium Arsenite (40-50 mg) Cool, 4°C, HCl pH<2	1L, G ¹	7 days	30 days
531.1	Monochloroacetic acid pH<3, Sodium Thiosulfate (80 mg), Cool, 4°C	60 mL, G ¹	Freeze -10°C, 28 days	-
547.	Sodium Thiosulfate (100 mg/L), Cool, 4°C	60 mL, G ¹	14 days (18 mo. frozen)	-
548	Cool, 4°C	60 mL, G ¹	7 days	1 day
549	Sodium Thiosulfate (100 mg/L), H2SO4 pH<2, Cool, 4°C, dark	1L, High Density Amber PVC or	7 days	21 days

550, 550.1	Sodium Thiosulfate (100 mg/L), Cool, 4°C, HCl pH<2	Silanized Amber Glass 1L, Amber G ²	7 days	4°C, dark, 40 days
551.1	Ammonium chloride Sodium sulfite (100 mg/L), Cool, 4°C, HCl pH< 4.5-5.0	60 mL ²	4°C, 14 days	-10°C, 14 days
552.2	Ammonium chloride (10 mg/L), Cool 4°C	100 mL, Amber G ²	14 days 4°C	7 days 4°C, 14 days -10°C
1613	Sodium Thiosulfate (80 mg), Cool, 4°C, dark	1L, Amber G ²	-	40 days

¹ Teflon-lined septa.

² Teflon-lined cap.

³ If residual chlorine is present at greater than 5 mg/L, a determination of the chlorine concentration may be necessary. Add an additional 25 mg of ascorbic acid or 3 mg of sodium thiosulfate per each 5 mg/L of residual chlorine for each 40-mL of sample.

(5) LABORATORY CERTIFICATION. Analyses under this section shall only be conducted by laboratories that have received certification under ch. NR 149 or have been approved by EPA.

NR 809.205 Monitoring requirements for synthetic organic contaminants. (1) GENERAL. Water suppliers for community and non-transient non-community water systems shall monitor for the synthetic organic contaminants listed in s. NR 809.20 for the purposes of determining compliance with the maximum contaminant levels as follows:

(a) Groundwater sources shall be sampled under normal operating conditions at every entry point to the distribution system which is representative of each well after treatment. Each sample shall be taken at the same location unless, if approved by the department, conditions make another sampling location more representative of each source or treatment plant.

(b) Surface water sources or combined surface water and groundwater sources shall be sampled at each entry point to the distribution system after treatment, or at locations in the distribution system that are representative of each source after treatment. Each sample shall be taken at the same sampling location unless, if approved by the department, conditions make another sampling location more representative of each source or treatment plant.

(c) If the public water system draws water from more than one source and the sources are combined before distribution, the public water system shall be sampled at an entry point to the distribution system during periods of normal operating conditions when water representative of all sources is being used.

(d) The water supplier for all new public water systems or for public water systems that use a new source of water that begin operation after January 22, 2004 shall demonstrate compliance with the MCLs specified in s. NR 809.20 in accordance with the requirements in this section. The water supplier shall also comply with the initial sampling frequencies specified by the department to ensure the public water system can demonstrate compliance with the MCLs. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements of this section.

(2) MONITORING FREQUENCY FOR SYNTHETIC ORGANIC CONTAMINANTS. Water suppliers shall monitor to determine compliance with the maximum contaminant level for synthetic organic contaminants specified in s. NR 809.20 at the following frequencies:

(a) *Initial monitoring.* Water suppliers for new public water systems or for public water systems with new sources shall demonstrate compliance with the MCLs listed under s. NR 809.20 for synthetic organic contaminants prior to initiating water service. Water suppliers for each community and non-transient, non-community water system shall

take 4 consecutive quarterly samples for each contaminant listed in s. NR 809.20 beginning with the year the public water system initiate water service and every compliance period after that unless they meet the requirements of par (b). After demonstrating compliance with the MCLs and beginning with the initial compliance period, water suppliers for new groundwater systems or for groundwater systems with new sources may receive a complete waiver from the department for dioxin, PCBs, and benzo(a)pyrene sampling.

(b) *Routine monitoring.* Sampling may be reduced to routine monitoring after the initial monitoring period as follows:

1. *Public water systems serving greater than 3,330.* Public water systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of 2 quarterly samples in one year during each repeat compliance period.

2. *Public water systems serving 3,300 or less.* Public water systems serving 3,300 persons or less which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.

(3) **WAIVER REQUEST.** Water suppliers for each community and non-transient non-community groundwater system may apply to the department for a waiver from the requirements of sub. (2)(b). A water supplier shall reapply for a waiver for each compliance period.

(4) **WAIVER EVALUATION.** The department may grant a waiver from the requirements of sub. (2) after evaluating the following factors:

(a) Knowledge of previous use including transport, storage or disposal of the contaminant within the watershed or zone of influence of the public water system. If a determination by the department reveals no previous use of the contaminant within the zone of influence of the well, a waiver may be granted.

(b) If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted:

1. Previous analytical results.

2. The proximity of the public water system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.

3. The environmental persistence and transport of the pesticide or PCBs.

4. How well the water source is protected against contamination due to such factors as depth of the well and the type of soil and the integrity of the well casing.

5. Elevated nitrate levels at the water supply source.

6. Use of PCBs in equipment used in the production, storage or distribution of water such as pumps and transformers.

(5) **WAIVER CONDITIONS AND VULNERABILITY ASSESSMENTS.** As a condition of the waiver under sub (4), the water supplier for a groundwater system shall update the vulnerability assessment considering the factors listed in sub. (4). Based on this vulnerability assessment, the department shall reconfirm that the public water system is non-vulnerable. If the department does not make this reconfirmation within 3 years of the initial determination or each subsequent determination, then the waiver is invalidated and the public water system is required to sample during each compliance period as specified in sub. (2)(b).

(6) **MONITORING FOR DETECTED CONTAMINANTS.** If a synthetic organic contaminant listed in s. NR 809.20 is detected, as provided by s. NR 809.203(1) in any sample, then the water supplier shall monitor quarterly at each entry point which resulted in detection. Quarterly monitoring may be modified by the department as follows:

(a) The department may decrease the quarterly monitoring requirement specified in par. (a) provided it has determined that the public water system is reliably and consistently below the MCL. In no case may the department make this determination unless a groundwater system has been monitored in a minimum of 2 quarters and a surface water system has been monitored in a minimum of 4 quarters.

(b) After the department determines the public water system is reliably and consistently below the MCL, the department may allow the public water system to be monitored annually. Public water systems which are monitored annually shall be monitored during the quarter that previously yielded the highest analytical results.

(c) Water suppliers for public water systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the department for reduced monitoring under sub. (2)(a) or (b) or a waiver as specified in sub. (3).

(d) If monitoring results in detection of one or more of certain related contaminants such as heptachlor and heptachlor epoxide, then subsequent monitoring shall analyze for all related contaminants.

(7) MONITORING WHEN AN MCL IS EXCEEDED. Additional monitoring for synthetic organic contaminants shall be required as follows in order to maintain compliance:

(a) If an organic contaminant listed in s. NR 809.20 is detected at a level exceeding the MCL in any sample, then the water supplier shall begin to take quarterly samples at each entry point which exceeded an MCL.

(b) Public water systems which exceed an MCL listed in s. NR 809.20 as determined by s. NR 809.207(1) shall be monitored quarterly. After a minimum of 4 quarterly samples show that the public water system is back in compliance and the department determines the public water system is reliably and consistently below the MCL as specified in s. NR 809.207(1), the public water system shall be monitored at the frequency specified in sub. (6)(b).

(8) CONFIRMATION SAMPLES. The department may require a confirmation sample for positive or negative results. If a confirmation sample is required by the department, the result shall be averaged with the first sampling result and the average used for the compliance determination as specified by s. NR 809.207(1). The department may delete results of obvious sampling errors from this calculation, or may require additional samples to determine whether the result is or is not in error.

(9) COMPOSITE SAMPLING. The department may reduce the total number of samples a public water system is required to analyze by allowing the use of compositing. If the department allows compositing, the following composite sampling requirements shall be met:

(a) Composite samples from a maximum of 5 entry points are allowed, if the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing is only permitted at entry points within a single public water system. Compositing of samples shall be done in the laboratory and analyzed within 14 days of sample collection.

(b) If the concentration in the composite sample detects one or more contaminants listed in s. NR 809.20, then a follow-up sample shall be taken and analyzed for each contaminant detected within 14 days from each entry point included in the composite.

(c) If duplicate aliquots of the original sample taken from each entry point used in the composite are available, the public water system may use these duplicates instead of re-sampling. The duplicate shall be analyzed and the results reported to the department within 14 days of collection.

(10) INCREASING MONITORING FREQUENCY. The department may increase the required monitoring frequency, if necessary, to detect variations within the public water system. Examples of variations include fluctuations in concentration due to seasonal use or changes in the water source.

(11) DESIGNATION OF SAMPLING TIMES. Each public water system shall be monitored during the month, quarter or year designated by the department within each compliance period.

NR 809.207 Compliance requirements for synthetic organic contaminants.

(1) MCL COMPLIANCE DETERMINATION. Compliance with synthetic organic contaminant MCLs shall be determined as follows:

(a) Compliance with the synthetic organic contaminant MCLs specified in s. NR 809.20 shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the public water system is in violation of the MCL.

(b) For public water systems which are conducting monitoring more frequently than annual, compliance is determined by a running annual average of all samples taken at each entry point. If the annual average of any entry point is greater than the MCL, then the public water system is out of compliance. If the initial sample or a subsequent

sample would cause the annual average to be exceeded, then the public water system is out of compliance immediately.

(c) If monitoring is conducted annually or less frequently, the public water system is out of compliance if the level of a contaminant at any entry point is greater than the MCL. Compliance shall be based on the average value of the initial sample and the confirmation sample.

(d) Any contaminant listed in s. NR 809.20 that is detected shall be quantified. Any sample below the reported method detection limit shall be calculated at zero for the purposes of determining the averages in pars. (b) and (c).

(e) If a public water system fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(2) DETECTION OF SYNTHETIC CONTAMINANTS NOT LISTED IN S. NR 809.20(1). Any detection of a volatile organic contaminant not listed in s. NR 809.20(1) shall be reported to the department with the other monitoring reports required under this section. The laboratory shall indicate whether any detected synthetic organic contaminant not listed in s. NR 809.20(1) has been confirmed or tentatively identified, and when a numerical result is reported, whether the result is quantitative or an estimate.

(3) USE OF ANALYTICAL RESULTS. The department may determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

NR 809.24 Volatile organic contaminant maximum contaminant levels and BATS.

(1) APPLICABILITY. The following maximum contaminant levels for volatile organic contaminants (VOC) apply to community water systems and non-transient, non-community water systems.

Contaminant	MCL (mg/L)
Benzene	0.005
Vinyl chloride	0.0002
Carbon tetrachloride	0.005
1,2-Dichloroethane	0.005
Trichloroethylene	0.005
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.20
para-Dichlorobenzene	0.075
cis-1,2-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0.005
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
ortho-Dichlorobenzene	0.6
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
1,2,4-Trichlorobenzene	0.07
1,1,2-Trichloroethane	0.005
Xylenes (total)	10

(2) BEST AVAILABLE TREATMENT. The following are the BATs available for achieving compliance with the maximum contaminant level for the volatile organic chemicals listed in sub. (1):

(a) Central treatment using packed tower aeration.

(b) Central treatment using granular activated carbon, except for vinyl chloride and dichloromethane.

(3) ALTERNATIVE TREATMENT. The department may approve the use of alternative treatment not listed in sub. (2), if a water supplier demonstrates to the department, using pilot studies or other means, that the alternative treatment is sufficient to achieve compliance with the MCLs in sub. (1).

NR 809.243 Analytical requirements for volatile organic contaminants.

(1) DETECTION LIMITS. For the purposes of this section, detection is defined as >0.0005 mg/l, except for vinyl chloride for which detection is defined as >0.0003 mg/L.

(2) ANALYTICAL METHODS. Analysis for the volatile organic contaminants listed in s. NR 809.24 shall be conducted using the methods prescribed in Table E.

**TABLE E
SDWA Approved Methodology for Volatile Organic Contaminants**

Contaminant	EPA Methods ^{1,2}
Regulated Parameters:	
Benzene	502.2, 524.2, 524.3
Carbon tetrachloride	502.2, 524.2, 551.1, 524.3
Chlorobenzene	502.2, 524.2, 524.3
1,2-Dichlorobenzene	502.2, 524.2, 524.3
1,4-Dichlorobenzene	502.2, 524.2, 524.3
1,2-Dichloroethane	502.2, 524.2, 524.3
cis-Dichloroethylene	502.2, 524.2, 524.3
trans-Dichloroethylene	502.2, 524.2, 524.3
Dichloromethane	502.2, 524.2, 524.3
1,2-Dichloropropane	502.2, 524.2, 524.3
Ethylbenzene	502.2, 524.2, 524.3
Styrene	502.2, 524.2, 524.3
Tetrachloroethylene	502.2, 524.2, 551.1, 524.3
1,1,1-Trichloroethane	502.2, 524.2, 551.1, 524.3
Trichloroethylene	502.2, 524.2, 551.1, 524.3
Toluene	502.2, 524.2, 524.3
1,2,4-Trichlorobenzene	502.2, 524.2, 524.3
1,1-Dichloroethylene	502.2, 524.2, 524.3
1,1,2-Trichloroethane	502.2, 524.2, 551.1, 524.3
Vinyl chloride	502.2, 524.2, 524.3
Xylenes (total)	502.2, 524.2, 524.3

¹ Procedures for Methods 502.2, 504.1, 505, 506, 507, 508, 508.1, 515.2, 524.2, 525.2, 531.1, 551.1 and 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water Supplement III, EPA/600/R-95-131, August 1995. Methods 508A and 515.1 are in "Methods for the Determination of Organic Compounds in Drinking Water", EPA-600/4-88/039, December 1988, Revised, July 1991. Methods 547, 550, and 550.1 are in "Methods for the Determination of Organic Compounds in Drinking Water, Supplement I", EPA-600/4-90/020, July 1990. Methods 548.1, 549.1 and 555 are in "Methods for the Determination of Organic Compounds in Drinking Water, Supplement II", EPA-600/R-92-129, August 1992. These documents are available from the National Technical

Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161 as publications NTIS PB91-231480, PB91-146027, and PB92-207703. The toll free number is 1-800-553-6847. EPA Methods 515.3 and 549.2 are available from U.S. Environmental Protection Agency, National Exposure Research Laboratory (NERL)-Cincinnati, 26 West Martin Luther King Drive, Cincinnati, OH 45268. ASTM Method D 5317-93 is available in the Annual Book of ASTM Standards, 1996, Vol. 11.02, American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428, or in any edition published after 1993.
² EPA Method 524.3, Version 1.0. "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry," June 2009. EPA 815-B-09-009.
http://epa.gov/safewater/methods/analyticalmethods_ogwdw.html.

(3) **SAMPLE COLLECTION.** Samples shall be collected using containers, preservatives and holding times specified in s. NR 809.203(4) Table D. In all cases, samples should be analyzed as soon after collection as possible.

(4) **LABORATORY CERTIFICATION.** Analyses under this section shall only be conducted by laboratories that have received certification under ch. NR 149 or have been approved by EPA.

(5) **LABORATORY EVALUATION.** Each certified laboratory shall determine the method detection limit (MDL) at which it is capable of detecting VOCs as defined in federal law under 40 CFR, Part 136, Appendix B. The maximum acceptable MDL is 0.0005 mg/L for all VOCs except vinyl chloride, which is 0.0002 mg/L. These are the detection concentrations for purposes of this section.

NR 809.245 Monitoring requirements for volatile organic contaminants.

(1) **GENERAL.** Water suppliers for community and non-transient non-community water systems shall monitor for the contaminants listed in s. NR 809.24 for purposes of determining compliance with the maximum contaminant levels as follows:

(a) Groundwater sources shall be sampled at every entry point to the distribution system which is representative of each well after treatment. Each sample shall be taken at the same location unless, if approved by the department, conditions make another location more representative of each source, treatment plant, or within the distribution system.

(b) Surface water sources or combined surface water and groundwater sources shall be sampled at each entry point to the distribution system after treatment or at points, if approved by the department, in the distribution system that are more representative of each source after treatment. Each sample shall be taken at the same location unless, if approved by the department, conditions make another location more representative of each source, treatment plant or within the distribution system.

(c) If the public water system draws water from more than one source and the sources are combined before distribution, the public water system shall be sampled at an entry point to the distribution system during periods of normal operating conditions when water representative of all sources is being used.

(d) Water suppliers for new public water systems or public water systems that use a new source of water shall demonstrate compliance with the MCLs specified in s. NR 809.24 in accordance with the requirements in this section. The water supplier shall also comply with the initial sampling frequencies specified by the department to ensure the public water system can demonstrate compliance with the MCLs. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

(2) **MONITORING FREQUENCY FOR VOLATILE ORGANIC CONTAMINANTS.** The frequency of monitoring to determine compliance with the maximum contaminant level for volatile organic contaminants specified in s. NR 809.24 shall be conducted as follows:

(a) *Initial monitoring* 1. Water suppliers for new public water systems or public water systems with new sources shall demonstrate compliance with the MCLs listed under s. NR 809.24 for volatile organic contaminants prior to initiating water service.

2. Each water supplier for a community or a non-transient non-community water system shall take 4 consecutive quarterly samples for each VOC contaminant specified in s. NR 809.24, beginning with the first quarter a new source goes into service.

3. If the initial monitoring under subds. 1. and 2. for the VOC contaminants listed in s. NR 809.24, did not detect any VOC contaminant, then the water supplier shall take one sample annually.

(b) *Routine monitoring.* Each water supplier for a community or a non-transient non-community water system shall take annual samples for VOC contaminants VOC contaminant specified in s. NR 809.24.

(c) *Reduced monitoring.* 1. After a minimum of 3 years of annual sampling, under par. (a) 3. or (b) the department may allow water suppliers for groundwater systems with no previous detection of any VOC contaminant specified in s. NR 809.24 to take one sample during each three year compliance period.

2. After a minimum of 3 years of annual sampling, under par. (a) 3. or (b) the department may allow water suppliers for surface water systems with no previous detection of any VOC contaminant specified in s. NR 809.24 to take one sample during each three year compliance period, if the surface water system meets criteria specified by the department.

(3) **WAIVER REQUESTS.** Each water supplier for a community or a non-transient groundwater system which does not detect a VOC contaminant specified in s. NR 809.24 may apply to the department for a waiver from the requirements of sub. (2)(c) after completing all of the initial monitoring under sub. (2)(a). For the purposes of this section, detection is defined as >0.0005 mg/l, except for vinyl chloride for which detection is defined as >0.0002 mg/L. A water supplier for a groundwater system shall reapply for a waiver for each compliance period. A waiver shall be effective for no more than 6 years or 2 compliance periods.

(4) **WAIVER EVALUATION.** The department may grant a waiver from sub. (2)(c) after evaluating the following factors:

(a) Knowledge of previous use including transport, storage or disposal of the contaminant within the watershed or zone of influence of the public water system. If a determination by the department reveals no previous use of the contaminant within zone of influence for the well, a waiver may be granted.

(b) If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

1. Previous analytical results.

2. The proximity of the public water system to potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

3. The environmental persistence and transport of the contaminants.

4. The number of persons served by the public water system and the proximity of a smaller public water system to a larger public water system.

5. How well the water source is protected against contamination. Groundwater systems shall consider factors such as depth of the well, the type of soil and wellhead protection.

(5) **WAIVER CONDITIONS AND VULNERABILITY ASSESSMENTS.** A water supplier for a groundwater system shall take one sample at each entry point during the time the waiver is effective. As a condition of the waiver under sub (4), water supplier for the groundwater system shall update the vulnerability assessment considering the factors listed in sub. (4). Based on this vulnerability assessment, the department shall reconfirm that the public water system is non-vulnerable. If the department does not make this reconfirmation within 3 years of the initial determination or each subsequent determination, then the waiver is invalidated and the public water system is required to sample during each compliance period as specified in sub. (2)(b).

(6) **MONITORING FOR DETECTED COMPOUNDS.** If vinyl chloride is detected at a level exceeding 0.0002 mg/L, or any other VOC contaminant specified in s. NR 809.24 is detected at a level exceeding 0.0005 mg/l in any sample, then:

(a) The public water system shall be monitored quarterly for all VOCs under s. NR 809.24 at each sampling location which resulted in a detection.

(b) The department may decrease the quarterly monitoring requirement specified in par. (a) if the department has determined that the public water system is reliably and consistently below the MCL. In no case may the department make this determination unless a groundwater system has been sampled a minimum of 2 quarters and a surface water system has been sampled a minimum of 4 quarters.

(c) If the department determines that the public water system is reliably and consistently below the MCL, the department may allow the system to be monitored annually. Public water systems which are monitored annually shall be monitored during the quarter which previously yielded the highest analytical result.

(d) Water suppliers for public water systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the department for a waiver as specified in sub. (3).

(7) MONITORING WHEN AN MCL IS EXCEEDED. Additional monitoring for volatile organic contaminants shall be required as follows in order to maintain compliance.

(a) If a VOC contaminant specified in s. NR 809.24 is detected at a level exceeding the MCL in any sample, then the water supplier shall begin to take quarterly samples at each entry point which exceeded a MCL.

(b) Water suppliers for public water systems which exceed a MCL listed in s. NR 809.24 shall be monitored quarterly. After a minimum of 4 quarterly samples show that the public water system is back in compliance and the department determines the public water system is reliably and consistently below the MCL as specified in s. NR 809.247(1), the water supplier for the public water system shall be monitored at the frequency specified in sub. (6)(c).

(8) CONFIRMATION SAMPLES. The department may require a confirmation sample for positive or negative results. The department may delete results of sampling errors from any compliance calculation, or may require the collection of additional samples to determine whether the result is or is not in error. When a confirmation sample is required, the result shall be averaged with the first sampling result and the average used for the compliance determination as specified in s. NR 809.247(1)(c).

(9) COMPOSITE SAMPLES. The department may reduce the total number of samples a water supplier for a public water system shall analyze by allowing the use of compositing. The following composite sampling requirements shall be met:

(a) Compositing may only be permitted for entry points within a single public water system. Composite samples from a maximum of 5 entry points may be allowed, if the detection limit of the method used for analysis is less than one-fifth of the MCL.

(b) Compositing of samples shall be done in the laboratory and analyzed within 14 days of sample collection according to the procedures in s. NR 809.243(1) Table E.

(c) If the concentration in the composite sample is greater than 0.0003 mg/L for vinyl chloride or 0.0005mg/L for any other contaminant listed under s. NR 809.24, then a follow-up sample shall be taken and analyzed for each contaminant detected within 14 days from each entry point included in the composite.

(d) If duplicates of the original sample taken from each sampling point used in the composite are available, the water supplier may use these instead of re-sampling. The duplicate shall be analyzed and the results reported to the department within 14 days of collection.

(10) INCREASING MONITORING FREQUENCY. The department may increase monitoring requirements if necessary to detect contaminant variations within a public water system.

(11) DESIGNATION OF SAMPLING TIMES. Each public water system shall be monitored during the month, quarter or year designated by the department within each compliance period.

NR 809.247 Compliance requirements for volatile organic contaminants. (1) MCL COMPLIANCE DETERMINATION. Compliance with volatile organic contaminant MCLs shall be determined as follows:

(a) Compliance with the VOC MCLs specified in s. NR 809.24 shall be determined based on the analytical results obtained at each entry point. If one entry point is in violation of an MCL, the public water system is in violation of the MCL.

(b) For public water systems which are monitored more frequently than annually, compliance is determined by a running annual average of all samples taken at each entry point. If the annual average of any entry point is greater than the MCL, the public water system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to exceed the MCL, the public water system is out of compliance immediately.

(c) If monitoring is conducted annually, or less frequently, the public water system is out of compliance if the level of a contaminant at any entry point is greater than the MCL. Compliance shall be based on the average value of this sample and the confirmation sample.

(d) If a water supplier fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(e) Any contaminant listed in s. NR 809.24 that is detected shall be quantified. Any sample below the reported method detection limit shall be calculated at zero for the purposes of determining the averages in pars. (b) and (c).

(2) DETECTION OF VOLATILE CONTAMINANTS NOT LISTED IN S. NR 809.24. Any detection of a volatile organic contaminant not listed in s. NR 809.24 shall be reported to the department with the other monitoring reports required under this section. The laboratory shall indicate whether any detected volatile organic contaminant not listed in s. NR 809.24 has been confirmed or tentatively identified, and when a numerical result is reported, whether the result is quantitative or an estimate.

(3) SEPARATE DISTRIBUTION SYSTEM NOTICE. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the department may allow the water supplier to give public notice to only that area served by that portion of the public water system which is out of compliance.

(4) USE OF ANALYTICAL RESULTS. The department may determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

NR 809.25 Special monitoring and reporting for selected organic contaminants and sulfate. (1) GENERAL. (a) Community systems with populations of 10,000 and greater shall be monitored for the contaminants listed in par. (e) and (f) on a schedule to be determined by the department. Community water systems with populations less than 10,000 and non-transient, non-community water systems shall be monitored for the contaminants listed in par. (e) and (f) at the discretion of the department.

(b) Surface water systems shall be sampled at the entry points to the distribution system after any application of treatment. The minimum number of samples is one year of quarterly samples per water source.

(c) Groundwater systems shall be sampled at points of entry to the distribution system representative of each well after any application of treatment. The minimum number of samples is one sample per entry point to the distribution system.

(d) The department may require confirmation and follow-up samples for positive or negative results.

(e) List of unregulated volatile organic compounds:

Chloroform
Bromoform
Chlorodibromomethane
Bromodichloromethane
Bromobenzene
Bromomethane
Chloromethane
Chloroethane
o-Chlorotoluene
p-Chlorotoluene
Dibromomethane
m-Dichlorobenzene
1,1-Dichloropropene
1,1-Dichloroethane
1,3-Dichloropropane
2,2-Dichloropropane
1,3-Dichloropropene
1,1,1,2-Tetrachloroethane
1,1,2,2-Tetrachloroethane
1,2,3-Trichloropropane
1,2,4-Trimethylbenzene
1,2,3-Trichlorobenzene
n-Propylbenzene
n-Butylbenzene

Naphthalene
Hexachlorobutadiene
1,3,5-Trimethylbenzene
p-Isopropyltoluene
Isopropylbenzene
Tert-butylbenzene
Sec-butylbenzene
Fluorotrichloromethane
Dichlorodifluoromethane
Bromochloromethane
Methyl-t-butyl ether (MTBE)

(f) List of unregulated synthetic organic contaminants:

Aldrin
Aldicarb
Aldicarb Sulfoxide
Aldicarb Sulfone
Butachlor
Carbaryl
Dicamba
Dieldrin
3-Hydroxycarbofuran
Methomyl
Metolachlor
Metribuzin
Propachlor

(g) Analysis under this section shall be conducted by a laboratory certified under ch. NR 149 using EPA methods 502.2, 524.2 for contaminants listed in par (e) and EPA methods listed in s. NR 809.203, Table C for contaminants listed in par. (f).

(2) SULFATE MONITORING. Monitoring for sulfate shall be conducted as required by the department.

(3) REPORTING REQUIREMENTS. Reporting requirements under this section shall be as required under s. NR 809.80.

(4) TREATMENT TECHNIQUES FOR ACRYLAMIDE AND EPICHLOROHYDRIN. In lieu of MCLs and monitoring for acrylamide and epichlorohydrin, the following treatment techniques and reporting are required. Each water supplier for public water system shall certify annually in writing to the department using third party or manufacturer's certification, that when acrylamide and epichlorohydrin are used in the treatment of drinking water, the combination, or product, of dose and monomer level does not exceed the levels specified as follows:

(a) Acrylamide = 0.05% dosed at 1 ppm or equivalent.

(b) Epichlorohydrin = 0.01% dosed at 20 ppm or equivalent.

(c) A water supplier may rely on certification from manufacturers or third parties, as approved by the department.

NR 809.30 Distribution System microbiological contaminant maximum contaminant levels. The following are the maximum contaminant levels for coliform bacteria applicable to public water systems.

(1) MCL FOR COLIFORM BACTERIA. The maximum contaminant level (MCL) for coliform bacteria is based on the presence or absence of total coliforms in a sample.

(a) For a public water system which collects at least 40 samples per month, if no more than 5.0% of the samples collected during a month are total coliform-positive, the public water system is in compliance with the MCL for total coliforms.

(b) For a public water system which collects fewer than 40 samples per month, if no more than one sample, including routine and repeat samples, collected during a monitoring period is total coliform-positive, the public water system is in compliance with the MCL for total coliforms.

(2) MCL FOR FECAL COLIFORM OR E. COLI. Any fecal coliform-positive repeat sample or E. Coli-positive repeat sample, or any total coliform-positive repeat sample following a fecal coliform-positive or E. Coli-positive routine sample constitutes a violation of the MCL for total coliforms. For purposes of the public notification requirements in subch. VII, this is a violation that may pose an acute risk to health.

(3) DETERMINING COMPLIANCE. The water supplier for a public water system shall determine compliance with the MCL for total coliforms in subs. (1) and (2) for each monitoring period in which the public water system is required to monitor for total coliforms.

(4) CORRECTIVE ACTION. The water supplier shall initiate action to identify the cause of the positive bacteriological sample results and to eliminate potential health hazards which may exist in the public water system when monitoring pursuant to s. NR 809.301 (1) or (2) shows the presence of any coliform organisms.

(5) HETEROTROPHIC BACTERIA LIMITS. If heterotrophic bacterial plate counts on water distributed to the consumer exceed 500 organisms per milliliter, the department shall determine if the bacterial count is of public health or nuisance significance and may require appropriate action.

(6) BEST AVAILABLE TREATMENT TECHNIQUES. Any of the following are best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant level for total coliforms in subs. (1) and (2):

- (a) Protection of wells from coliform contamination by appropriate placement and construction.
- (b) Maintenance of a disinfectant residual throughout the distribution system.
- (c) Proper maintenance of the distribution system including appropriate pipe replacement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, and continual maintenance of positive water pressure in all parts of the distribution system.
- (d) Filtration and disinfection of surface water, or disinfection of groundwater using strong oxidants such as chlorine, chlorine dioxide or ozone.
- (e) The development and implementation of a department-approved wellhead protection program.

Note: The basic purpose of a wellhead protection program is to restrict potentially polluting activities near wells and well fields and within recharge areas of aquifers supplying water to these wells. In general, activities are more restricted close to the well and less so farther away.

NR 809.31 Distribution system microbiological contaminant monitoring requirements. (1) ROUTINE MONITORING. (a) Water Suppliers for public water systems shall collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sample siting plan. These plans are subject to department review and revision.

(b) 1. Water suppliers for community water systems shall take water samples for coliform determination at regular intervals, and in a number proportionate to the population served by the public water system. Water suppliers required to collect multiple samples each month shall sample at geographically representative locations and on dates evenly spaced during the month. Except as specified in subd. 2., the minimum sampling frequency shall be as set forth in the following:

Population served:	Minimum number of samples per month
25 to 1,000 (Not serving a municipality)	1
25 to 1,000 (Serving a municipality)	2
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5

4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

2. Based on a history of no coliform bacterial contamination and on a sanitary survey by the department showing the public water system to be supplied solely by a protected groundwater source and free of sanitary defects, a water supplier for a non-municipal community water system serving 25 to 1,000 persons may, with written permission from the department, reduce this sampling frequency, except that it shall not be reduced to less than one per calendar quarter.

(c) The water supplier for a non-community school or a non-transient non-community water system shall sample for coliform bacteria in each calendar quarter during which the public water system provides water to the public, unless the department, on the basis of a sanitary survey conducted in the past 5 years, or other factors, determines that more frequent monitoring is appropriate.

(d) The monitoring frequency for total coliforms for non-community water systems, notwithstanding par. (c), is as follows: