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# Chapter NR 809

## SAFE DRINKING WATER


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**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 s. 281.12, Stats., and ch. 280, Stats.

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

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. Register, April, 1982, No. 316, eff. 5−1−82; renum. from NR 109.01, Register, July, 1993, No. 451, eff. 8−1−93**;** corrections made under s. 13.93 (2m) (b) 7., Stats., Register, October, 1997, No. 502.

**NR 809.02 Departmental justification. (1)** Where the department exercises discretion allowed under this chapter to require a public water system owner or operator 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

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upon an application by the owner or operator of a public water system.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; renum. to be (1), cr. (2), Register, August, 1994, No. 464, eff. 9−1−94.

**NR 809.03 Applicability.** The provisions of this chapter shall apply to all new and existing public water systems as defined in this chapter.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; renum. from NR 109.03, Register, July, 1993, No. 451, eff. 8−1−93.

**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 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)** "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.

**(5)** "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.

**(6)** "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.

**(7)** "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 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.

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

**(9)** "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.

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

**(11)** "CT" or "CTcalc" is the product of "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:

$$\frac{CTcalc}{CT_{99.9}}$$

where "$CT_{99.9}$" is the CT value required for 99.9% (3 log) inactivation of *Giardia lamblia cysts*. The sum of the inactivation ratios, or total inactivation ratio for a series of disinfection sequences is:

$$\frac{\Sigma\,(CTcalc)}{CT_{99.9}}$$

and is calculated by adding together the inactivation ratio for each disinfection sequence. In determining the total inactivation ratio, the public water system owner or operator 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 a 3 log inactivation of *Giardia lamblia cysts.*

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

**(13)** "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.

**(14)** "Department" means the department of natural resources.

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

(a) A precoat 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.

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

**(17)** "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.

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

**(19)** "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 809.775.

**(20)** "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.

**(21)** "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).

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

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

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

**(25)** "Entry point" means a location in the 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.

**(26)** "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.

**(27)** "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.

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

**(29)** "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.

**(30)** "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.

**(31)** "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.

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

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

**(34)** "Ground water under the direct influence of surface water" 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.

**(35)** "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 s. NR 809.11 (2) (b) and in s. NR 809.20 (1) (b), the initial compliance period means January 1993 − December 1995 for systems with 150 or more service connections and January 1996 − December 1998 for systems having fewer than 150 service connections.

**(36)** "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.

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

**(38)** "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.

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

**(40)** "Man−made beta particle and photon emitters" means all radionuclides emitting beta particles and/or photons 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.

**(41)** "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.

**(42)** "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.

**(43)** "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.

**(44)** "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.

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

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

**(47)** "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.

**(48)** "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. Examples of non−transient non−community water systems include those serving schools, day care centers and factories.

**(49)** "Optimal corrosion control treatment" means the corrosion control treatment that minimizes the lead and copper con-

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centrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations as listed in part 141 of the code of federal regulations (CFR) 40.

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

**(51)** "Picocurie (pCi)" means that quantity of radioactive material producing 2.22 nuclear transformations per minute.

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

**(53)** "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.

**(54)** "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.

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

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

**(57)** "Public water system" or "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 system:

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

(b) Includes any collection or pretreatment storage facilities not under the system's control 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.

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

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

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

**(61)** "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.

**(62)** "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 such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.

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

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

**(65)** "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.

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

**(67)** "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.

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

**(69)** "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.

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

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

**(72)** "Surface water systems" means public water systems using surface water or ground water 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.

**(73)** "Supplier of water" or "water supplier" means any person who owns or operates a public water system.

**(74)** "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).

**(75)** "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.

**(76)** "Supplier of water" means any person who owns or operates a public water system.

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

**(78)** "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. Examples of transient non−community water systems include those serving taverns, motels, restaurants, churches, campgrounds and parks.

**(79)** "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.

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

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (1) and (9), renum. (12) to (17) to be (13) to (18) and am. (13), cr. (12), Register, April, 1982, No. 316, eff. 5−1−82; renum. (1) to (18) to be (2) to (9), (11), (13) to (15), (18) to (23) and am. (9) and (11), cr. (1), (10), (12), (16) and (17), Register, August, 1989, No. 404, eff. 9−1−89; renum. (1) to (23) to be (3), (6), (9), (15), (18), (19), (22) to (24), (26) to (30), (32) to (36), (38), (39), (44) and (44m), cr. (2), (4), (5), (7), (8), (10) to (14), (16), (17), (20), (21), (25), (31), (37), (40) to (43) and (45) to (47), Register, March, 1991, No. 423, eff. 4−1−91; renum. (1) to (47) to be (2) to (4), (7) to (9), (12), (10), (14) to (19), (23), (25), (13), (26), (28), (32), (27), (33), (34), (37), (35), (38), (39), (41), (42), (44), (43), (45) to (48), (51), (49), (53), (54), (57), (58), (60) to (66) and am. (10), (16) (b), (34), (38) and (39), cr. (1), (5), (6), (12), (20) to (22), (24), (29) to (31), (36), (40), (50), (52), (55), (56), (59) and (63), Register, July, 1993, No. 451, eff.

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8−1−93; am. (29), Register, August, 1994, No. 464, eff. 9−1−94; renum. (7) to (66) to be (8) to (18), (20), (21), (24) to (26), (28) to (30), (32) to (35), (37) to (42), (45) to (68), (70), (71), (76), (77), (78), (79) and (80) and am. (57), cr. (7), (19), (22), (23), (27), (31), (36), (43), (44), (69), (72) to (75), Register, December, 2000, No. 540, eff. 1−1−01; CR 00−161: cr. (intro), am. (4), (47), (48), (57) and (78), Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (21), (34) (a) Register October 2003 No. 574, eff. 11−1−03; CR 03−067: am. (54) and (55) Register March 2004 No. 579, eff. 4−1−04.

**NR 809.05 Coverage.** This chapter shall apply 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); and

**(2)** Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply; and

**(3)** Does not sell water to any person; and

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

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (1), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.05, Register, July, 1993, No. 451, eff. 8−1−93.

## Subchapter I — Maximum Contaminant Levels, Monitoring and Analytical Requirements

**NR 809.09 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

**(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 |
| Arsenic | zero[1] |
| Benzene | 0.001 |
| Benzo[a]pyrene | 0.000002 |
| Carbon tetrachloride | 0.0003 |
| Chlordane | 0.00003 |
| 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) | $2 \times 10^{-10}$ |
| Tetrachloroethylene | 0.0007 |
| Thallium | 0.0005 |
| Toxaphene | 0.00003 |
| 1,1,2−Trichloroethane | 0.003 |
| Trichloroethylene | 0.003 |
| Vinyl chloride | 0.000015 |

[1] This value for arsenic is effective January 23, 2006. Until then, there is no MCLG for arsenic.

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

| Contaminant | MCL 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 |
| 2,4,5−TP | 0.05 |
| Xylenes (Total) | 10 |

[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

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the MCLG but below the MCL for that contaminant, the following shall apply:

(a) The system owner or operator 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 system owner or operator 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 system owner or operator to prepare and submit a report which:

1. Assesses the cause and significance of the problem, and

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 system owner or operator to treat or replace the water source.

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; am. (1), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.09, Register, July, 1993, No. 451, eff. 8−1−93; am. (1) to (3), Register, August, 1994, No. 464, eff. 9−1−94; CR 03−067: am. (2) Register March 2004 No. 579, eff. 4−1−04.

**NR 809.10 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.

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.10 and am. Register, July, 1993, No. 451, eff. 8−1−93.

**NR 809.11 Inorganic chemical maximum contaminant levels. (1)** (a) The maximum contaminant levels for nitrate and nitrite are applicable to both community water systems and non−community water systems, except as provided in sub. (3).

(b) The maximum contaminant level for arsenic is 0.05 mg/L for community water systems before January 23, 2006. On or after January 23, 2006 the maximum contaminant level for arsenic is 0.010 mg/L for community water systems and non−transient, non−community water systems.

(c) The maximum contaminant level for fluoride only applies to community water systems.

(d) The maximum contaminant levels for antimony, asbestos, barium, beryllium, cadmium, chromium, cyanide, mercury, nickel, selenium and thallium apply to community water systems and non−transient, non−community water systems.

(e) Compliance with maximum contaminant levels for inorganic chemicals is calculated under s. NR 809.12.

**(2)** The following are the maximum contaminant levels for inorganic contaminants:

| (a) Contaminant | MCL in mg/L |
|---|---|
| Arsenic | 0.010[1] |
| Asbestos | 7 Million fibers/liter (longer than 10 um) |
| Barium | 2 |
| Cadmium | 0.005 |
| Chromium | 0.1 |
| Fluoride | 4.0 |
| Mercury | 0.002 |
| Nitrate | 10 (as Nitrogen) |
| Nitrite | 1 (as Nitrogen) |
| Total Nitrate Nitrite | 10 (as Nitrogen) |
| Selenium | 0.05 |

[1] The MCL of 0.010 mg/L for arsenic is effective January 23, 2006. Until then, the MCL for arsenic is 0.05 mg/L.

| (b) Contaminant | MCL in mg/L |
|---|---|
| Antimony | 0.006 |
| Beryllium | 0.004 |
| Cyanide (as free Cyanide) | 0.2 |
| Nickel | 0.1 |
| Thallium | 0.002 |

**Note:** Water systems having fewer than 150 service connections begin monitoring for the contaminants listed in par. (b) in the January 1, 1996−December 31, 1998 compliance period.

**(3)** 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 supplier of water demonstrates to the satisfaction of the department that:

(a) Such water will not be available to children under 6 months of age; and

(b) The non−community water system 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; and

(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 low nitrate (contains less than 10 mg/l nitrate as nitrogen), bacteriologically safe drinking water shall be provided for infants under 6 months of age.

(e) No adverse health effects will result.

**(4)** (a) The following are 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:

| 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 |

[1]BAT only if influent Hg concentration

[2]BAT for Chromium III only.

[3]BAT for Selenium IV only.

[4]BATs for Arsenic V. Pre−oxidation may be required to convert Arsenic III to Arsenic V.

[5]To 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 systems < 500 service connections)

3 = Direct and Diatomite Filtration

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4 = Granular Activated Carbon

5 = Ion Exchange

6 = Lime Softening (not BAT for systems < 500 service connections)

7 = Reverse Osmosis

8 = Corrosion Control

9 = Electrodialysis

10 = Oxidation (Chlorine)

11 = Ultraviolet

12 = Oxidation/Filtration

(b) A public water system owner or operator 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)** The EPA identifies the following table as the affordable technology, treatment technique, or other means available to water systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant level for arsenic:

**Small System Compliance Technologies[1] for Arsenic[2]**

| Small system compliance technology | Affordable for listed small system categories[3] |
|---|---|
| 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 system compliance technologies must be affordable and technically feasible for small systems.

[2] Small 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 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 system 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.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. Register, April, 1982, No. 316, eff. 5−1−82; am. (1) and (2), Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.11 and am. (1) and (2), Register, July, 1993, No. 451, eff. 8−1−93; am. (1) (c), (2) and (4) (a), Register, August, 1994, No. 464, eff. 9−1−94; CR 00−162: am. (3) (b) Register November 2002 No. 563, eff. 12−1−02; CR 03−067: rn. (1) (b) to (d) to be (1) (c) to (e) and am. (1) (c), cr. (1) b) and (5), am. (2) (a) and (4) (a), Register March 2004 No. 579, eff. 4−1−04.

**NR 809.12 Inorganic chemical sampling and analytical requirements.** Monitoring for the contaminants listed in s. NR 809.11 for the purposes of determining compliance with the maximum contaminant levels shall be conducted as follows:

**(1)** (a) Groundwater sources shall be sampled at every entry point to the distribution system which is representative of each well after treatment beginning in the initial compliance period. Each sample shall be taken at the same entry point unless conditions make another sampling location more representative of each source after treatment.

(b) Surface water sources or combined surface water and groundwater sources shall be sampled at every point of entry 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 entry point unless conditions make another sampling location more representative of each source after treatment.

(c) If a system draws water from more than one source and the sources are combined before distribution, the 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.

**(2)** The frequency of monitoring to determine compliance with the maximum contaminant level for asbestos specified in s. NR 809.11 (2) shall be conducted as follows:

(a) Each community and non−transient, non−community water system is required to 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.

(b) If the owner or operator of the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos−cement pipe, or both, it may apply to the department for a waiver of the monitoring requirement in par. (a). If the department grants the waiver, the system is not required to monitor.

(c) The department may grant a waiver based on a consideration of the following factors:

1. Potential asbestos contamination of the water source, and

2. The use of asbestos−cement pipe for finished water distribution and the corrosive nature of the water.

(d) A waiver remains in effect until the completion of the 3−year compliance period. Systems not receiving a waiver shall monitor in accordance with the provisions of par. (a).

(e) A system vulnerable to asbestos contamination due solely to corrosion of asbestos−cement pipe shall take one sample at a tap served by asbestos−cement pipe and under conditions where asbestos contamination is most likely to occur.

(f) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provisions in sub. (1).

(g) A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos−cement pipe shall take one sample at a tap served by asbestos−cement pipe and under conditions where asbestos contamination is most likely to occur.

(h) A system which exceeds the MCL as determined in s. NR 809.12 (9) shall monitor 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) provided the department has determined that the 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) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of this subsection, then the department may allow system owners to use that data to satisfy the

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monitoring requirement for the initial compliance period beginning January 1, 1993.

**(3)** The frequency of 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 shall be conducted as follows:

(a) Groundwater sources shall be sampled at each entry point during each compliance period. Suppliers of water having surface water sources or combined surface water and groundwater sources shall take one sample annually at each entry point.

(b) The system owner or operator may apply to the department for a waiver from the monitoring frequencies specified in par. (a). The department may grant a waiver for monitoring of cyanide, provided that the system is not vulnerable to contamination because there is no industrial source of cyanide.

(c) A condition of the waiver shall require 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.

(d) The department may grant a waiver provided surface water systems have monitored annually for at least 3 years and groundwater systems have conducted a minimum of 3 rounds of monitoring. At least one of the 3 samples shall have been taken since January 1, 1990. Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until 3 rounds of monitoring from the new source have been completed.

(e) In determining the appropriate reduced monitoring frequency, the department shall consider:

1. Reported concentrations from all previous monitoring;

2. The degree of variation in reported concentrations; and

3. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.

(f) Systems which exceed the MCLs as calculated in sub. (9) 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) provided it has determined that the 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.

(g) All new systems or 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 system shall also comply with the initial sampling frequencies specified by the department to ensure a system can demonstrate compliance with the MCLs. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

**(4)** The frequency of monitoring for all public water systems to determine compliance with the MCL for nitrate specified in s. NR 809.11 (2) shall be conducted as follows:

(a) Community water systems and non−transient non−community water systems served by groundwater systems shall be monitored annually; systems served by surface water shall monitor quarterly.

(b) Transient non−community water systems shall be monitored annually.

(c) 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) 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.

(e) After the initial round of quarterly sampling is completed, any community or non−transient non− community water system which is monitoring annually shall take subsequent samples during the quarter which previously resulted in the highest analytical result.

**(5)** The frequency of monitoring for all public water systems to determine compliance with the MCL for nitrite specified in s. NR 809.11 (2) shall be conducted as follows:

(a) All public water systems owners or operators shall take one sample at each entry point in the compliance period specified by the department.

(b) After the initial sample, 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. Notwithstanding par. (c), the frequency may not exceed 1 sample per year.

(c) 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.

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

(c) If the department requires a confirmation sample for any contaminant, the results of the initial and confirmation samples shall be averaged. The resultant average shall be used to determine the system's compliance in accordance with sub. (9). 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.

**(7)** 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)** Systems may apply to the department to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

**(9)** (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.

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(b) For systems which are conducting monitoring 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 system is out of compliance. If any one or more samples would cause the annual average to exceed an MCL, then the 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 system fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

(c) For systems which are monitoring annually, or less frequently, the 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 system 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 sub. (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) 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.

**(10)** Each public water system shall monitor during the month, quarter or year designated by the department during each compliance period.

**(11)** Analyses conducted to determine compliance with s. NR 809.11 shall be made in accordance with methods listed in s. NR 809.725 (1), Table A.

**(12)** 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 s. NR 809.725 (1), Table F.

**(13)** 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 |

**(14)** (a) The department may reduce the total number of samples a system shall analyze by allowing the use of compositing. Compositing shall only be permitted for entry points within a single 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 s. NR 809.725 (1) Table F has not been exceeded, the system 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 for each analytical method and MCLs for inorganic contaminants specified in this section and s. NR 809.11:

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**Detection Limits For Inorganic Contaminants**

| Contaminant | MCL (mg/L) | Methodology | Detection limit (mg/L) |
|---|---|---|---|
| Antimony | 0.006 | Atomic Absorption; Furnace<br>Atomic Absorption; Platform<br>ICP−Mass Spectrometry<br>Hydride−Atomic Absorption | 0.003<br>0.0008[5]<br>0.0004<br>0.001 |
| Arsenic | 0.010[6] | Atomic Absorption; Furnace<br>Atomic Absorption; Platform—Stabilized Temperature<br>Atomic Absorption; Gaseous Hydride<br>ICP−Mass Spectrometry | 0.001<br>0.0005[7]<br>0.001<br>0.0014[8] |
| Asbestos | 7 MFL[1] | Transmission Electron Microscopy | 0.01 MFL |
| Barium | 2 | Atomic Absorption; furnace technique<br>Atomic Absorption; direct aspiration<br>Inductively Coupled Plasma | 0.002<br>0.1<br>0.002 (0.001) |
| Beryllium | 0.004 | Atomic Absorption; Furnace<br>Atomic Absorption; Platform<br>Inductively Coupled Plasma[2]<br>ICP−Mass Spectrometry | 0.0002<br>0.00002[5]<br>0.0003<br>0.0003 |
| Cadmium | 0.005 | Atomic Absorption; furnace technique<br>Inductively Coupled Plasma | 0.0001<br>0.001 |
| Chromium | 0.1 | Atomic Absorption; furnace technique<br>Inductively Coupled Plasma | 0.001<br>0.007 (0.001) |
| Cyanide | 0.2 | Distillation, Spectrophotometric[3]<br>Distillation, Automated, Spectrophotometric[3]<br>Distillation, Selective Electrode[3]<br>Distillation, Amenable, Spectrophotometric[4] | 0.02<br>0.005<br>0.05<br>0.02 |
| Mercury | 0.002 | Manual Cold Vapor Technique<br>Automated Cold Vapor Technique | 0.0002<br>0.0002 |
| Nickel | xl | Atomic Absorption; Furnace<br>Atomic Absorption; Platform<br>Inductively Coupled Plasma[2]<br>ICP−Mass Spectrometry | 0.001<br>0.0006[5]<br>0.005<br>0.0005 |
| Nitrate | 10 (as N) | Manual Cadmium Reduction<br>Automated Hydrazine Reduction<br>Automated Cadmium Reduction<br>Ion Selective Electrode<br>Ion Chromatography | 0.01<br>0.01<br>0.05<br>1<br>0.01 |
| Nitrite | 1 (as N) | Spectrophotometric<br>Automated Cadmium Reduction<br>Manual Cadmium Reduction<br>Ion Chromatography | 0.01<br>0.05<br>0.01<br>0.004 |
| Selenium | 0.05 | Atomic Absorption; furnace<br>Atomic Absorption; gaseous hydride | 0.002<br>0.002 |
| Thallium | 0.002 | Atomic Absorption; Furnace<br>Atomic Absorption; Platform<br>ICP−Mass Spectrometry | 0.001<br>0.0007[5]<br>0.0003 |

[1] MFL = million fibers per liter >10 µm.

[2] Using a 2X pre−concentration step as noted in Method 200.7. Lower method detection limits may be achieved when using a 4X pre−concentration.

[3] Screening method for total cyanides.

[4] Measures "free" cyanides.

[5] Lower method detection limits are reported using stabilized temperature graphite furnace atomic absorption.

[6] The value for arsenic is effective January 23, 2006. Until then, the MCL is 0.05 mg/L.

[7] The method detection limit reported for EPA method 200.9 (Atomic Absorption; Platform—Stabilized Temperature) was determined using a 2X concentration step during sample digestion. The method detection limit determined for samples analyzed using direct analyses (i.e., no sample digestion) will be higher. Using multiple depositions, EPA Method 200.9 is capable of obtaining a method detection limit of 0.0001 mg/L.

[8] Using selective ion monitoring, EPA Method 200.8 (ICP–MS) is capable of obtaining a method detection limit of 0.0001 mg/L.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. Register, April, 1982, No. 316, eff. 5−1−82; am. (3) and (4), cr. (7), Register, August, 1989, No. 404, eff. 9−1−89; am. (6), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.12, r. and recr. Register, July, 1993, No. 451, eff. 8−1−93; am. (3) (intro.), (a) and (b), (6) (a), (9) (b) and (c), (12) and (13), cr. (14), Register, August, 1994, No. 464, eff. 9−1−94**;** am. (1) (a) and (b), (3) (a) and (b), (9) (b), Register, October, 1997, No. 502, eff. 11−1−97; am. (3) (a), (4) (a) and (b), (5) (a) and (13), Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (6) (b), r. (9) (e) Register November 2002 No. 563, eff. 12−1−02; CR 03−067: r. and recr. (3) (intro.), (4) (intro.), (5) (intro.) and (13), cr. (3) (g), am. (9) (b), (c) and (14) (d), cr. (14) (e) Register March 2004 No. 579, eff. 4−1−04; CR 04−061: cr. (9) (f) Register May 2005 No. 593, eff. 6−1−05.

**NR 809.13 Sodium monitoring, reporting and notification requirements. (1)** The supplier of water 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 will be collected and analyzed annually for systems utilizing surface water sources in whole or in part, and at least every 3 years for systems utilizing solely groundwater sources. The minimum number of samples required

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to be taken by the system shall be based on the number of plants used by the 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 supplier of water 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)** The supplier of water 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 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)** The supplier of water 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)** Analyses for sodium shall be performed as prescribed in s. NR 809.725 (1), Table E.

**Note:** A primary maximum contaminant level has not been established for sodium.

**History:** Cr. Register, April, 1982, No. 316, eff. 5−1−82; r. and recr. (4), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.13, am. (1), Register, July, 1993, No. 451, eff. 8−1−93.

**NR 809.14 Corrosivity monitoring — special characteristics. (1)** The supplier of water for a community water system shall collect samples from a representative entry point to the water distribution system for the purpose of analysis to determine the corrosivity characteristics of the water.

(a) The supplier shall collect 2 samples per plant for analysis for each plant using surface water sources wholly or in part or more if required by the department; one sample shall be collected during mid−winter and one during mid−summer. The supplier of the water shall collect one sample per plant for analysis for each plant using groundwater sources or more if required by the department. The minimum number of samples required to be taken by the system shall be based on the number of plants used by the 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.

(b) Determination of the corrosivity characteristics of the water shall include measurement of field pH, calcium hardness, alkalinity, temperature, total dissolved solids (total filterable residue), and calculation of the Langelier Index in accordance with sub. (3). The determination of corrosivity characteristics shall only include one round of sampling (2 samples per plant for surface water and one sample per plant for groundwater sources). However, the department may require more frequent monitoring as appropriate. In addition, the department may require monitoring for additional parameters which may indicate corrosivity characteristics, such as sulfates and chlorides. In certain cases, the Aggressive Index may be used instead of the Langelier Index; any request to use the Aggressive Index shall be made in writing to the department, and the department shall make this determination.

**(2)** The supplier of water shall report to the department the results of the analysis for the corrosivity characteristics within the first 10 days of the month following the month in which the sample results were received. If more frequent sampling is required by the department, the supplier may accumulate the data and shall report each value within the first 10 days of the month following the month in which analytical results of the last sample were received.

**(3)** Analyses conducted to determine the corrosivity of the water shall be made in accordance with methods listed in s. NR 809.725 (1), Table E.

**(4)** Suppliers of water for community water supply systems shall identify whether the following construction materials are present in their distribution system and report their findings to the department:

(a) Lead from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing.

(b) Copper from piping and alloys, service lines and home plumbing.

(c) Galvanized piping, service lines and home plumbing.

(d) Ferrous piping materials such as cast iron and steel.

(e) Asbestos cement pipe.

(f) Vinyl lined asbestos cement pipe.

(g) Coal tar lined pipes and tanks.

**(5)** When the water of a community water system is determined to have a Langelier Index value more corrosive than −1.0, the supplier of water shall sample the distribution system to determine the presence of corrosion products. Parameters to be evaluated shall be determined by the department and will vary with piping materials used in the distribution system.

**(6)** If sampling required in sub. (5) indicates the presence of corrosion products, or if the water of a community water system is determined to have a Langelier Index value more corrosive than −2.0, the department may require the supplier of water to implement corrosion−control measures.

**History:** Cr. Register, April, 1982, No. 316, eff. 5−1−82; am. (3), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.14, Register, July, 1993, No. 451, eff. 8−1−93.

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

| (a) Contaminant | MCL (mg/L) |
|---|---|
| Alachlor | 0.002 |
| Atrazine | 0.003 |
| Carbofuran | 0.04 |
| Chlordane | 0.002 |
| Dibromochloropropane | 0.0002 |
| 2,4−D | 0.07 |
| Endrin | 0.002 |
| Ethylene Dibromide | 0.00005 |
| Heptachlor | 0.0004 |
| Heptachlor epoxide | 0.0002 |
| Lindane | 0.0002 |
| Methoxychlor | 0.04 |
| Polychlorinated biphenyls (PCBs) | 0.0005 |
| Pentachlorophenol | 0.001 |
| Toxaphene | 0.003 |
| 2,4,5−TP | 0.05 |

| (b) Contaminant | MCL (mg/L) |
|---|---|
| Benzo[a]pyrene | 0.0002 |
| Dalapon | 0.2 |
| Di(2−ethylhexyl)adipate | 0.4 |
| Di(2−ethylhexyl)phthalate | 0.006 |
| Dinoseb | 0.007 |

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| | |
|---|---|
| Diquat | 0.02 |
| Endothall | 0.1 |
| Glyphosate | 0.7 |
| Hexachlorobenzene | 0.001 |
| Hexachlorocyclopentadiene | 0.05 |
| Oxamyl | 0.2 |
| Picloram | 0.5 |
| Simazine | 0.004 |
| 2,3,7,8−TCDD (Dioxin) | $3x10^{-8}$ |

**Note:** Water systems having fewer than 150 service connections begin monitoring for the contaminants listed in par. (b) in the January 1, 1996 − December 31, 1998 compliance period.

**(2)** The following are the BATs available for achieving compliance with the maximum contaminant levels for the organic chemicals 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 and,

(c) Oxidation for glyphosate.

**(3)** A public water system owner or operator 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).

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; cr. (3), Register, April, 1982, No. 316, eff. 5−1−82; am. title and (1) (intro.), r. (3), Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.20, r. and recr. Register, July, 1993, No. 451, eff. 8−1−93; am. Register, August, 1994, No. 464, eff. 9−1−94; am. (2) (b), Register, October, 1997, No. 502, eff. 11−1−97.

**NR 809.21 Synthetic organic contaminant sampling and analytical requirements. (1)** Owners or operators of 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 at every entry point to the distribution system which is representative of each well after treatment. Each sample shall be taken at the same entry point unless 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 points in the distribution system that are representative of each source after treatment. Each sample shall be taken at the same entry point unless conditions make another sampling location more representative of each source or treatment plant.

(c) If the system draws water from more than one source and the sources are combined before distribution, the 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.

**(2)** (a) Each community and non−transient, non−community water system shall take 4 consecutive quarterly samples for each contaminant listed in s. NR 809.20 every 3 years beginning with the initial compliance period.

**Note:** For the contaminants in s. NR 809.20 (1) (b), the initial compliance period is January 1993 − December 1995 for systems with 150 or more service connections and January 1996 − December 1998 for systems having fewer than 150 service connections.

(b) 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.

(c) Systems serving fewer than or equal to 3,300 persons 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)** Each community and non−transient non−community water system may apply to the department for a waiver from the requirements of sub. (2). A system shall reapply for a waiver for each compliance period.

**(4)** The department may grant a waiver 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 system. If a determination by the department reveals no previous use of the contaminant within the watershed or zone of influence, 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 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, transformers, etc.

**(5)** (a) If an organic contaminant listed in s. NR 809.20 is detected as defined by sub. (6) in any sample, then the system owner or operator shall monitor quarterly at each entry point which resulted in a detection.

(b) The department may decrease the quarterly monitoring requirement specified in par. (a) provided it has determined that the system is reliably and consistently below the MCL. 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.

(c) After the department determines the system is reliably and consistently below the MCL, the department may allow the system to monitor annually. Systems which monitor annually shall monitor during the quarter that previously yielded the highest analytical results.

(d) 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).

(e) 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.

**(6)** Detection as used in this section shall be defined as greater than or equal to the following concentrations for each contaminant.

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| Contaminant | Detection Limit (mg/L) |
|---|---|
| 1. Alachlor | 0.0002 |
| 2. Atrazine | 0.0001 |
| 3. Benzo[a]pyrene | 0.00002 |
| 4. Carbofuran | 0.0009 |
| 5. Chlordane | 0.0002 |
| 6. 2,4−D | 0.0001 |
| 7. Dalapon | 0.001 |
| 8. Dibromochloropropane | 0.00002 |
| 9. Di(2−ethylhexyl)adipate | 0.006 |
| 10.Di(2−ethylhexyl)phthalate | 0.006 |
| 11. Dinoseb | 0.0002 |
| 12. Diquat | 0.0004 |
| 13. Endothall | 0.009 |
| 14. Endrin | 0.00001 |
| 15. Ethylene dibromide | 0.00001 |
| 16. Glyphosate | 0.006 |
| 17. Heptachlor | 0.00004 |
| 18. Heptachlor epoxide | 0.00002 |
| 19. Hexachlorobenzene | 0.0001 |
| 20.Hexachlorocyclopentadiene | 0.0001 |
| 21. Lindane | 0.00002 |
| 22. Methoxychlor | 0.0001 |
| 23. Oxamyl | 0.002 |
| 24. Picloram | 0.0001 |
| 25. Polychlorinated biphenyls (PCBs as decachlorobiphenyls) | 0.0001 |
| 26. Pentachlorophenol | 0.00004 |
| 27. Simazine | 0.00007 |
| 28. Toxaphene | 0.001 |
| 29. 2,3,7,8−TCDD (Dioxin) | 0.000000005 |
| 30. 2,4,5−TP | 0.0002 |

**(7)** (a) If an organic contaminant listed in s. NR 809.20 is detected at a level exceeding the MCL in any sample, then the system owner or operator shall take a confirmation sample at each entry point which exceeded a MCL.

(b) Systems which exceed a MCL listed in s. NR 809.20 as determined by sub. (10) shall monitor quarterly. After a minimum of 4 quarterly samples show the system is in compliance and the department determines the system is reliably and consistently below the MCL as specified in sub. (10), the system shall monitor at the frequency specified in sub. (5) (c).

**(8)** 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 sub. (10). 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)** (a) The department may reduce the total number of samples a system shall analyze by allowing the use of compositing. 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. Compositing is only permitted at entry points within a single 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 duplicates of the original sample taken from each entry point used in the composite are available, the system may use these duplicates instead of resampling. The duplicate shall be analyzed and the results reported to the department within 14 days of collection.

**(10)** (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 system is in violation of the MCL.

(b) For 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 system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately.

(c) If monitoring is conducted annually or less frequently, the 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 system fails to collect the required number of samples, compliance shall be based on the total number of samples collected.

**(11)** Analysis for the organic contaminants listed in s. NR 809.20 shall be conducted using the methods prescribed in s. NR 809.725 (1), Table B.

**(12)** Analysis for PCBs shall be conducted as follows:

(a) Each system which monitors for PCBs shall analyze each sample using either Method 505 or Method 508 as specified in s. NR 809.725 (1), Table B.

(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.

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

**(14)** If monitoring data collected after January 1, 1990 are generally consistent with the requirements in this section, then the department may allow systems to use that data to satisfy the monitoring requirements for the initial compliance period beginning January 1, 1993.

**(15)** The department may increase the required monitoring frequency, where necessary, to detect variations within the system. Examples of variations include fluctuations in concentration due to seasonal use or changes in water source.

**(16)** The department may determine compliance or initiate enforcement action based upon analytical results and other infor-

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mation complied by their sanctioned representatives and agencies.

**(17)** Each public water system shall monitor during the month, quarter or year designated by the department within each compliance period.

**(18)** All new systems or 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 (1) in accordance with the requirements in this section. The system shall also comply with the initial sampling frequencies specified by the department to ensure a system can demonstrate compliance with the MCLs. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am., Register, April, 1982, No. 316, eff. 5−1−82; am. (4) and (5), Register, December, 1982, No. 324, eff. 1−1−83; am. title, (3) and (5), Register, August, 1989, No. 404, eff. 9−1−89; am. (4), r. (5) and (6), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.21, r. and recr. Register, July, 1993, No. 451, eff. 8−1−93; am. (2) (a), (6), (9) (a) and (13), Register, August, 1994, No. 464, eff. 9−1−94**;** am. (9) (b), Register, October, 1997, No. 502, eff. 11−1−97;am. (13), Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: r. (10) (e) Register November 2002 No. 563, eff. 12−1−02; CR 03−067: am. (10) (a), cr. (10) (e) and (18) Register March 2004 No. 579, eff. 4−1−04.

**NR 809.22 Total trihalomethane maximum contaminant level.** The maximum contaminant level of 0.10 mg/L for total trihalomethanes, the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform), and trichloromethane (chloroform), applies to community water systems using surface water or ground water under the direct influence of surface water which serve a population of 10,000 people or more until December 31, 2001. This level applies to community water systems that use only ground water not under the direct influence of surface water and serve a population of 10,000 people or more until December 31, 2003. After December 31, 2003, this section is no longer applicable.

**Note:** Compliance with the maximum contaminant level for total trihalomethanes is calculated pursuant to s. NR 809.23.

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.22 and am., Register, July, 1993, No. 451, eff. 8−1−93; r. and recr., Register, December, 2000, No. 540, eff. 1−1−01; CR 02−147: am. Register October 2003 No.574, eff. 11−1−03.

**NR 809.23 Total trihalomethanes — sampling and analytical requirements. (1)** The supplier of water for a community water system which serves a population of 10,000 or more individuals and which adds a disinfectant (oxidant) to the water shall analyze for total trihalomethanes (TTHMs) in accordance with this section. For the purpose of this section, the minimum number of samples required to be taken by the system shall be based on the number of plants used by the 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. All samples required during an established monitoring period shall be collected within a 24−hour period.

**(2)** (a) For all community water systems utilizing surface water sources in whole or in part, and for all community water systems utilizing only groundwater sources that have not been determined by the department to qualify for the monitoring requirements of sub. (3), analyses for TTHMs shall be performed at quarterly intervals on at least 4 water samples for each plant used by the system. At least 25% of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system. The remaining 75% shall be taken at representative locations in the distribution system, taking into account the number of persons served, different sources of water and different treatment methods employed. The results of all analyses per quarter shall be arithmetically averaged and reported to the department within 30 days of the system's receipt of such results. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in sub. (5).

(b) The monitoring frequency required by par. (a) may be reduced by the department to a minimum of one sample analyzed for TTHMs per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon a determination by the department that the data from at least one year of monitoring in accordance with par. (a) and local conditions demonstrate that TTHM concentrations will be consistently below the maximum contaminant level. If at any time during which the reduced monitoring frequency prescribed under this paragraph applies, the results from any analysis exceed 0.10 mg/l of TTHMs and such results are confirmed by at least one check sample taken promptly after such results are received, or if the system makes any significant change to its source of water or treatment program, the supplier of water shall immediately begin monitoring in accordance with the requirements of par. (a), which monitoring shall continue for at least one year before the frequency may be reduced again. At the option of the department, a system's monitoring frequency may be increased above the minimum in those cases where it is necessary to detect variations of TTHM levels within the distribution system.

**(3)** (a) The supplier of water for a community water system utilizing only groundwater sources may seek to have the monitoring frequency required by sub. (2) (a) reduced to a minimum of one sample for maximum TTHM potential per year for each plant used by the system, taken at a point in the distribution system reflecting maximum residence time of the water in the system. The supplier of water shall submit to the department the results of at least one sample analyzed for maximum TTHM potential for each plant used by the system, taken at a point in the distribution system reflecting the maximum residence time of the water in the system, taken at a point in the distribution system reflecting the maximum residence time of the water in the system. The system's monitoring frequency may only be reduced upon a determination by the department that, based upon the data submitted by the system, the system has a maximum TTHM potential of less than 0.10 mg/l and that, based upon an assessment of the local conditions of the system, the system is not likely to approach or exceed the maximum contaminant level for total TTHMs. The results of all analyses shall be reported to the department within 30 days of the system's receipt of such results. All samples collected shall be used for determining whether the system must comply with the monitoring requirements of sub. (2), unless the analytical results are invalidated for technical reasons. Sampling and analyses shall be conducted in accordance with the methods listed in sub. (5).

(b) If at any time during which the reduced monitoring frequency prescribed under par. (a) applies, the results from any analysis taken by the supplier of water for maximum TTHM potential are equal to or greater than 0.10 mg/l and such results are confirmed by at least one check sample taken promptly after such results are received, the system shall immediately begin monitoring in accordance with the requirements of sub. (2) and such monitoring shall continue for at least one year before the frequency may be reduced again. In the event of any significant change to the system's raw water or treatment program, the supplier of water shall immediately analyze an additional sample for maximum TTHM potential taken at a point in the distribution system reflecting maximum residence time of the water in the system for the purpose of determining whether the system must comply with the monitoring requirements of sub. (2). At the option of the department, monitoring frequencies may be increased above the minimum in those cases where this is necessary to detect variation of TTHM levels within the distribution system.

**(4)** Compliance with s. NR 809.22 shall be determined based on a running annual average of quarterly samples collected by the system as prescribed in sub. (2) (a) or (b). If the average of samples covering any 12 month period exceeds the maximum contaminant level, the supplier of water shall report to the department under s. NR 809.80 and notify the public under subch. X. Monitoring after the maximum contaminant level is exceeded shall be at a fre-

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quency designated by the department and shall continue until a monitoring schedule as a condition to a variance under s. NR 809.91, conditional waiver under s. NR 809.90 or enforcement action becomes effective.

**(5)** Sampling and analyses made under this section shall be conducted as prescribed in s. NR 809.725 (1), Table B.

**(6)** Before the supplier of water for a community water system makes any significant modifications to its existing treatment process for the purposes of achieving compliance with s. NR 809.22, such supplier shall submit and obtain department approval of a detailed plan setting forth its proposed modification and those safeguards that it will implement to ensure that the bacteriological quality of the drinking water provided by such system will not be adversely affected by such modification. Each system shall comply with the provisions set forth in the department approved plan. At a minimum, a department approved plan shall require the supplier of water for a system modifying its disinfection practice to:

(a) Evaluate the water system for sanitary defects and evaluate the source water for biological quality;

(b) Evaluate its existing treatment practices and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system;

(c) Such data shall include the results from monitoring for coliform and fecal coliform bacteria, fecal streptococci, standard plate counts at 35°C and 20°C, phosphate, ammonia nitrogen and total organic carbon. Virus studies may be required where source waters are heavily contaminated with sewage effluent;

(d) Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water (example: when chloramines are introduced as disinfectants or when pre−chlorination is being discontinued). Additional monitoring may also be required by the department for chlorate, chlorite and chlorine dioxide if chlorine dioxide is approved as a disinfectant. Standard plate count analyses may also be required by the department as appropriate before and after any modifications; and

(e) Include in the plan provisions to maintain an active disinfectant residual throughout the distribution system at all times during and after the modification.

**History:** Cr. Register, April, 1982, No. 316, eff. 5−1−82; renum. to be NR 809.23 and am. (4), Register, August, 1989, No. 404, 9−1−89; r. and recr. (5), am. (6) (intro.), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.23, Register, July, 1993, No. 451, eff. 8−1−93; am. (1), Register, December, 2000, No. 540, eff. 1−1−01.

**NR 809.24 Volatile organic contaminant maximum contaminant levels and BATS. (1)** The following maximum contaminant levels for volatile organic (VOC) contaminants 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 |
| o−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)** 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, and

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

**(3)** A public water system owner or operator 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).

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.24 and am. (1) and (2) (a), cr. (3), Register, July, 1993, No. 451, eff. 8−1−93; am. (1) and (2) (b), Register, August, 1994, No. 464, eff. 9−1−94; am. (2) (a), Register, October, 1997, No. 501, eff. 11−1−97.

**NR 809.25 Volatile organic contaminant sampling and analytical requirements. (1)** Owners or operators of 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 entry point unless conditions make another sampling 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 in the distribution system that are representative of each source after treatment. Each sample shall be taken at the same entry point unless conditions make another sampling location more representative of each source, treatment plant or within the distribution system.

(c) If the system draws water from more than one source and the sources are combined before distribution, the 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.

**(2)** Each community and non−transient non−community water system owner or operator shall take 4 consecutive quarterly samples for each VOC contaminant specified in s. NR 809.24 during each compliance period, beginning with the initial compliance period.

**(3)** If the initial monitoring for VOC contaminants listed in s. NR 809.24 as allowed in sub. (19) has been completed by December 31, 1992 and the analysis did not detect any VOC contaminant specified in s. NR 809.24, then the system owner or operator shall take one sample annually beginning January 1, 1993.

**(4)** After a minimum of 3 years of annual sampling, the department may allow groundwater systems with no previous detection of any VOC contaminant specified in s. NR 809.24 to take one sample during each compliance period.

**(5)** Each community and 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 subs. (3) and (4) after completing the initial monitoring. For the purposes of this section, detection is defined as >0.0005 mg/l, except for vinyl chloride for which detection is defined as

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>0.0003 mg/L. A waiver shall be effective for no more than 6 years or 2 compliance periods.

**(6)** The department may grant a waiver 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 system. If a determination by the department reveals no previous use of the contaminant within the watershed or zone of influence, 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 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 system to a larger system.

5. How well the water source is protected against contamination such as whether it is a surface or groundwater system. Groundwater systems shall consider factors such as depth of the well, the type of soil and wellhead protection. Surface water systems shall consider watershed protection.

**(7)** As a condition of the waiver a groundwater system shall take one sample at each entry point during the time the waiver is effective, and update its vulnerability assessment considering the factors listed in sub. (6). Based on this vulnerability assessment, the department shall reconfirm that the system is non−vulnerable. If the department does not make this reconfirmation within 3 years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in sub. (3).

**(8)** Each community and non−transient non−community surface water system which does not detect a contaminant specified in s. NR 809.24 may apply to the department for a waiver from the requirements of sub. (3) after completing initial monitoring. Systems meeting this criteria shall be determined by the department to be non−vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the department.

**(9)** If vinyl chloride is detected at a level exceeding 0.0003 mg/L, or other VOC contaminant specified in s. NR 809.24 is detected at a level exceeding 0.0005 mg/1 in any sample, then:

(a) The system shall monitor quarterly at each entry point which resulted in a detection.

(b) The department may decrease the quarterly monitoring requirement specified in par. (a) provided it has determined that the system is reliably and consistently below the MCL. 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.

(c) If the department determines that the system is reliably and consistently below the MCL, the department may allow the system to monitor annually. Systems which monitor annually shall monitor during the quarter which previously yielded the highest analytical result.

(d) 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. (5).

**(10)** If a VOC contaminant specified in s. NR 809.24 is detected at a level exceeding the MCL in any sample, then:

(a) The system shall take a confirmation sample at each entry point which exceeded a MCL.

(b) A system which exceeds a MCL listed in s. NR 809.24 as determined under sub. (13) shall monitor quarterly. After a minimum of 4 consecutive quarterly samples which show the system is in compliance as specified in sub. (13), and the department determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in sub. (9) (c).

**(11)** 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 sub. (13).

**(12)** (a) The department may reduce the total number of samples a system shall analyze by allowing the use of compositing. Compositing shall only be permitted for entry points within a single 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 and analyzed within 14 days of sample collection according to the procedures in s. NR 809.725 (2) and (3).

(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 system may use these instead of resampling. The duplicate shall be analyzed and the results reported to the department within 14 days of collection.

**(13)** (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 system is in violation of the MCL.

(b) For systems which are conducting monitoring 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 system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to exceed the MCL, the system is out of compliance immediately.

(c) If monitoring is conducted annually, or less frequently, the 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 system 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).

(f) 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 system to give public notice to only that area served by that portion of the system which is out of compliance.

**(14)** The department may increase monitoring requirements when necessary to detect contaminant variations within a system.

**(15)** Analyses under this section shall be conducted using the methods prescribed in s. NR 809.725 (1), Table B. Samples shall be collected using the containers, preservative and holding times specified in s. NR 809.725 (1), Table G.

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**(16)** Analyses under this section shall only be conducted by laboratories that have received certification by EPA or certified under ch. NR 149.

**(17)** Each certified laboratory shall determine the method detection limit (MDL) at which it is capable of detecting VOCs as defined under 40 Code of Federal Regulations, Part 136, Appendix B. The maximum acceptable MDL is 0.0005 mg/L for all VOCs except vinyl chloride, which is 0.0003 mg/L. These are the detection concentrations for purposes of this section.

**(18)** The department may increase monitoring requirements when necessary to detect contaminant variations within a system.

**(19)** The department may allow the use of monitoring data collected after January 1, 1988 for purposes of monitoring compliance. If the data are generally consistent with the other requirements in this section, the department may use a single sample rather than 4 quarterly samples to satisfy the initial monitoring requirement of sub. (2).

**(20)** Each public water system shall monitor during the month, quarter or year designated by the department within each compliance period.

**(21)** The department may determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

**(22)** All new systems or 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 809.24 (1) in accordance with the requirements in this section. The system shall also comply with the initial sampling frequencies specified by the department to ensure a system can demonstrate compliance with the MCLs. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; am. (7) (a) 3. and (b) 3., (c), (8), r. and recr. (9), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.25, r. and recr. Register, July, 1993, No. 451, eff. 8−1−93; am. (12) (a), Register, August, 1994, No. 464, eff. 9−1−94; am. (2), (12) (c), (16) and (17), Register, October, 1997, No. 502, eff. 11−1−97; CR 03−067: am. (13) (a), renum. (13) (d) and (e) to be (13) (e) and (f), cr. (13) (d) and (22) Register March 2004 No. 579, eff. 4−1−04.

**NR 809.26 Special monitoring, reporting, and public notification for selected organic contaminants and sulfate. (1)** (a) Suppliers of water having community or non−transient, non−community water systems shall monitor for the contaminants listed in par. (e) by the date specified in Table 1:

**Table 1**
**Monitoring Schedule by System Size**

| Number of persons served | Monitoring to begin no later than |
|---|---|
| Over 10,000 | Jan. 1, 1988 |
| 3,300 to 10,000 | Jan. 1, 1989 |
| Less than 3,300 | Jan. 1, 1991 |

[1] A trihalomethane (THM). Monitoring results for total THMs required under s. NR 809.23 do not comply with this section because the samples are collected in the distribution system.

(b) Surface water systems shall be sampled at points in the distribution system representative of each water system source or at 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) Suppliers of water having community water systems or non−transient, non−community water systems shall monitor for the following contaminants at the discretion of the department:

Chloroform[1]
Bromoform[1]
Chlorodibromomethane[1]
Bromodichloromethane[1]
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

[1] A trihalomethane (THM). Monitoring results for total THMs required under s. NR 809.23 do not comply with this section because the samples are collected in the distribution system.

(f) Analysis under this section shall be conducted using the methods prescribed in s. NR 809.725 (1), Table B.

(g) Analysis under this section shall only be conducted by laboratories that have received approval by the U.S. environmental protection agency or are certified under ch. NR 149.

(h) Public water systems may use monitoring data collected any time after January 1, 1983 to meet the requirements for unregulated monitoring, provided that the monitoring program was consistent with the requirements of this section.

(i) Suppliers of water having a community water system or a non−transient, non−community water system shall repeat the monitoring required in this subsection as specified by the department.

**(2)** (a) The requirements of this subsection only apply to the contaminants listed in sub. (1).

(b) Any supplier of water having a community water system or non−transient, non−community water system who is required to monitor under sub. (1) shall send a copy of the results of such

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monitoring within 30 days of receipt and any public notice under par. (c) to the department.

(c) The supplier of water shall notify persons served by the system of the availability of the results of sampling under sub. (1) by including a notice in the first set of water bills issued by the system after the receipt of the results or written notice within 3 months. The notice shall identify a person and supply the telephone number to contact for information on the monitoring results.

**(3)** Monitoring for sulfate and the contaminants listed in par. (e) shall be conducted as follows:

(a) Suppliers of water for community and non−transient, non−community water systems shall take 4 consecutive quarterly samples at each entry point for the organic contaminants listed in par. (j) and report the results to the department.

(b) Suppliers of water for community or non−transient, non−community water systems shall take one sample at each entry point for sulfate and report the results to the department.

(c) Each community and non−transient non−community water system owner may apply to the department for a waiver from the requirements of pars. (a) and (b).

(d) The department may grant a waiver from the requirements of par. (a) based on the criteria specified in s. NR 809.21 (4). The department may grant a waiver from the requirement of par. (b) if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

(e) 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 entry point unless conditions make another sampling location more representative of each source or treatment plant.

(f) 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 in the distribution system that are representative of each source after treatment. Each sample shall be taken at the same entry point unless conditions make another sampling location more representative of each source or treatment plant.

(g) If the system draws water from more than one source and the sources are combined before distribution, the 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.

(h) The department may require a confirmation sample for positive or negative results.

(i) The department may reduce the total number of samples a system shall analyze by allowing the use of compositing. Compositing shall only be permitted at entry points within a single system. Composite samples from a maximum of 5 entry points are allowed. Compositing of samples shall be done in the laboratory and the composite sample shall be analyzed within 14 days of collection.

(j) List of unregulated organic contaminants

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

(k) Instead of performing the monitoring required by this subsection, a community water system or non− transient non−community water system serving fewer than 150 service connections may send a letter to the department stating that the system is available for sampling. This letter shall be sent to the department by January 1, 1994. The system may not send such samples to the department unless requested to do so by the department.

**(4)** Analyses under this section shall be conducted using the methods prescribed in s. NR 809.725 (1), Tables A and B.

**(5)** In lieu of MCLs and monitoring for acrylamide and epichlorohydrin, the following treatment techniques and reporting are required. Each 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 drinking water systems, 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.

Suppliers of water may rely on certification from manufacturers or third parties, as approved by the department

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; r. and recr. (1) (g), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.26 and am. (1) (e), r. (1) (f), renum. (1) (g) to (k) to be (1) (f) to (j) and am. (1) (f), (g) and (j), cr. (3) to (5), Register, July, 1993, No. 451, eff. 8−1−93; am. (12) (a), Register, August, 1994, No. 464, eff. 9−1−94**;** correction in (3) (d) made under s. 13.93 (2m) (b) 7., Stats., Register, October, 1997, No. 501; am. (1) (e), (3) (intro.), (a) and (b), r. (1) (i), renum. (1) (j) to be (1) (i) and am., Register, December, 2000, No. 540, eff. 1−1−01; correction in (3) (a) made under s. 13.93 (2m) (b) 7., Stats., Register November 2002 No. 563; CR 02−147: am. (1) (e), renum. (3) (L) to be (3) (k) Register October 2003 No. 574, eff. 11−1−03.

**NR 809.30 Microbiological contaminant maximum contaminant levels.** The following are the maximum contaminant levels for coliform bacteria applicable to public water systems.

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

(a) For a 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 system is in compliance with the MCL for total coliforms.

(b) For a 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 system is in compliance with the MCL for total coliforms.

**(2)** 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. X, this is a violation that may pose an acute risk to health.

**(3)** 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 system is required to monitor for total coliforms.

**(4)** The supplier of water shall initiate definitive action to identify the cause of the positive bacteriological sample results and to eliminate potential health hazards which may exist in the system when monitoring pursuant to s. NR 809.31 (1) or (2) shows the presence of any coliform organisms.

**(5)** 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)** 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):

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(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 ground water using strong oxidants such as chlorine, chlorine dioxide or ozone; or

(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.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (2) and (4), Register, April, 1982, No. 316, eff. 5−1−82; correction in (intro.) made under s. 13.93 (2m) (b) 7., Stats., Register, October, 1985, No. 358; am. (intro.) and (4), Register, August, 1989, No. 404, eff. 9−1−89; r. and recr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.30, Register, July, 1993, No. 451, eff. 8−1−93; **CR 07−025: am. (1) (b) and (3) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.31 Microbiological contaminant sampling and analytical requirements. (1)** ROUTINE MONITORING. (a) Suppliers of water 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 system. 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 water system to be supplied solely by a protected ground water source and free of sanitary defects, 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 in no case shall it be reduced to less than one per calendar quarter.

(c) The supplier of water 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 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:

1. A non−community water system using only ground water and serving 1,000 persons per day or fewer shall monitor each calendar quarter that the system provides water to the public, except that the department may reduce the monitoring frequency, in writing, if a sanitary survey shows that the system is free of sanitary defects. In no case may the monitoring frequency be reduced to less than once per year.

2. A non−community water system using only ground water and serving on average more than 1,000 persons per day for any month shall monitor at the same frequency as a like−sized community water system, as specified in par. (b) 1., except that the department may reduce the monitoring frequency, in writing, for any month the average daily population served is less than 1,000 persons per day.

3. A non−community water system using ground water under the direct influence of surface water as defined in s. NR 809.04, in total or in part, shall monitor at the same frequency as a like−sized community municipal system, as specified in par. (b) 1. The system shall begin monitoring at this frequency beginning 6 months after the department determines that the ground water source is under the direct influence of surface water.

(e) Public water systems shall collect samples at regular time intervals throughout the month, except that a system which uses ground water and serves 1,000 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

(f) Special purpose samples such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement or repair, may not be used to determine compliance with the MCL for total coliforms in s. NR 809.30. Repeat samples taken pursuant to sub. (2) are not considered special purpose samples, and shall be used to determine compliance with the MCL for total coliforms in s. NR 809.30.

(g) A public water system that uses groundwater under the direct influence of surface water as defined in s. NR 809.04 (34),

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and does not provide filtration in compliance with s. NR 809.76, shall collect at least one sample in the distribution system near the first service connection each day one or more turbidity measurements of the source water obtained as specified in s. NR 809.78 (1) (b), exceeds 1 NTU. This sample shall be analyzed for the presence of total coliforms. The system owner or operator shall collect this coliform sample within 24 hours of the first exceedance unless the department determines that the system, for logistical reasons beyond its control, cannot have the sample analyzed within 30 hours of collection. Results from this coliform monitoring shall be included in determining compliance with the MCL for total coliforms in s. NR 809.30.

**(2)** REPEAT MONITORING. (a) If a routine sample is total coliform−positive, the water supplier of a public water system shall collect a set of repeat samples within 24 hours of being notified of the positive result. A system which is required to collect more than one routine sample/month shall collect no fewer than 3 repeat samples for each total coliform−positive sample found. A system which is required to collect one routine sample/month or fewer shall collect no fewer than 4 repeat samples for each total coliform−positive sample found. The department may extend the 24−hour limit on a case−by−case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of an extension, the department will specify how much time the water supplier has to collect repeat samples.

(b) The water supplier shall collect at least one repeat sample from the sampling tap where the original total coliform−positive sample was taken, and at least one repeat sample at a tap within 5 service connections upstream and at least one repeat sample at a tap within 5 service connections downstream of the original sampling site. If a total coliform−positive sample is at the end of the distribution system, or one away from the end of the distribution system, the department may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.

(c) The water supplier shall collect all repeat samples on the same day, except that the department may allow a system with a single service connection to collect the required set of repeat samples over a 4 day period or to collect a larger volume repeat sample in one or more sample containers of any size, as long as the total volume collected is at least 400 ml (300 ml for systems which collect more than one routine sample/month.)

(d) If one or more repeat samples in the set is total coliform−positive, the public water supplier shall collect an additional set of repeat samples in the manner specified in pars. (a) to (c). The additional set of samples shall be collected within 24 hours of being notified of the positive result, unless the department extends the limit as provided in par. (a). The water supplier shall repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the MCL for total coliforms in s. NR 809.30 has been exceeded and notifies the department as specified in s. NR 809.80 (2).

(e) If a water supplier collecting fewer than 5 routine samples/month has one or more total coliform−positive samples and the department does not invalidate the samples under sub. (3), the supplier shall collect at least 5 routine samples during the next month the system provides water to the public, except that the department may waive this requirement if the conditions of subd. 1. or 2. are met. The requirement for a water supplier to collect repeat samples in pars. (a) to (d) is not waivable.

1. The department may waive the requirement to collect 5 routine samples the next month the system provides water to the public if the department performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit shall be sufficiently detailed to allow the department to determine whether additional monitoring or any corrective action is needed.

2. The department may waive the requirement to collect 5 routine samples the next month the system provides water to the public if the department has determined why the sample was total coliform−positive and establishes that the water supplier has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. In this case, the decision to waive the following month's additional monitoring requirement will be documented in writing, signed by a qualified department official, and made available to the public. The written documentation shall describe the specific cause of the total coliform−positive sample and what action the water supplier has taken or will take to correct this problem. The requirement to collect 5 routine samples the next month the system provides water to the public is not waivable solely on the grounds that all repeat samples are total coliform−negative. The system owner or operator shall still collect at least one routine sample before the end of the next month it serves water to the public and use it to determine compliance with the MCL for total coliforms in s. NR 809.30, unless the department has determined that the system corrected the contamination problem before the system collected the set of repeat samples required in pars. (a) to (d) and all repeat samples were total coliform negative.

(f) After a water supplier collects a routine sample and before learning the results of the analysis of that sample, if the water supplier collects another routine sample from within 5 adjacent service connections of the initial sample, and the initial sample after analysis is found to contain total coliforms, then the system may count the subsequent sample as a repeat sample instead of as a routine sample.

(g) Results of all routine and repeat samples not invalidated by the department shall be included in determining compliance with the MCL for total coliforms in s. NR 809.30 and the minimum routine requirements of this section.

**(3)** INVALIDATION OF TOTAL COLIFORM SAMPLES. (a) A total coliform−positive sample invalidated under this subsection does not count towards meeting the minimum monitoring requirements of this section.

(b) The department may invalidate a total coliform−positive sample only if the conditions of subd. 1., 2. or 3. are met.

1. The certified laboratory establishes that improper sample analysis caused the total coliform−positive result.

2. The department, on the basis of the results of repeat samples collected as required by sub. (2) (a) to (d), determines that the total coliform−positive sample resulted from a domestic or other non−distribution system plumbing problem. No sample may be invalidated by the department on the basis of repeat sample results unless all repeat samples collected at the same tap as the original total coliform−positive sample are also total coliform−positive, and all repeat samples collected within 5 service connections of the original tap are total coliform−negative (e.g., the department will not invalidate a total coliform−positive sample on the basis of repeat samples if all the repeat samples are total coliform−negative, or if the public water system has only one service connection.)

3. The department has substantial grounds to believe that a total coliform−positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system owner or operator shall still collect all repeat samples required under sub. (2) (a) to (d), and use them to determine compliance with the MCL for total coliforms in s. NR 809.30. To invalidate a total coliform−positive sample under this paragraph, the decision with the rationale for the decision shall be documented in writing, approved by a qualified department official and available to the public for inspection. The document shall state the specific cause of the total coliform−positive sample, and what action the system owner or operator has taken or will take, to correct this problem. The department may not invalidate a total

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coliform−positive sample solely on the grounds that all repeat samples are total coliform−negative.

(c) A laboratory shall invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence−Absence Coliform Test, or exhibits confluent growth or produces colonies too numerous to count with an analytical method using a membrane filter (e.g., Membrane Filter Technique). If a laboratory invalidates a sample because of such interference, the system owner or operator shall collect another sample from the same location as the original sample within 24 hours of being notified of the interference problem, and have it analyzed for the presence of total coliforms. The system owner or operator shall continue to re−sample within 24 hours and have the samples analyzed until it obtains a valid result. The department may waive the 24 hour time limit on a case−by−case basis.

**(4)** FECAL COLIFORMS/ESCHERICHIA COLI (E. COLI) TESTING. (a) If any routine or repeat sample is total coliform−positive, the system owner or operator shall analyze that total coliform−positive culture medium to determine if fecal coliforms are present, except that the system may test for E. Coli in lieu of fecal coliforms. If fecal coliforms or E. Coli are present, the system owner or operator shall notify the department by the end of the day when the system is notified of the test result, unless the system is notified of the result after normal department business hours, in which case the system owner or operator shall notify the department before the end of the next business day.

(b) The department may allow a public water system, on a case−by−case basis, to forgo fecal coliform or E. Coli testing on a total coliform−positive sample if that system owner or operator assumes that the total coliform−positive sample is fecal coliform−positive or E. Coli−positive. Accordingly, the system owner or operator shall notify the department as specified in par. (a) and the provisions of s. NR 809.30 (2) apply.

**(5)** ANALYTICAL METHODOLOGY. (a) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 ml.

(b) Public water system owners or operators need only determine the presence or absence of total coliforms; a determination of total coliform density is not required.

**Note:** The coliform density may, however, be helpful in selecting a remedial option.

(c) Beginning January 1, 2001, samples collected to determine compliance with s. NR 809.30 (1) shall be analyzed by the enzyme substrate test method.

(d) The department may approve, on a case−by−case basis, other methods as prescribed in s. NR 809.725 (1), Table C for use in determining compliance with s. NR 809.30 (1).

**(6)** SANITARY SURVEYS. (a) All public water systems shall undergo a sanitary survey every 5 years. The department will review the results of each sanitary survey to determine whether the existing monitoring frequency is adequate and what additional measures, if any, the system needs to undertake to improve drinking water quality.

(b) Sanitary surveys shall be performed by the department or an agent approved by the department. If the department requests a system owner to have a sanitary survey performed, the system owner is responsible for ensuring the survey is completed.

**(7)** (a) When a sample collected under subs. (1) to (4) exceeds a maximum contaminant level in s. NR 809.30 (1) or (2), the supplier of water shall report the violation to the department no later than the end of the next business day after it learns of the violation, and shall provide public notice of the violation in accordance with subch. X.

(b) A public water supplier who has failed to comply with a coliform monitoring requirement, shall report the monitoring violation to the department within 10 days after discovering the violation, and notify the public as specified in subch. X.

**(8)** In addition to sampling from the distribution system, each supplier of water for a system providing disinfection shall obtain at least one sample every 3 months from each well prior to the point of any chemical addition. For waterworks which have more than one well in the same location and utilizing the same aquifer, only one of the wells may be sampled each time on an alternating basis. If a well has a high potential for contamination, the department may, in individual cases, require more frequent sampling.

**(9)** At surface water facilities, the microbiological quality of the water shall be monitored sufficiently to maintain quality control of the treatment process. Each plant shall establish a schedule which will be subject to review and modification by the department.

**Note:** Generally, membrane filter or 5 tube fermentation tests and heterotrophic plate counts of the raw, settled and finished water on an established schedule will be necessary to meet this requirement.

**(10)** At all waterworks which have a potential for high total bacteria levels because of the water quality, the method of treatment, chemical addition or other cause, the department may require heterotrophic plate counts pursuant to an established schedule. Analyses shall be conducted in accordance with the analytical requirements in s. NR 809.725 (1), Table C.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (2) (a) (intro.) and (b) and (3), renum. (4) to (9) to be (5) to (10) and am. (5) to (9), cr. (4), Register, April, 1982, No. 316, eff. 5−1−82; am. (7), Register, December, 1982, No. 324, eff. 1−1−83; am. (5) (a), (b) (intro.) and 2., (c) and (10), Register, August, 1989, No. 404, eff. 9−1−89; r. and recr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.31 and am. (1) (b) 1., (c), (d) 1., (2) (e) 2., (g), (3) (a), (b) 1., (5) (c) and (10), cr. (1) (g), Register, July, 1993, No. 451, eff. 8−1−93; am. (2) (d), Register, August, 1994, No. 464, eff. 9−1−94; am. (1) (d) 1. and 2., (5) (c) and (6) (a), cr. (5) (d), Register, December, 2000, No. 540, eff. 1−1−01; correction in (1) (g) made under s. 13.93 (2m) (b) 7., Stats., Register November 2002 No. 563; **CR 07−025: am. (6) (a) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.50 Maximum contaminant levels, compliance dates and best available technologies for radionuclides.** The following are the maximum contaminant levels, compliance dates and best available technologies for radium−226, radium−228 and gross alpha particle radioactivity:

**(1)** MAXIMUM CONTAMINANT LEVELS FOR RADIONUCLIDES. The following are the maximum contaminant levels for radium−226, radium−228 and gross alpha particle radioactivity:

(a) *MCL for combined radium−226 and radium−228.* The maximum contaminant level for combined radium−226 and radium−228 is 5 pCi/l. The combined radium−226 and radium−228 value is determined by the addition of the results of the analysis for radium−226 and the analysis for radium−228.

(b) *MCL for gross alpha particle activity, excluding radon and uranium.* The maximum contaminant level for gross alpha particle activity, including radium−226 but excluding radon and uranium, is 15 pCi/l.

(c) *MCL for uranium.* The maximum contaminant level for uranium is 30 ug/l.

**(2)** COMPLIANCE DATES FOR COMBINED RADIUM−226 AND RADIUM−228, GROSS ALPHA PARTICLE ACTIVITY, GROSS BETA PARTICLE AND PHOTON RADIOACTIVITY AND URANIUM. Community water systems shall comply with the MCLs listed in sub. (1) and with s. NR 809.51 (1) beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of ss. NR 809.50 and 809.51. Compliance with reporting requirements for the radionuclides under appendix A to subch. VII is required on December 8, 2003.

**(3)** BEST AVAILABLE TECHNOLOGIES (BATS) FOR RADIONUCLIDES. The department identifies, as indicated in the following table, the best available technology for achieving compliance with the maximum contaminant levels for combined radium−226 and radium−228, uranium, gross alpha particle activity and beta par-

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ticle and photo radioactivity. A community water system that must treat to reduce radionuclide levels below the MCLs specified in sub. (1) or s. NR 809.51 shall achieve compliance using one of the methods listed in Table B, Table C or Table D.

**Table B**
**BAT for Combined Radium−226 and Radium−228, Uranium, Gross Alpha Particle Activity, and Beta Particle and Photon Radioactivity**

| Contaminant | BAT |
|---|---|
| 1. Combined radium−226 and radium−228 | Ion exchange, reverse osmosis, lime softening |
| 2. Uranium | Ion exchange, reverse osmosis, lime softening, coagulation/ filtration |
| 3. Gross alpha particle activity (excluding Radon and Uranium). | Reverse osmosis. |
| 4. Beta particle and photon radioactivity | Ion exchange and reverse osmosis. |

**(4)** SMALL WATER SYSTEMS COMPLIANCE TECHNOLOGIES FOR RADIONUCLIDES.

**Table C**
**List of Small Water Systems Compliance Technologies for Radionuclides and Limitations To Use**

| Unit technologies | Limitations (see foot−notes) | Operator skill level required[1] | Raw water quality range and consideration[1] |
|---|---|---|---|
| 1. Ion exchange (IE). | (a) | Intermediate | All ground waters. |
| 2. Point of use (POU [2]) IE | (b) | Basic | All ground waters |
| 3. Reverse osmosis (RO) | (c) | Advanced | Surface waters usually require pre−filtration |
| 4. POU [2] RO | (b) | Basic | Surface waters usually require pre−filtration. |
| 5. Lime softening | (d) | Advanced | All waters. |
| 6. Green sand filtration | (e) | Basic | |
| 7. Co−precipitation with Barium sulfate | (f) | Intermediate to Advanced | Ground waters with suitable water quality |
| 8.Electrodialysis/electrodialysis reversal | | Basic to Intermediate | All ground waters. |
| 9. Pre−formed hydrous Manganese oxide filtration. | (g) | Intermediate | All ground waters |
| 10. Activated alumina | (a), (h) | Advanced | All ground waters; competing anion concentrations may affect regeneration fre−quency. |
| 11. Enhanced coagulation/filtration | (i) | Advanced | Can treat a wide range of water qualities. |

1 National Research Council (NRC). Safe Water from Every Tap: Improving Water Service to Small Communities. National Academy Press, Washington, D.C. 1997.

2 POU devices are typically installed at the kitchen tap. See the April 21, 2000 NODA for more details.

**Limitations Footnotes:** Technologies for Radionuclides:

a The regeneration solution contains high concentrations of the contaminant ions. Disposal options should be carefully considered before choosing this technology.

b When POU devices are used for compliance, programs for long−term operation, maintenance, and monitoring must be provided by water utility to ensure proper performance.

c Reject water disposal options should be carefully considered before choosing this technology. See other RO limitations described in the SWTR Compliance Technologies Table.

d The combination of variable source water quality and the complexity of the water chemistry involved may make this technology too complex for small surface water systems.

e Removal efficiencies can vary depending on water quality.

f This technology may be very limited in application to small water systems. Since the process requires static mixing, detention basins, and filtration, it is most applicable to systems with sufficiently high sulfate levels that already have a suitable filtration treatment train in place.

g This technology is most applicable to small water systems that already have filtration in place.

h Handling of chemicals required during regeneration and pH adjustment may be too difficult for small water systems without an adequately trained operator.

i Assumes modification to a coagulation/filtration process already in place.

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**Table D**
**Compliance Technologies by System Size Category for Radionuclide NPDWR's**

| Contaminant | Compliance technologies [1] for system size categories (population served) | | |
|---|---|---|---|
| | 25–500 | 501–3,300 | 3,300–10,000 |
| 1. Combined radium−226 and radium−228 | 1, 2, 3, 4, 5, 6, 7, 8, 9 | 1, 2, 3, 4, 5, 6, 7, 8, 9 | 1, 2, 3, 4, 5, 6, 7, 8, 9 |
| 2. Gross alpha particle activity | 3, 4 | 3, 4 | 3, 4 |
| 3. Beta particle activity and photon activity | 1, 2, 3, 4 | 1, 2, 3, 4 | 1, 2, 3, 4 |
| 4. Uranium | 1, 2, 4, 10, 11 | 1, 2, 3, 4, 5, 10, 11 | 1, 2, 3, 4, 5, 10, 11 |

**Note:** [1] Numbers correspond to those technologies found listed in the table C of s. NR 809.50.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; renum. from NR 109.50, Register, July, 1993, No. 451, eff. 8−1−93; CR 01−067: r. and recr. Register March 2002 No. 555, eff. 4−1−02; **CR 07−025: am. (3) Table B Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.51 Beta particle and photon radioactivity from man−made radionuclides maximum contaminant levels. (1)** The average annual concentration of beta particle and photon radioactivity from man−made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year.

**(2)** Except for the radionuclides listed in Table A, the concentration of man–made radionuclides causing 4 mrem total body or organ dose equivalents shall be calculated on the basis of a 2 liter per day drinking water intake using the 168 hour data listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure", NBS Handbook 69 as amended August, 1963, U.S. Department of Commerce. Copies of this document are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the legislative reference bureau, and may be obtained for personal use from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. If 2 or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ may not exceed 4 millirem/year.

**Table A**
**Average annual concentrations assumed to produce a total body or organ dose of 4 mrem/yr.**

| Radionuclide | Critical Organ | pCi per liter |
|---|---|---|
| Tritium | Total body | 20,000 |
| Strontium−90 | Bone marrow | 8 |

**Note:** Sections NR 809.50 through 809.52 are identical to the radioactivity standards of the department of health services in ch. DHS 157, Wis. Adm. Code, and to the National Interim Primary Drinking Water Regulations, 40 CFR 141. These sections are adopted pursuant to s. 254.34, Stats.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; renum. from NR 109.51, Register, July, 1993, No. 451, eff. 8−1−93; CR 02−147: r. and recr. (2) and Table A Register October 2003 No. 574, eff. 11−1−03; **correction in (2) made under s. 13.92 (4) (b) 6., Stats., Register January 2008 No. 625.**

**NR 809.515 Maximum contaminant level goals for radionuclides.** MCLGs for radionuclides, including combined radium−226 and radium−228, gross alpha particle activity (excluding radon and uranium), beta particle and photon radioactivity, and uranium, are zero for each contaminant.

**History:** CR 01−067: cr. Register March 2002 No. 555, eff. 4−1−02.

**NR 809.52 Analytical methods for radioactivity. (1)** Analyses conducted to determine compliance with ss. NR 809.50 and 809.51 shall be made in accordance with approved methods listed in s. NR 809.725 (1), Table D.

**(2)** To determine compliance with s. NR 809.50 (1), the detection limit may not exceed the concentrations in Table A in this section.

**Table A**
**Detection Limits for Gross Alpha Particle Activity, Radium 226, Radium 228, and Uranium**

| Contaminant | Detection Limit |
|---|---|
| Gross alpha particle activity | 3 pCi/l |
| Radium 226 | 1 pCi/l |
| Radium 228 | 1 pCi/l |
| Uranium | Reserve |

**(3)** To judge compliance with the maximum contaminant levels listed in s. NR 809.50, averages of data shall be used and shall be rounded to the same number of significant figures as the maximum contaminant level for the substance in question.

**(4)** For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100% at the 95% confidence level, 1.96 $\sigma$ where $\sigma$ is the standard deviation of the net counting rate of the sample.

**(5)** To determine compliance with s. NR 809.50 (1) (a), the detection limit may not exceed one pCi/l. To determine compliance with s. NR 809.50 (1) (b), the detection limit may not exceed 3 pCi/l. To determine compliance with s. NR 809.51, the detection limits may not exceed the concentrations listed in Table B in this section.

**Table B**
**Detection Limits for Man−made Beta Particle and Photon Emitters**

| Radionuclide | Detection Limit |
|---|---|
| Tritium | 1,000 pCi/1 |
| Strontium−89 | 10 pCi/1 |
| Strontium−90 | 2 pCi/1 |
| Iodine−131 | 1 pCi/1 |
| Cesium−134 | 10 pCi/1 |
| Gross beta | 4 pCi/1 |
| Other radionuclides | 1/10 of the applicable limit |

**Note:** Sections NR 809.50 to 809.52 are identical to the radioactivity standards of the department of health services in ch. DHS 157, Wis. Adm. Code, and to the National Interim Primary Drinking Water Regulations, 40 CFR 141. These sections are adopted pursuant to s. 254.34, Stats.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; r. and recr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.52 and am. (1), Register, July, 1993, No. 451, eff. 8−1−93; CR 01−067: cr. (2) to (5) Register March 2002 No. 555, eff. 4−1−02; CR 02−147: r. and recr. (2) and (5) Register October 2003 No. 574, eff. 11−1−03.

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**NR 809.53 Radioactivity monitoring frequency and compliance requirements for community water systems. (1)** MONITORING REQUIREMENTS FOR GROSS ALPHA PARTICLE ACTIVITY, RADIUM−226, RADIUM−228 AND URANIUM. (a) *Initial monitoring.* Community water systems shall conduct initial monitoring to determine compliance with ss. NR 809.50 (1) and 809.51 (1) by December 31, 2007. For the purposes of monitoring for gross alpha particle activity, radium−226, radium−228, uranium and beta particle and photon radioactivity in drinking water, "detection limit" is defined in s. NR 809.52 (4).

(b) *Applicability and sampling location.* Community water system applicability and sampling location requirements shall be as follows:

1. Applicability and sampling location for existing community water systems or sources. All existing community water systems shall sample at every entry point to the distribution system that is representative of all sources being used, hereafter called a sampling point, under normal operating conditions. The community water system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the department has designated a distribution system location, in accordance with par. (c) 2. c.

2. Applicability and sampling location for new community water systems or sources. All new community water systems or community water systems that use a new source of water shall begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. Community water systems shall conduct more frequent monitoring when ordered by the department in the event of possible contamination or when changes in the distribution system or treatment processes occur which may increase the concentration of radioactivity in finished water.

(c) *Initial monitoring.* Community water systems shall conduct initial monitoring for gross alpha particle activity, radium−226, radium−228 and uranium as follows:

1. Except as provided in subd. 2., a community water system shall collect 4 consecutive quarterly samples at all sampling points before December 31, 2007.

2. As an alternative to the requirement of subd. 1., a community water system may use historical monitoring data collected at a sampling point to satisfy the initial monitoring requirements for that sampling point for the following situations:

a. To satisfy initial monitoring requirements, a community water system having only one entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 1, 2000 and December 8, 2003.

b. To satisfy initial monitoring requirements, a community water system with multiple entry points and having appropriate historical monitoring data for each entry point to the distribution system may use the monitoring data from the last compliance monitoring period that began between June 1, 2000 and December 8, 2003.

c. To satisfy initial monitoring requirements, a community water system with appropriate historical data for a representative point in the distribution system may use the monitoring data from the last compliance monitoring period that began between June 1, 2000 and December 8, 2003, provided that the department finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The department shall make a written finding indicating how the data conforms to these requirements.

3. For gross alpha particle activity, uranium, radium−226 and radium−228 monitoring, the department may waive the final 2 quarters of initial monitoring for a sampling point if the results of the samples from the previous 2 quarters are below the detection limit.

4. If the average of the initial monitoring results for a sampling point is above the MCL, the community water system shall collect and analyze quarterly samples at that sampling point until the community water system has results from 4 consecutive quarters that are at or below the MCL, unless the community water system enters into another schedule as part of a formal compliance agreement with the department.

(d) *Reduced monitoring.* The department may allow community water systems to reduce the future frequency of monitoring from once every 3 years to once every 6 or 9 years at each sampling point, based on the following criteria:

1. If the average of the initial monitoring results for each contaminant, i.e., gross alpha particle activity, uranium, radium−226 or radium−228, is below the detection limit specified in s. NR 809.50 (3), Table B., the community water system shall collect and analyze for that contaminant using at least one sample at that sampling point every 9 years.

2. For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is at or above the detection limit but at or below one−half the MCL, the community water system shall collect and analyze for that contaminant using at least one sample at that sampling point every 6 years. For combined radium−226 and radium−228, the analytical results shall be combined. If the average of the combined initial monitoring results for radium−226 and radium−228 is at or above the detection limit but at or below one−half the MCL, the community water system shall collect and analyze for that contaminant using at least one sample at that sampling point every 6 years.

3. For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above one−half the MCL but at or below the MCL, the community water systems shall collect and analyze at least one sample at that sampling point every 3 years. For combined radium−226 and radium−228, the analytical results shall be combined. If the average of the combined initial monitoring results for radium−226 and radium−228 is above one−half the MCL, but at or below the MCL, the community water system shall collect and analyze at least one sample at that sampling point every 3 years.

4. Community water systems shall use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods. For example, if a community water system's sampling point is on a 9−year monitoring period, and the sample result is above one−half MCL, then the next monitoring period for the sampling point is 3 years.

5. If a community water system has a monitoring result that exceeds the MCL while on reduced monitoring, the community water system shall collect and analyze quarterly samples at that sampling point until the community water system has results from 4 consecutive quarters that are below the MCL, unless the community water system enters into another schedule as part of a formal compliance agreement with the department.

(e) *Compositing.* To fulfill quarterly monitoring requirements for gross alpha particle activity, radium−226, radium−228 or uranium, a community water system may composite up to 4 consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The department will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than one−half MCL, the department may direct the community water system to take additional quarterly samples before allowing the community water system to sample under a reduced monitoring schedule.

(f) *Gross alpha particle activity measurement substitutions.* A gross alpha particle activity measurement may be substituted

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for the required radium−226 measurement provided that the measured gross alpha particle activity does not exceed 5 pCi/l. A gross alpha particle activity measurement may be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/l. The gross alpha measurement shall have a confidence interval of 95% (1.65, where is the standard deviation of the net counting rate of the sample) for radium−226 and uranium. When a community water system uses a gross alpha particle activity measurement in lieu of a radium−226 or uranium or both measurement, the gross alpha particle activity analytical result shall be used to determine the future monitoring frequency for radium−226 or uranium, or both. If the gross alpha particle activity result is less than detection, one−half the detection limit shall be used to determine compliance and the future monitoring frequency.

**(2)** MONITORING AND COMPLIANCE REQUIREMENTS FOR BETA PARTICLE AND PHOTON RADIOACTIVITY. To determine compliance with the maximum contaminant levels in s. NR 809.51 for beta particle and photon radioactivity, a community water system shall monitor at a frequency as follows:

(a) Community water systems designated by the department as vulnerable, shall sample for beta particle and photon radioactivity. Community water systems shall collect quarterly samples for beta emitters and annual samples for tritium and strontium−90 at each entry point to the distribution system, beginning within one quarter after being notified by the department. Community water systems already designated by the department shall continue to sample until the department reviews and either reaffirms or removes the designation.

1. If the gross beta particle activity minus the naturally occurring potassium−40 beta particle activity at an entry point has a running annual average, computed quarterly, less than or equal to 50 pCi/l, the department may reduce the frequency of monitoring at that entry point to once every 3 years. Community water systems shall collect all samples required in this subsection during the reduced monitoring period.

2. For community water systems in the vicinity of a nuclear facility, the department may allow the community water system to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the community water system's entry points, where the department determines if the data is applicable to a particular community water system. In the event there is a release from a nuclear facility, community water systems which are using surveillance data shall begin monitoring at the community water system's entry points in accordance with this subsection.

3. At the discretion of the department, suppliers of water utilizing only ground waters may be required to monitor for manmade radioactivity.

(b) Community water systems designated by the department as utilizing waters contaminated by effluents from nuclear facilities shall sample for beta particle and photon radioactivity. Community water systems shall collect quarterly samples for beta emitters and iodine−131 and annual samples for tritium and strontium−90 at each entry point to the distribution system, hereafter called a sampling point, beginning within one quarter after being notified by the department. Community water systems already designated by the department as community water systems using waters contaminated by effluents from nuclear facilities shall continue to sample until the department reviews and either reaffirms or removes the designation.

1. Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of 3 monthly samples.

**Note:** Quarterly monitoring for gross beta particle activity based on the analysis of monthly samples is recommended.

2. For iodine−131, a composite of 5 consecutive daily samples shall be analyzed once each quarter. As ordered by the department, more frequent monitoring shall be conducted when iodine−131 is identified in the finished water.

3. Annual monitoring for strontium−90 and tritium shall be conducted by means of the analysis of a composite of 4 consecutive quarterly samples or analysis of 4 quarterly samples.

**Note:** Annual monitoring for strontium−90 and tritium by means of the analysis of a composite of 4 consecutive quarterly samples is recommended.

4. If the gross beta particle activity beta minus the naturally occurring potassium−40 beta particle activity at a sampling point has a running annual average, computed quarterly, less than or equal to 15 pCi/l, the department may reduce the frequency of monitoring at that sampling point to every 3 years. Community water systems shall collect all samples required in this paragraph during the reduced monitoring period.

5. For community water systems in the vicinity of a nuclear facility, the department may allow the community water system to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the community water system's entry points, where the department determines if the data is applicable to a particular community water system. In the event that there is a release from a nuclear facility, community water systems which are using surveillance data shall begin monitoring at the community water system's entry points in accordance with this paragraph.

(c) Community water systems designated by the department to monitor for beta particle and photon radioactivity may not apply to the department for a waiver from the monitoring frequencies specified in either par. (a) or (b).

(d) Community water systems may analyze for naturally occurring potassium−40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. Community water systems may subtract the potassium−40 beta particle activity value from the total gross beta particle activity value to determine if 50 pCi/l is exceeded. The potassium−40 beta particle activity shall be calculated by multiplying elemental potassium concentrations, in mg/l, by a factor of 0.82.

(e) If the gross beta particle activity minus the naturally occurring potassium−40 beta particle activity exceeds 50 pCi/l, an analysis of the sample shall be performed to identify the major radioactive constituents present in the sample and the appropriate doses shall be calculated and summed to determine compliance with s. NR 809.51 (1) using the formula in s. NR 809.51 (2). Doses shall also be calculated and combined for measured levels of tritium and strontium to determine compliance.

(f) Community water systems shall monitor monthly at the sampling points that exceed the maximum contaminant level in s. NR 809.51 beginning the month after the exceedance occurs. Community water systems shall continue monthly monitoring until the system has established, by a rolling average of 3 monthly samples, that the MCL is being met. Community water systems that establish that the MCL is being met shall return to quarterly monitoring until they meet the requirements in par. (a) 1. or (b) 4.

**(3)** GENERAL MONITORING AND COMPLIANCE REQUIREMENTS FOR RADIONUCLIDES. (a) The department may require more frequent monitoring than specified in subs. (1) and (2), or may require confirmation samples at its discretion. The results of the initial and confirmation samples shall be averaged for use in compliance determinations.

(b) Each public water system shall monitor at the time designated by the department during each compliance period.

(c) Compliance with ss. NR 809.50 (1) and 809.51 (1) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the community water system is in violation of the MCL.

1. For community water systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point. If the average of any sam-

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pling point is greater than the MCL, the community water system is out of compliance with the MCL.

2. For community water systems monitoring more than once per year, if any sample result will cause the running annual average, as defined in this chapter, to exceed the MCL at any sample point, the community water system is out of compliance with the MCL immediately.

3. Community water systems shall include all samples taken and analyzed under this section in determining compliance, even if that number is greater than the minimum required.

4. If a community water system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance shall be based on the running average of the samples collected.

5. If a sample result is less than the detection limit, zero will be used to calculate the annual average, unless a gross alpha particle activity is being used in lieu of radium−226 or uranium or both. If the gross alpha particle activity result is less than detection, 1/2 the detection limit shall be used to calculate the annual average.

(d) The department may delete results of obvious sampling or analytic errors.

(e) If the MCL for radioactivity set forth in ss. NR 809.50 (1) and 809.51 (1) and (2) is exceeded, the operator of a community water system shall give notice to the department pursuant to s. NR 809.80 (1) and to the public as required by subch. X.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (1) (a) (intro.) and (2) (a) (intro.), r. (1) (a) 2.a., renum. (1) (a) 2.b. and c. to be (1) (b) and (c), r. (2) (b), renum. (2) (c), (d), (intro.) and (e) to be (2) (b), (c), (intro.) and (d) and am., Register, April, 1982, No. 316, eff. 5−1−82; am. (1) (c), Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.53, Register, July, 1993, No. 451, eff. 8−1−93; correction in (2) (d) made under s. 13.93 (2m) (b) 7., Stats., Register, October, 1997, No. 502; CR 01−067: r. and recr. Register March 2002 No. 555, eff. 4−1−02; **CR 07−025: cr. (3) (e) Register January 2008 No. 625, eff. 2−1−08.**

## Subchapter II — Control of Lead and Copper

**NR 809.541 General requirements. (1)** APPLICABILITY AND EFFECTIVE DATES. (a) The requirements of this subchapter constitute the state primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this subchapter applies to community water systems and non−transient, non−community water systems.

**(2)** SCOPE. These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

**(3)** LEAD AND COPPER ACTION LEVELS. (a) The lead action level is exceeded if the concentration of lead in more than 10% of tap water samples collected during any monitoring period conducted in accordance with s. NR 809.547 is greater than 0.015 mg/L i.e., if the "90th percentile" lead level is greater than 0.015 mg/L.

(b) The copper action level is exceeded if the concentration of copper in more than 10% of tap water samples collected during any monitoring period conducted in accordance with s. NR 809.547 is greater than 1.3 mg/L, i.e., if the "90th percentile" copper level is greater than 1.3 mg/L.

(c) The 90th percentile lead and copper levels shall be computed as follows:

1. The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

2. The number of samples taken during the monitoring period shall be multiplied by 0.9.

3. For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

4. The contaminant concentration in the numbered sample yielded by the calculation in subd. 2. is the 90th percentile contaminant level.

**(4)** CORROSION CONTROL TREATMENT REQUIREMENTS. (a) All water system owners or operators shall install and operate optimal corrosion control treatment as defined in s. NR 809.04.

(b) Any water system that complies with the applicable corrosion control treatment requirements specified by the department under ss. NR 809.542 and 809.543 shall be deemed in compliance with the treatment requirement contained in par. (a).

**(5)** SOURCE WATER TREATMENT REQUIREMENTS. Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the department under s. NR 809.544.

**(6)** LEAD SERVICE LINE REPLACEMENT REQUIREMENTS. Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in s. NR 809.545.

**(7)** PUBLIC EDUCATION REQUIREMENTS. Any system exceeding the lead action level shall implement the public education requirements contained in s. NR 809.546. Any system exceeding the copper action level shall annually provide public education on the health effects of copper using language in Appendix B to subch. X, and information on reducing exposure to copper in drinking water similar to s. NR 809.546.

**(8)** MONITORING AND ANALYTICAL REQUIREMENTS. (a) Tap water monitoring for lead and copper, monitoring for water quality parameters, and source water monitoring for lead and copper shall be completed in compliance with ss. NR 809.548 and 809.549. The analyses shall be conducted using methods as prescribed in s. NR 809.725 (1), Table A.

(b) The department may allow the use of previously collected monitoring data for the purposes of monitoring if the data were collected and analyzed in accordance with the requirements of this subchapter.

**(9)** REPORTING REQUIREMENTS. System owners or operators shall report to the department any information required by the treatment provisions of this subchapter and s. NR 809.55.

**(10)** RECORDKEEPING REQUIREMENTS. System owners or operators shall maintain records in accordance with s. NR 809.82.

**(11)** VIOLATION OF NATIONAL PRIMARY DRINKING WATER REGULATIONS. Failure to comply with the applicable requirements of ss. NR 809.541 to 809.549, 809.725, 809.80, and 809.82., including requirements established by the department pursuant to these provisions, shall constitute a violation of the state primary drinking water regulations for lead or copper, or both.

**(12)** PREMISE OWNER NOTIFICATION OF LEAD AND COPPER RESULTS. System owners or operators shall provide owners or occupants of all premises used in the lead and copper monitoring program the analytical results of all samples collected at that site. If sample results at a sample location exceed 15 *u*g/L for lead and 1300 *u*g/L for copper, system owners or operators must inform premise owners or occupants of health effects and measures necessary to lower lead or copper levels.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; am. (7) and (12), Register, October, 1997, eff. 11−1−97.

**NR 809.542 Applicability of corrosion control treatment steps for small, medium and large−size water systems. (1)** CORROSION CONTROL TREATMENT REQUIREMENTS. System owners or operators shall complete the applicable corrosion

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control treatment requirements described in s. NR 809.543 by the deadlines established.

(a) The owner or operator of a large system shall complete the corrosion control treatment steps specified in sub. (4), unless the system is deemed to have optimized corrosion control under sub. (2) (b) or (c).

(b) The owner or operator of a small system and a medium−size system shall complete the corrosion control treatment steps specified in sub. (5), unless the system is deemed to have optimized corrosion control under sub. (2) (a), (b) or (c).

**(2)** DETERMINATION OF OPTIMUM CORROSION CONTROL. A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if the system satisfies one of the criteria specified in par. (a) to (c). Any system deemed to have optimized corrosion control under this subsection, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the department determines appropriate to ensure optimal corrosion control treatment is maintained.

(a) A small or medium−size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of 2 consecutive 6−month monitoring periods conducted in accordance with s. NR 809.547.

(b) Any water system may be deemed by the department to have optimized corrosion control treatment if the system owner or operator demonstrates to the satisfaction of the department that it has conducted activities equivalent to the corrosion control steps applicable to the system under this section. If the department makes this determination, it shall provide the system with written notice explaining the basis for its decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with s. NR 809.543 (6). Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the department−designated optimal water quality control parameters in accordance with s. NR 809.543 (8) and continue to conduct lead and copper tap and water quality parameter sampling in accordance with ss. NR 809.547 (4) (c) and 809.548 (4), respectively. A system owner or operator shall provide the department with the following information in order to support a determination under this subsection:

1. The results of all test samples collected for each of the water quality parameters in s. NR 809.543 (3) (c);

2. A report explaining the test methods used by the water system owner or operator to evaluate the corrosion control treatments listed in s. NR 809.543 (3) (a), the results of all tests conducted, and the basis for the system owner or operator's selection of optimal corrosion control treatment;

3. A report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumers' taps; and

4. The results of tap water samples collected in accordance with s. NR 809.547 at least once every 6 months for one year after corrosion control has been installed.

(c) Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with s. NR 809.547 and source water monitoring conducted in accordance with s. NR 809.549 that demonstrates for 2 consecutive 6−month monitoring periods that the difference between the 90$^{th}$ percentile tap water lead level computed under s. NR 809.541 (3) (c), and the highest source water lead concentration, is less than the practical quantitation level for lead specified in 40 CFR 141.89(a)(1)(ii).

1. The department may deem that systems whose highest source water lead level is below method detection limit have optimized corrosion control under this subsection if the 90$^{th}$ percentile tap water lead level is less than or equal to the practical quantitation level for 2 consecutive 6−month monitoring periods.

2. Any water system deemed to have optimized corrosion control in accordance with this subsection shall continue monitoring for lead and copper at the tap no less frequently than once every 3 calendar years using the reduced number of sites specified in s. NR 809.547 (3) and collecting the samples at times and locations specified in s. NR 809.547 (4) (d) 4. Any system that has not conducted a round of monitoring pursuant to s. NR 809.547 (4) (d) since September 30, 1997, shall complete a round of monitoring pursuant to this subsection as specified by the department.

3. Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the department in writing pursuant to s. NR 809.55 (1) (e) of any change in treatment or the addition of a new source. The department may require any system to conduct additional monitoring or to take other action the department deems appropriate to ensure that systems maintain minimal levels of corrosion in the distribution system.

4. As of December 1, 2002, a system is not deemed to have optimized corrosion control under this subsection, and shall implement corrosion control treatment pursuant to subd. 5. unless it meets the copper action level.

5. Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this subsection shall implement corrosion control treatment in accordance with the deadlines in sub. (5). Any large system shall adhere to the schedule specified in that paragraph for medium−size systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under this subsection.

**(3)** CRITERIA FOR CLASSIFYING CORROSION CONTROL TREATMENT STUDIES FOR SMALL AND MEDIUM−SIZE SYSTEMS. Any small or medium−size water system owner or operator that is required to complete the corrosion control steps due to the exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of 2 consecutive monitoring periods conducted pursuant to s. NR 809.547 and the results are submitted to the department. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system owner or operator shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The department may require a system owner or operator to repeat treatment steps previously completed by the system owner or operator where the department determines that this is necessary to implement properly the treatment requirements. The department shall notify the system owner or operator in writing of such a determination and explain the basis for its decision. A small or medium−size water system shall implement corrosion control treatment steps in accordance with sub. (5), including a system deemed to have optimized corrosion control under sub. (2) (a), whenever it exceeds the lead or copper action level.

**(4)** TREATMENT STEPS AND DEADLINES FOR LARGE SYSTEMS. Except as provided in sub. (2) (b) and (c), owners or operators of large systems shall complete the following corrosion control treatment steps by the indicated dates:

(a) Step 1: The system owner or operator shall conduct initial monitoring during 2 consecutive 6−month monitoring periods by January 1, 1993.

(b) Step 2: The system owner or operator shall complete corrosion control studies and submit option for optimal corrosion control treatment to the department by July 1, 1994.

(c) Step 3: The department shall approve optimal corrosion control treatment by January 1, 1995.

(d) Step 4: The system owner or operator shall install optimal corrosion control treatment by January 1, 1997.

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(e) Step 5: The system owner or operator shall complete follow−up sampling by January 1, 1998.

(f) Step 6: The department shall review installation of treatment and approve optimal water quality control parameters by July 1, 1998.

(g) Step 7: The system owner or operator shall operate in compliance with the department−approved optimal water quality control parameters and continue to conduct tap sampling.

**(5)** TREATMENT STEPS AND DEADLINES FOR SMALL AND MEDIUM−SIZE SYSTEMS. Except as provided in sub. (2), owners or operators of small and medium−size systems shall complete the following corrosion control treatment steps by the indicated time periods:

(a) Step 1: The system owner or operator shall conduct initial tap sampling until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under s. NR 809.547 (4) (d). The owner or operator of a system that exceeds the lead or copper action level shall recommend optimal corrosion control treatment within 6 months after it exceeds one of the action levels.

(b) Step 2: Within 12 months after a system exceeds the lead or copper action level, the department shall require the system owner or operator to perform corrosion control studies.

(c) Step 3: If the department requires a system owner or operator to perform corrosion control studies under step 2, the system owner or operator shall complete the studies within 18 months after the department requires the studies be conducted.

(d) Step 4: If the system owner or operator has performed corrosion control studies under step 2, the department shall review and determine adequacy of system's optimal corrosion control treatment within 6 months after completion of step 3.

(e) Step 5: The system owner or operator shall install optimal corrosion control treatment within 24 months after the department approves the treatment.

(f) Step 6: The system owner or operator shall complete follow−up sampling within 36 months after the department approves optimal corrosion control treatment.

(g) Step 7: The department shall review the system's installation of treatment and approve optimal water quality control parameters within 6 months after completion of step 6.

(h) Step 8: The system owner or operator shall operate in compliance with the department−approved optimal water quality control parameters and continue to conduct tap sampling.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; am. (4) (b) and (c), Register, August, 1994, No. 464, eff. 9−1−94; am. (3), Register, October, 1997, No. 502, eff. 11−1−97; CR 00−161: am. (2) (intro.), (b) and (c), cr. (2) (c) 1. to 5., Register November 2002 No. 563, eff. 12−1−02; **CR 07−025: am. (2) (c) 3. Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.543 Description of corrosion control treatment requirements.** Each system owner or operator shall complete the following corrosion control treatment requirements which are applicable to their system under s. NR 809.542.

**(1)** SYSTEM OWNER OR OPERATOR RECOMMENDATION REGARDING CORROSION CONTROL TREATMENT. Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, owners or operators of small and medium−size water systems exceeding the lead or copper action level shall recommend installation of one or more of the corrosion control treatments listed in sub. (3) (a) which the system owner or operator believes constitutes optimal corrosion control for that system. The department may require the system owner or operator to conduct additional water quality parameter monitoring in accordance with s. NR 809.548 (2) to assist the department in reviewing the system owner or operator's recommendation. In no case, may the time period for installation of optimal corrosion control treatment on a small or medium−size system exceed the schedule as listed in s. NR 809.542 (5) (a) to (h).

**(2)** DEPARTMENT DECISION TO REQUIRE STUDIES OF CORROSION CONTROL TREATMENT BY SMALL AND MEDIUM−SIZE SYSTEMS. The department may require the owner or operator of any small or medium−size system that exceeds the lead or copper action level to perform corrosion control studies under sub. (3) to identify optimal corrosion control treatment for the system.

**(3)** PERFORMANCE OF CORROSION CONTROL STUDIES. (a) Any public water system owner or operator performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

1. Alkalinity and pH adjustment;
2. Calcium hardness adjustment; and
3. The addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

(b) The water system owner or operator shall evaluate each of the corrosion control treatments listed in par. (a) using either pipe rig/loop tests, metal coupon tests, partial−system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.

(c) The water system owner or operator shall measure the following water quality parameters in any tests conducted before and after evaluating the corrosion control treatments listed in par. (a):

1. Lead;
2. Copper;
3. pH;
4. Alkalinity;
5. Calcium;
6. Conductivity;
7. Orthophosphate (when an inhibitor containing a phosphate compound is used);
8. Silicate (when an inhibitor containing a silicate compound is used); and
9. Water temperature.

(d) The water system owner or operator shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with at least one of the following:

1. Data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; or
2. Data and documentation demonstrating that the water system owner or operator has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes, or both.

(e) The water system owner or operator shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

(f) On the basis of an analysis of the data generated during each evaluation, the water system owner or operator shall recommend to the department in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system owner or operator shall provide a rationale for its recommendation along with all supporting documentation specified in pars. (a) to (e).

**(4)** DEPARTMENT EVALUATION OF OPTIMAL CORROSION CONTROL TREATMENT. (a) Based upon consideration of available information including, where applicable, studies performed under sub. (3) and a system owner or operator's recommended treatment alternative, the department shall either approve the corrosion control treatment option recommended by the system owner or opera-

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tor, or designate alternative corrosion control treatments from among those listed in sub. (3) (a). When approving optimal treatment, the department shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(b) The department shall notify the system owner or operator of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the department requests additional information to aid its review, the water system owner or operator shall provide the information.

**(5)** INSTALLATION OF OPTIMAL CORROSION CONTROL. Each system owner or operator shall properly install and operate throughout its distribution system the optimal corrosion control treatment approved by the department under sub. (4).

**(6)** DEPARTMENT REVIEW OF TREATMENT. The department shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system owner or operator and determine whether the system owner or operator has properly installed and operated the optimal corrosion control treatment approved by the department in sub. (4). Upon reviewing the results of tap water and water quality parameter monitoring by the system owner or operator, both before and after the system owner or operator installs optimal corrosion control treatment, the department shall establish ranges for water quality parameters.

**(7)** APPROVAL OF OPTIMAL WATER QUALITY CONTROL PARAMETERS. The department shall review system owner or operator recommendations and select the values for the applicable water quality control parameters listed in sub. (3) which reflect optimal corrosion control treatment for the system. The department may specify values for additional water quality control parameters to reflect optimal corrosion control for the system. The department shall notify the water system owner in writing of these determinations and explain the basis for its decision. At a minimum, the department shall establish:

(a) A minimum value or a range of values for pH measured at each entry point to the distribution system;

(b) A minimum pH value, measured in all tap samples. The value shall be equal to or greater than 7.0, unless the water system owner provides information to indicate that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

(c) If a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the department determines is necessary to protect the interior walls of the pipes of the distribution system from corrosion;

(d) If alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples; and

(e) If calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples.

**(8)** CONTINUED OPERATION AND MONITORING. All system owners or operators optimizing corrosion control shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the department under sub. (7), in accordance with this subsection for all samples collected under s. NR 809.548 (4) to (6). Compliance with the requirements of this subsection shall be determined every 6 months, as specified under s. NR 809.548 (4). A water system is out of compliance with the requirements of this subsection for a 6−month period if it has excursions for any department−specified parameter on more than 9 days during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the department. The department may delete results of obvious sampling errors from this calculation. Daily values are calculated as follows:

(a) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling or a combination of both. If EPA has approved an alternative formula under 40 CFR 142.16 in the department's application for a program revision submitted pursuant to 40 CFR 142.12, the department's formula shall be used to aggregate multiple measurements taken at a sampling point for the water quality parameter in lieu of the formula in this paragraph.

(b) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the result of that measurement.

(c) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value shall be the daily value calculated on the most recent day on which the water quality parameter was measured at the sample site.

**(9)** MODIFICATION OF DEPARTMENT TREATMENT DECISIONS. Upon its own initiative or in response to a request by a water system owner or operator or other interested party, the department may modify its determination of the optimal corrosion control treatment under sub. (4) or optimal water quality control parameters under sub. (6). A request for modification by a system owner or operator or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The department may modify its determination where it concludes that such change is necessary to ensure that the system owner or operator continues to optimize corrosion control treatment. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the department's decision, and provide an implementation schedule for completing the treatment modifications.

**(10)** TREATMENT DECISIONS BY EPA IN LIEU OF THE DEPARTMENT. The EPA regional administrator may review treatment determinations made by the department under sub. (4), (6) or (8) and issue federal treatment determinations consistent with the requirements of those subsections where the regional administrator finds that:

(a) The department has failed to issue a treatment determination by the applicable deadlines contained in s. NR 809.542,

(b) The department has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or

(c) The technical aspects of the department's determination would be indefensible in an expected federal enforcement action taken against a system owner or operator.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; CR 00−161: r. and recr. (8), Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (3) (c) 8. and (7) (d) Register October 2003 No. 574, eff. 11−1−03.

**NR 809.544 Source water treatment requirements.** **(1)** DEADLINES FOR COMPLETING SOURCE WATER TREATMENT STEPS. System owners or operators shall complete the applicable source water monitoring and treatment requirements by the following deadlines:

(a) Step 1: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring and when necessary propose an optimal treatment alternative to the department within 6 months after exceeding the lead or copper action level.

(b) Step 2: The department shall make a determination regarding proposed source water treatment within 6 months after receipt of proposed treatment alternatives under step 1.

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(c) Step 3: If the department approves installation of source water treatment, the system owner or operator shall install the treatment within 24 months after completion of step 2.

(d) Step 4: The system owner or operator shall complete follow−up tap water monitoring and source water monitoring within 36 months after completion of step 2.

(e) Step 5: The department shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels within 6 months after completion of step 4.

(f) Step 6: The system owner or operator shall operate in compliance with the department−specified maximum permissible lead and copper source water levels and continue source water monitoring.

**(2)** DESCRIPTION OF SOURCE WATER TREATMENT REQUIREMENTS. (a) *System treatment recommendation.* Any owner or operator of a system that exceeds the lead or copper action level shall recommend in writing to the department the installation and operation of one of the source water treatments listed in par. (b). A system owner or operator may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

(b) *Department determination regarding source water treatment.* The water system owner or operator shall complete an evaluation of the results of all source water samples collected by the water system owner or operator to determine whether source water treatment is necessary to minimize lead or copper levels and the evaluation shall be submitted to the department. If the department determines that treatment is needed, the department shall either approve installation and operation of the source water treatment recommended by the system owner or operator, if any, or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the department requests additional information to aid in its review, the water system owner or operator shall provide the information by the date specified by the department in its request. The department shall notify the system owner or operator in writing of its determination and set forth the basis for its decision.

(c) *Installation of source water treatment.* Each system owner or operator shall properly install and operate the source water treatment approved by the department under par. (b).

(d) *Department review of source water treatment and specification of maximum permissible source water levels.* The department shall review the source water samples taken by the water system owner or operator both before and after the system owner or operator installs source water treatment, and determine whether the system owner or operator has properly installed and operated the source water treatment approved by the department. Based upon its review, the department shall establish the maximum permissible lead and copper concentrations for finished water entering the distribution system. Levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The department shall notify the system owner or operator in writing and explain the basis for its decision.

(e) *Continued operation and maintenance.* Each water system owner or operator shall maintain lead and copper levels below the maximum permissible concentrations established by the department at each sampling point monitored in accordance with s. NR 809.549. The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible concentration approved by the department.

(f) *Modification of department treatment decisions.* Upon its own initiative or in response to a request by a water system owner or operator or other interested party, the department may modify its determination of the source water treatment under par. (b), or maximum permissible lead and copper concentrations for finished water entering the distribution system under par. (d). A request for modification by a system owner or operator or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The department may modify its determination where it concludes that such change is necessary to ensure that the system owner or operator continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the department's decision, and provide an implementation schedule for completing the treatment modifications.

(g) *Treatment decisions by EPA in lieu of the department.* The EPA regional administrator may review treatment determinations made by the department under par. (b), (d) or (f) and issue federal treatment determinations consistent with the requirements of those paragraphs where the administrator finds that:

1. The department has failed to issue a treatment determination by the applicable deadlines contained in s. NR 809.544 (1),

2. The department has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or

3. The technical aspects of the department's determination would be indefensible in an expected federal enforcement action taken against a system owner or operator.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93.

**NR 809.545 Lead service line replacement requirements. (1)** System owners or operators with water systems that fail to meet the lead action level in tap samples taken pursuant to s. NR 809.547 (4) (b), after installing corrosion control or source water treatment, or both, whichever sampling occurs later, shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of s. NR 809.542 or 809.544 for failure to install source water or corrosion control treatment, the department may require the system owner or operator to commence lead service line replacement under this section after the date by which the system owner or operator was required to conduct monitoring under s. NR 809.547 (4) (b) has passed.

**(2)** A system owner or operator shall replace annually at least 7% of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system owner or operator shall identify the initial number of lead service lines in its distribution system, including an identification of the portions owned by the system, based on a materials evaluation, including the evaluation required under s. NR 809.547 (1) and relevant legal authorities, such as contracts and local ordinances regarding the portion owned by the system. The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in sub. (1).

**(3)** A system owner or operator is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to s. NR 809.547 (2) (c), is less than or equal to 0.015 mg/L.

**(4)** A water system owner or operator shall replace the entire service line, up to the building inlet, unless he or she demonstrates to the satisfaction of the department under sub. (5), that he or she controls less than the entire service line. In such cases, the system owner or operator shall replace the portion of the line which the department determines is under the system owner or operator's control. The system owner or operator shall notify the user served by the line that the system owner or operator will replace the portion of the service line under his or her control and shall offer to replace the building owner's portion of the line, but is not required to bear the cost of replacing the building owner's portion of the line. A system owner or operator is not required to bear the cost of replacing the privately−owned portion of the line, nor is the owner or operator required to replace the privately−owned portion where the owner chooses not to pay the cost of replacing the privately−owned portion of the line, or where replacing the privately−owned system would be precluded by state, local or common

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law. An owner or operator of a water system that does not replace the entire length of the service line shall also complete the following tasks:

(a) At least 45 days prior to commencing with the partial replacement of a lead service line, the water system owner or operator shall provide notice to the residents of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The department may allow the water system owner or operator to provide notice under this paragraph less than 45 days prior to commencing partial lead service line replacement where the replacement is in conjunction with emergency repairs. In addition, the water system owner or operator shall inform the residents served by the line that the system will, at the system's expense, collect a sample from each partially−replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under s. NR 809.547 (2) (c), within 72 hours after the completion of the partial replacement of the service line. The system owner or operator shall collect the sample and report the results of the analysis to the owner and each resident served by the line within 3 business days. Mailed notices post−marked within 3 business days of receiving the results shall be considered "on time."

(b) The water system owner or operator shall provide the information required by par. (a) to the residents of individual dwellings by mail or by other methods approved by the department. In instances where multi−family dwellings are served by the line, the water system owner or operator may post the information at a conspicuous location.

**(5)** The department shall require a system owner or operator to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The department shall make this determination in writing and notify the system owner or operator of its finding within 6 months after the system owner or operator is triggered into lead service line replacement based on monitoring referenced in sub. (1).

**(6)** Any system owner or operator may cease replacing all lead service lines whenever lead service line samples collected pursuant to s. NR 809.547 (2) (b) meet the lead action level during each of 2 consecutive monitoring periods and the system owner or operator submits the results to the department. If the lead service line samples in any such water system thereafter exceeds the lead action level, the system owner or operator shall recommence replacing lead service lines, pursuant to sub. (2).

**(7)** To demonstrate compliance with subs. (1) to (4), a system owner or operator shall report to the department the information specified in s. NR 809.55 (5).

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; CR 00−161: am. (2) and (4), cr. (4) (a) and (b), r. (5), renum. (6), (7) and (8) to be (5), (6) and (7), Register November 2002 No. 563, eff. 12−1−02.

**NR 809.546 Public education and supplemental monitoring requirements.** The owner or operator of a water system that exceeds the lead action level based on tap water samples collected in accordance with s. NR 809.547 shall deliver the public education materials contained in subs. (1) and (2) in accordance with the requirements in sub. (3).

**(1)** COMMUNITY WATER SYSTEMS − CONTENT OF WRITTEN PUBLIC EDUCATION MATERIALS. A community water system owner or operator shall include the following text in all of the printed materials it distributes through its lead public education program. System owners or operators may delete information pertaining to lead service lines, upon approval by the department, if no lead service lines exist anywhere in the water system service area. Public education language under par. (d) 2. e. and 4. c. may be modified regarding building permit record availability and consumer access to these records, if approved by the department. System owners or operators may also continue to utilize pre−printed materials that meet the public education language requirements in s. NR 809.546 (1), effective August 1, 1993. Any additional information presented by a system owner or operator shall be consistent with the following information and be in plain English that can be understood by laypersons.

(a) The United States environmental protection agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Although most homes have very low levels of lead in their drinking water, some homes in the community have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under federal law we are required to have a program in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace each lead service line that we control if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect you and your family by reducing your exposure to lead in drinking water.

(b) Lead is a common metal found throughout the environment in lead−based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination −− like dirt and dust −− that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

(c) 1. Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20% or more of a person's total exposure to lead.

2. Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead−based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines). In 1986, congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

3. When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead.

(d) 1. Despite our best efforts mentioned earlier to control water corrosivity and remove lead from the water supply, lead levels in some homes or buildings can be high. To find out whether you need to take action in your own home, have your drinking water tested to determine if it contains excessive concentrations of lead. Testing the water is essential because you cannot see, taste or smell lead in drinking water. Some local laboratories that can provide this service are listed at the end of this booklet. For more

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information on having your water tested, please call [insert phone number of water system].

2. If a water test indicates that the drinking water drawn from a tap in your home contains lead above 15 ppb, then you should take the following precautions:

a. Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than 6 hours. The longer water resides in your home's plumbing the more lead it may contain. Flushing the tap means running the cold water faucet until the water gets noticeably colder, usually about 15−30 seconds. If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking. Although toilet flushing or showering flushes water through a portion of your home's plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your family's health. It usually uses less than one or 2 gallons of water and costs less than [insert a cost estimate based on flushing 2 times a day for 30 days] per month. To conserve water, fill a couple of bottles for drinking water after flushing the tap, and whenever possible use the first flush water to wash the dishes or water the plants. If you live in a high−rise building, letting the water flow before using it may not work to lessen your risk from lead. The plumbing systems have more, and sometimes larger pipes than smaller buildings. Ask your landlord for help in locating the source of the lead and for advice on reducing the lead level.

b. Try not to cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and heat it on the stove.

c. Remove loose lead solder and debris from the plumbing materials installed in newly constructed homes, or homes in which the plumbing has recently been replaced, by removing the faucet strainers from all taps and running the water from 3 to 5 minutes. Thereafter, periodically remove the strainers and flush out any debris that has accumulated over time.

d. If your copper pipes are joined with lead solder that has been installed illegally since it was banned in Wisconsin on September 24, 1984, notify the plumber who did the work and request that he or she replace the lead solder with lead−free solder. Lead solder looks dull gray, and when scratched with a key looks shiny. In addition, notify the department of natural resources about the violation.

e. Determine whether or not the service line that connects your home or apartment to the water main is made of lead. The best way to determine if your service line is made of lead is by either hiring a licensed plumber to inspect the line or by contacting the plumbing contractor who installed the line. You can identify the plumbing contractor by checking the city's record of building permits which should be maintained in the files of the [insert name of department that issues building permits]. A licensed plumber can at the same time check to see if your home's plumbing contains lead solder, lead pipes or pipe fittings that contain lead. The public water system that delivers water to your home should also maintain records of the materials located in the distribution system. If the service line that connects your dwelling to the water main contributes more than 15 ppb to drinking water, after our comprehensive treatment program is in place, we are required to replace the portion of the line we own. If the line is only partially owned by the [insert name of the city, county, or water system that controls the line], we are required to provide the owner of the privately−owned portion of the line with information on how to replace the privately−owned portion of the service line, and offer to replace that portion of the line at the owner's expense. If we replace only the portion of the line that we own, we also are required to notify you in advance and provide you with information on the steps you can take to minimize exposure to any temporary increase in lead levels that may result from the partial replacement, to take a follow−up sample at our expense from the line within 72 hours after the partial replacement, and to mail or otherwise provide you with the results of that sample within three business days of receiving the results. Acceptable replacement alternatives include copper, steel, iron and plastic pipes.

f. Have an electrician check your wiring. If grounding wires from the electrical system are attached to your pipes, corrosion may be greater. Check with a licensed electrician or your local electrical code to determine if your wiring can be grounded elsewhere. DO NOT attempt to change the wiring yourself because improper grounding can cause electrical shock and fire hazards.

3. The steps described in subd. 2. will reduce the lead concentrations in your drinking water. However, if a water test indicates that the drinking water coming from your tap contains lead concentrations in excess of 15 ppb after flushing, or after we have completed our actions to minimize lead levels, then you may want to take the following additional measures:

a. Purchase or lease a home treatment device. Home treatment devices are limited in that each unit treats only the water that flows from the faucet to which it is connected, and all of the devices require periodic maintenance and replacement. Devices such as reverse osmosis systems or distillers can effectively remove lead from your drinking water. Some activated carbon filters may reduce lead levels at the tap, however all lead reduction claims should be investigated. Be sure to check the actual performance of a specific home treatment device before and after installing the unit.

b. Purchase bottled water for drinking and cooking.

4. You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

a. [insert the name of city or county department of public utilities] at [insert phone number] can provide you with information about your community's water supply, and a list of local laboratories that have been certified by EPA for testing water quality;

b. [insert the name of city of county department that issues building permits] at [insert phone number] can provide you with information about building permit records that should contain the names of plumbing contractors that plumbed your home; and

c. [insert the name of the state department of public health] at [insert phone number] or the [insert the name of the city or county health department] at [insert phone number] can provide you with information about the health effects of lead and how you can have your child's blood tested.

5. The following is a list of some state approved laboratories in your area that you can call to have your water tested for lead. [Insert names and phone numbers of at least 2 laboratories].

**(1m)** NON−TRANSIENT NON−COMMUNITY WATER SYSTEMS − CONTENT OF WRITTEN PUBLIC EDUCATION MATERIALS. A non−transient non−community water system shall either include the text specified in sub. (1) or shall include the text in pars. (a) to (d) in all of the printed materials it distributes through its lead public education program. Water systems may delete information pertaining to lead service lines upon approval by the department if no lead service lines exist anywhere in the water system service area. Any additional information presented by a system shall be consistent with the following information and be in plain English that can be understood by laypeople.

(a) *Introduction.* The United States Environmental Protection Agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Some drinking water samples taken from this facility have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under federal law we are required to have a pro-

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gram in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead rule please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect yourself by reducing your exposure to lead in drinking water.

(b) *Health effects of lead.* Lead is found throughout the environment in lead−based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination−−like dirt and dust−−that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

(c) *Lead in drinking water.* 1. Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20 percent or more of a person's total exposure to lead.

2. Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead−based solder used to join copper pipe, brass and chrome−plated brass faucets, and in some cases, pipes made of lead that connect houses and buildings to water mains (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

3. When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon if the water has not been used all day, can contain fairly high levels of lead.

(d) *Steps you can take to reduce exposure to lead in drinking water.* 1. Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in plumbing the more lead it may contain. Flushing the tap means running the cold water faucet for about 15−30 seconds. Although toilet flushing or showering flushes water through a portion of the plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your health. It usually uses less than one gallon of water.

2. Do not cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and then heat it.

3. The steps described above will reduce the lead concentrations in your drinking water. However, if you are still concerned, you may wish to use bottled water for drinking and cooking.

4. You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

a. [insert the name or title of facility official if appropriate] at [insert phone number] can provide you with information about your facility's water supply; and

b. [insert the name or title of the state health department] at [insert phone number] or [insert the name of the city or county health department] at [insert phone number] can provide you with information about the health effects of lead.

**(2)** CONTENT OF BROADCAST MATERIALS. A water system owner or operator shall include the following information in all public service announcements submitted under its lead public education program to television and radio stations for broadcasting:

(a) Why should everyone want to know the facts about lead and drinking water? Because unhealthy amounts of lead can enter drinking water through the plumbing in your home. That's why I urge you to do what I did. I had my water tested for [insert free or $ per sample]. You can contact the [insert the name of the city or water system] for information on testing and on simple ways to reduce your exposure to lead in drinking water.

(b) To have your water tested for lead, or to get more information about this public health concern, please call [insert the phone number of the city or water system owner or operator].

**(3)** DELIVERY OF A PUBLIC EDUCATION PROGRAM. (a) In communities where a significant proportion of the population speaks a language other than English, public education materials shall be communicated in the appropriate languages.

(b) The owner or operator of a community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with s. NR 809.547, and that is not already repeating public education tasks pursuant to sub. (3) (c), (g) or (h), shall, within 60 days:

1. Insert notices in each customer's water utility bill containing the information in sub. (1), along with the following alert on the water bill itself in large print:

"SOME HOMES IN THIS COMMUNITY HAVE ELEVATED LEAD LEVELS IN THEIR DRINKING WATER. LEAD CAN POSE A SIGNIFICANT RISK TO YOUR HEALTH. PLEASE READ THE ENCLOSED NOTICE FOR FURTHER INFORMATION."

2. Submit the information in subs. (1) and (1m) to the editorial departments of the major daily and weekly newspapers circulated throughout the community.

3. Deliver pamphlets or brochures or both that contain the public education materials in subs. (1) (b) and (d) and (1m) (b) and (d) to facilities and organizations, including the following:

a. Public schools and/or local school boards;

b. City or county health department;

c. Women, Infants, and Children and/or Head Start Program(s) whenever available;

d. Public and private hospitals and/or clinics;

e. Pediatricians;

f. Family planning clinics; and

g. Local welfare agencies.

4. Submit the public service announcement in sub. (2) to at least 5 of the radio and television stations with the largest audiences that broadcast to the community served by the water system.

5. A community water system having a billing cycle that does not include a billing within 60 days of exceeding the action level, or that cannot insert information in the water utility bill without making major changes to its billing system, may use a separate mailing to deliver the information in par. (a) as long as the information is delivered to each customer within 60 days of exceeding the action level. Water systems shall also include the "alert" language specified in subd. 1.

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(c) A community water system owner or operator shall repeat the tasks contained in par. (b) 1. to 3. every 12 months, and the tasks contained in par. (b) 4. every 6 months for as long as the system exceeds the lead action level.

(d) Within 60 days after it exceeds the lead action level, unless it already is repeating public education tasks pursuant to par. (e), a non−transient, non−community water system owner or operator shall deliver the public education materials contained in sub. (1m) (a), (b) and (d) as follows:

1. Post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and

2. Distribute informational pamphlets or brochures or both on lead in drinking water to each person served by the non−transient, non−community water system. The department may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

(e) A non−transient, non−community water system owner or operator shall repeat the tasks contained in par. (d) at least once during each calendar year in which the system exceeds the lead action level.

(f) A water system owner or operator may discontinue delivery of public education materials if the system has met the lead action level during the most recent 6−month monitoring period conducted pursuant to s. NR 809.547. Such a system owner or operator shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.

(g) A community water system may apply to the department, in writing, unless the department has waived the requirement for prior department approval, to use the text specified in sub. (1) (b) in lieu of the text in sub. (1) (a) and to perform the tasks listed in pars. (d) and (e) in lieu of the tasks in pars. (b) and (c) if the system meets the following requirements:

1. The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices.

2. The system provides water as part of the cost of services provided and does not separately charge for water consumption.

(h) 1. A community water system serving 3,300 or fewer people may omit the task contained in par. (b) 4. As long as it distributes notices containing the information contained in sub. (1) (a) to every household served by the system, systems may further limit their public education programs as follows:

a. Systems serving 500 or fewer people may forego the task contained in par. (b) 2. The system may limit the distribution of the public education materials required under par. (b) 3. to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children, unless it is notified by the department in writing that it shall make a broader distribution.

b. If approved by the department in writing, a system serving 501 to 3,300 people may omit the task in par. (b) 2. or limit the distribution of the public education materials required under par. (b) 3. or both to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

2. A community water system serving 3,300 or fewer people that delivers public education in accordance with par. (h) 1. shall repeat the required public education tasks at least once during each calendar year in which the system exceeds the lead action level.

**(4)** SUPPLEMENTAL MONITORING AND NOTIFICATION OF RESULTS. A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with s. NR 809.547 shall offer to sample the tap water of any customer who requests it. The system owner or operator is not required to pay for collecting or analyzing the sample, nor is the system owner or operator required to collect and analyze the sample itself.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; CR 00−161: am. (1) (intro.), (1) (d) 2. e., (3) (b) (intro.), 1., 2. and 3. (intro.), (3) (d) (intro.) and 2., cr. (1m), (3) (b) 5., (g) and (h), Register November 2002 No. 563, eff. 12−1−02; **CR 07−025: am. (1) (a) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.547 Monitoring requirements for lead and copper in tap water. (1)** SAMPLE SITE LOCATION. (a) By the applicable date for commencement of monitoring under sub. (4) (a), each water system owner or operator shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meet the requirements as specified in pars. (c) to (f), and which is sufficiently large to ensure that the water system owner or operator can collect the number of lead and copper tap samples required in sub. (3). All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point−of−use or point−of−entry treatment devices designed to remove inorganic contaminants.

(b) A water system owner or operator shall use the information on lead, copper and galvanized steel that it is required to collect under s. NR 809.14 (4) when conducting a materials evaluation. When an evaluation of the information collected pursuant to s. NR 809.14 (4) is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in this subsection, the water system owner or operator shall review the following sources of information in order to identify a sufficient number of sampling sites. In addition, the system owner or operator shall seek to collect such information where possible in the course of its normal operations, e.g., checking service line materials when reading water meters or performing maintenance activities:

1. All plumbing codes, permits and records in the files of the building department which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;

2. All inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and

3. All existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

(c) The sampling sites selected for a community water system's sampling pool, "tier 1 sampling sites", shall consist of single family structures that:

1. Contain copper pipes with lead solder installed after 1982 or contain lead pipes; or

2. Are served by a lead service line. When multiple−family residences comprise at least 20% of the structures served by a water system, the system may include these types of structures in its sampling pool, or both.

(d) Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with "tier 2 sampling sites", consisting of buildings, including multiple−family residences that:

1. Contain copper pipes with lead solder installed after 1982 or contain lead pipes; or

2. Are served by a lead service line, or both.

(e) Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with "tier 3 sampling sites", consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2 and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. For the purpose of this para-

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graph, a representative site is a site at which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(f) The sampling sites selected for a non−transient non−community water system, "tier 1 sampling sites", shall consist of buildings that:

1. Contain copper pipes with lead solder installed after 1982 or contain lead pipes; or

2. Are served by a lead service line, or both.

(g) A non−transient, non−community water system with insufficient tier 1 sites that meet the targeting criteria in par. (f) shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the non−transient non−community water system shall use representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site at which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(h) Any water system owner or operator whose distribution system contains lead service lines shall draw 50% of the samples collected during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50% of those samples from sites served by a lead service line. A water system owner or operator who cannot identify a sufficient number of sampling sites served by a lead service line shall collect first draw samples from all of the sites identified as being served by such lines.

**(2)** SAMPLE COLLECTION METHODS. (a) All tap samples for lead and copper collected in accordance with this subchapter, with the exception of lead service line samples collected under s. NR 809.545 (3) and samples collected under par. (e), shall be first draw samples.

(b) Each first−draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least 6 hours. First−draw samples from residential housing shall be collected from the cold water kitchen tap or bathroom sink tap. First−draw samples from a nonresidential building shall be collected at an interior tap from which water is typically drawn for consumption. Non−first−draw samples collected in lieu of first−draw samples pursuant to par. (e) shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First−draw samples may be collected by the system or the system may allow residents to collect first−draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acidification of first−draw samples may be done up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample shall stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

(c) If the sample is not acidified immediately after collection, then the sample shall stand in the original container for at least 16 hours after acidification.

1. First−draw samples from residential housing shall be collected from the cold−water kitchen tap or bathroom sink tap.

2. First−draw samples from a non−residential building shall be collected at an interior tap from which water is typically drawn for consumption.

3. For systems that conduct business 24 hours per day, a first draw sample shall represent water that has been standing in the pipes for the longest time possible.

4. First−draw samples may be collected by the system owner or operator or the system may allow residents to collect first−draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acidification of first−draw samples may be done up to 14 days after the sample is collected.

5. If a system owner or operator allows residents to perform sampling, the system owner or operator may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

(cm) Each service line sample shall be one liter in volume and have stood motionless in the lead service line for at least 6 hours. Lead service line samples shall be collected in one of the following 3 ways:

1. At the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;

2. Tapping directly into the lead service line; or

3. If the sampling site is a building constructed as a single−family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

(d) A water system owner or operator shall collect each first−draw tap sample from the same sampling site from which it collected a previous sample. If for any reason the water system owner or operator cannot gain entry to a sampling site in order to collect a follow−up tap sample, the system owner or operator may collect the follow−up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

(e) The owner or operator of a non−transient non−community water system or a community water system that meets the criteria of s. NR 809.546 (3) (g) 1. and 2., that does not have enough taps that can supply first−draw samples, may apply to the department in writing to substitute non−first−draw samples. Owners and operators of these water systems shall collect as many first−draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The department may waive the requirement for prior departmental approval of non−first−draw sample sites selected by the system, either through department rule or written notification to the system.

**(3)** NUMBER OF SAMPLES. Water system owners or operators shall collect at least one sample during each monitoring period specified in sub. (4) from the number of sites listed in the following column titled "standard monitoring." A system owner or operator conducting reduced monitoring under sub. (4) (d) may collect one sample from the number of sites specified in the second following column during each monitoring period specified in sub. (4) (d). The department may specify sampling locations when a system is conducting reduced monitoring.

| System Size (# People Served) | # of sites (Standard Monitoring) | # of sites (Reduced Monitoring) |
|---|---|---|
| >100,000 | 100 | 50 |
| 10,001−100,000 | 60 | 30 |
| 3,301 to 10,000 | 40 | 20 |
| 501 to 3,300 | 20 | 10 |
| 101 to 500 | 10 | 5 |
| ≤ 100 | 5 | 5 |

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**(4)** TIMING OF MONITORING. (a) *Initial tap sampling.* The first 6−month monitoring period for small, medium and large−size systems shall begin on the following dates:

| System Size (# People Served) | First six−month Monitoring Period Begins On |
|---|---|
| >50,000 | January 1, 1992 |
| 3,301 to 50,000 | July 1, 1992 |
| ≤3,300 | July 1, 1993 |

1. The owners and operators of all large systems shall monitor during 2 consecutive 6−month periods.

2. The owners and operators of all small and medium−size systems shall monitor during each 6−month monitoring period until:

a. The system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under s. NR 809.542, in which case the system owner or operator shall continue monitoring in accordance with par. (b), or

b. The system meets the lead or copper action levels during 2 consecutive 6−month monitoring periods, in which case the system owner or operator may reduce monitoring in accordance with par. (d).

(b) *Monitoring after installation of corrosion control and source water treatment.* 1. Any large system with optimal corrosion control treatment installed pursuant to s. NR 809.542 (4) (d) shall be monitored during 2 consecutive 6−month periods by the date specified in s. NR 809.542 (4) (e).

2. Any small or medium−size system with optimal corrosion control treatment installed pursuant to s. NR 809.542 (5) (e) shall be monitored during 2 consecutive 6−month monitoring periods by the date specified in s. NR 809.542 (5) (f).

3. Any system owner or operator that installs source water treatment pursuant to s. NR 809.544 (1) (c) shall monitor during 2 consecutive 6−month monitoring periods by the date specified in s. NR 809.544 (1) (d).

(c) *Monitoring after the department specifies water quality parameter values for optimal corrosion control.* After the department approves the values for water quality control parameters under s. NR 809.543 (6), the system owner or operator shall monitor during each subsequent 6−month monitoring period, with the first monitoring period to begin on the date the department specifies the optimal values under s. NR 809.543 (6).

(d) *Reduced monitoring.* 1. The owner or operator of a small or medium−size water system that meets the lead and copper action levels during each of 2 consecutive 6−month monitoring periods may reduce the number of samples in accordance with sub. (3), and reduce the frequency of sampling to once per year.

2. Any water system owner or operator that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the department under s. NR 809.543 (6) during each of 2 consecutive 6−month monitoring periods may request that the department allow the system owner or operator to reduce the frequency of monitoring to once per year and reduce the number of lead and copper samples in accordance with sub. (3), if it receives written approval from the department. The department shall review monitoring, treatment, and other relevant information submitted by the water system owner or operator in accordance with s. NR 809.55, and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring. The department shall review, and where appropriate, revise its determination when the system owner or operator submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

3. The owner or operator of a small or medium−size water system that meets the lead and copper action levels during 3 consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every 3 years. Any owner or operator of a water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the department under s. NR 809.543 (6) during 3 consecutive years of monitoring may reduce the frequency of monitoring from annually to once every 3 years if it receives written approval from the department. The department shall review monitoring, treatment and other relevant information submitted by the water system owner or operator in accordance with s. NR 809.55, and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every 3 years. The department shall review, and where appropriate, revise its determination when the water supplier submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

4. A water system owner or operator that reduces the number and frequency of sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in sub. (1). System owners or operators sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September unless the department has approved a different sampling.

a. The department may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. A period shall be no longer than 4 consecutive months and shall represent a time of normal operation where the highest levels of lead are most likely to occur. For a non−transient non−community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the department shall designate a period that represents a time of normal operation for the system.

b. Systems monitoring annually, that have been collecting samples during the months of June through September and that receive department approval to alter their sample collection period under this subd. 4. a. shall collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive department approval to alter the sampling collection period as under this subd. 4. a. shall collect their next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling shall be collected annually or triennially, as required by this section. Small water systems with waivers, granted pursuant to sub. (7), that have been collecting samples during the months of June through September and receive department approval to alter their sample collection period under this subd. 4. a. shall collect their next round of samples before the end of the 9−year period.

5. Any water system owner or operator that demonstrates for 2 consecutive 6−month monitoring periods that the tap water lead level computed under s. NR 809.541 (3) (c) is less than or equal to 0.005 mg/L and the tap water copper level computed under s. NR 809.541 (3) (c) is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with sub. (3) and reduce the frequency of sampling to once every 3 calendar years.

6. a. Water suppliers for a small or medium−sized water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with par. (c) and collect the number of samples specified for standard monitoring under sub. (3). A system owner or operator shall also conduct water quality parameter monitoring in accordance with s. NR 809.548 (2), (3) or (4) during the monitoring period in which the action level was exceeded. Any water system subject to reduced monitoring frequency that fails to operate within the range of values for the water quality control parameters specified by the

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department under s. NR 809.543 (6) shall resume tap water sampling in accordance with par. (c) and collect the number of samples specified for standard monitoring under sub. (3).

b. Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the department under s. NR 809.543 (6) for more than 9 days in any 6−month period specified in s. NR 809.548 (4) shall conduct tap water sampling for lead and copper at the frequency specified in par. (c), collect the number of samples specified for standard monitoring under sub. (3), and shall resume monitoring for water quality parameters within the distribution system in accordance with s. NR 809.548 (4).

7. Any water system conducting tap monitoring for lead and copper under par. (b) may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

a. The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in sub. (3) after it has completed 2 subsequent 6−month rounds of monitoring that meet the criteria subd. 2. and the system has received written approval from the department that it is appropriate to resume reduced monitoring on an annual frequency.

b. The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either subd. 3. or 5. and the system has received written approval from the department that it is appropriate to resume triennial monitoring.

c. The system may reduce the number of water quality parameter tap water samples required in accordance with s. NR 809.548 (5) (a) and the frequency with which it collects such samples in accordance with s. NR 809.548 (5) (b). A system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of s. NR 809.548 (5) (b), that it has re−qualified for triennial monitoring.

8. Any water system subject to a reduced monitoring frequency under this paragraph that either adds a new source of water or changes any water treatment shall inform the department in writing in accordance with s. NR 809.55 (1) (e). The department may require the system to resume sampling in accordance with sub. (2) (c) and collect the number of samples specified for standard monitoring under sub. (3) or take other appropriate steps such as increased water quality parameter monitoring or re−evaluation of its corrosion control treatment given the potentially different water quality considerations.

**(5)** ADDITIONAL MONITORING BY SYSTEM OWNER OR OPERATORS. The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system owner or operator and the department in making any determinations, i.e., calculating the 90th percentile lead or copper level, under this subchapter.

**(6)** INVALIDATION OF LEAD OR COPPER TAP WATER SAMPLES. A sample invalidated under this subsection does not count toward determining lead or copper 90th percentile levels under s. NR 809.541 (3) (c) or toward meeting the minimum monitoring requirements of sub. (3).

(a) The department may invalidate a lead or copper tap water sample if at least one of the following conditions is met:

1. The laboratory establishes that improper sample analysis caused erroneous results.

2. The department determines that the sample was taken from a site that did not meet the site selection criteria of this section.

3. The sample container was damaged in transit.

4. There is substantial reason to believe that the sample was subject to tampering.

(b) The system shall report the results of all samples to the department and all supporting documentation for samples the system believes should be invalidated.

(c) To invalidate a sample under par. (a), the decision and the rationale for the decision shall be documented in writing. The department may not invalidate a sample solely on the grounds that a follow−up sample result is higher or lower than that of the original sample.

(d) The water system owner or operator shall collect replacement samples for any samples invalidated under this subsection if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of sub. (3). Any replacement samples shall be taken as soon as possible, but no later than 20 days after the date the department invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period may not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

**(7)** MONITORING WAIVERS FOR SMALL WATER SYSTEMS. The owner or operator of any small water system that meets the criteria of this subsection may apply to the department to reduce the frequency of monitoring for lead and copper under this section to once every 9 years, also known as a "full waiver," if it meets all of the materials criteria specified in par. (a) and all of the monitoring criteria specified in par. (b). If department rules permit, any small water system that meets the criteria in pars. (a) and (b) only for lead, or only for copper, may apply to the department for a waiver to reduce the frequency of tap water monitoring to once every 9 years for that contaminant only, also known as a "partial waiver."

(a) *Materials criteria.* The system owner or operator shall demonstrate that its distribution system and service lines and all drinking water supply plumbing, including plumbing conveying drinking water within all residences and buildings connected to the system, are free of lead−containing materials or copper−containing materials, as those terms are defined in this paragraph, as follows:

1. 'Lead.' To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead, hereafter known as a "lead waiver," the water system owner or operator shall provide certification and supporting documentation to the department that the system is free of all lead−containing materials, as follows:

a. It contains no plastic pipes which contain lead plasticizers, or plastic service lines which contain lead plasticizers; and

b. It is free of lead service lines, lead pipes, lead soldered pipe joints, and leaded brass or bronze alloy fittings and fixtures, unless the fittings and fixtures meet the specifications of any standard established pursuant to 42 USC 300g−6(e).

**Note:** 42 USC 300g−6(e) is section 1417 (e) of the federal Safe Drinking Water Act.

2. 'Copper.' To qualify for a full waiver, or a waiver of the tap water monitoring requirements for copper, hereafter known as a "copper waiver," the water system owner or operator shall provide certification and supporting documentation to the department that the system contains no copper pipes or copper service lines.

(b) *Monitoring criteria for waiver issuance.* The system shall have completed at least one 6−month round of standard tap water monitoring for lead and copper at sites approved by the department and from the number of sites required by sub. (3) and demonstrate that the 90th percentile levels for any and all rounds of monitoring conducted since the system became free of all lead−containing and copper−containing materials, as appropriate, meet the following criteria:

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1. 'Lead levels.' To qualify for a full waiver, or a lead waiver, the system shall demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.

2. 'Copper levels.' To qualify for a full waiver, or a copper waiver, the system shall demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.

(c) *Department approval of waiver application.* The department shall notify the system owner or operator of its waiver determination, in writing, setting forth the basis of its decision and any condition of the waiver. As a condition of the waiver, the department may require the system owner or operator to perform specific activities, such as limited monitoring, periodic outreach to customers to remind them to avoid installation of materials that might void the waiver, to avoid the risk of lead or copper concentration of concern in tap water. The small water system shall continue monitoring for lead and copper at the tap as required by sub. (4) (a) to (d), as appropriate, until it receives written notification from the department that the waiver has been approved.

(d) *Monitoring frequency for systems with waivers.* 1. A system owner or operator with a full waiver shall conduct tap water monitoring for lead and copper in accordance with sub. (4) (d) 4. at the reduced number of sampling sites identified in sub. (3) at least once every 9 years and provide the materials certification specified in par. (a) for both lead and copper to the department along with the monitoring results.

2. A system owner or operator with a partial waiver shall conduct tap water monitoring for the waived contaminant in accordance with sub. (4) (d) 4. at the reduced number of sampling sites specified in sub. (3) at least once every 9 years and provide the materials certification specified in par. (a) pertaining to the waived contaminant along with the monitoring results. The system owner or operator shall also continue to monitor for the non−waived contaminant in accordance with requirements of sub. (4) (a) to (d), as appropriate.

3. If a system with a full or partial waiver adds a new source of water or changes any water treatment, the system owner or operator shall notify the department in writing in accordance with s. NR 809.55 (1) (e). The department has the authority to require the system to add or modify waiver conditions. The department may require recertification that the system is free of lead−containing or copper−containing materials, or both, require additional rounds of monitoring, if it deems the modifications are necessary to address treatment or source water changes at the system.

4. If a system with a full or partial waiver becomes aware that it is no longer free of lead−containing or copper−containing materials as a result of new construction or repairs, the system owner or operator shall notify the department in writing no later than 60 days after becoming aware of a change.

(e) *Continued eligibility.* If the system continues to satisfy the requirements of par. (d), the waiver shall be renewed automatically, unless any of the conditions listed in subds. 1. to 3. occurs. A system whose waiver has been revoked may re−apply for a waiver at a time as it again meets the appropriate materials and monitoring criteria of pars. (a) and (b).

1. A system with a full waiver or a lead waiver no longer satisfies the materials criteria of par. (a) 1. if the 90th percentile lead level is greater than 0.005 mg/L.

2. A system with a full waiver or a copper waiver no longer satisfies the materials criteria of par. (a) 2. if the 90th percentile copper level is greater than 0.65 mg/L.

3. The department notifies the system owner or operator, in writing, that the waiver has been revoked, setting forth the basis of its decision.

(f) *Requirements following waiver revocation.* A system whose full or partial waiver has been revoked by the department is subject to the corrosion control treatment and lead and copper tap water monitoring requirements, as follows:

1. If the system exceeds the lead or copper action level, or both, the system shall implement corrosion control treatment in accordance with the deadlines specified in s. NR 809.542 (5), and any other applicable requirements of this paragraph.

2. If the system meets both the lead and the copper action level, the system shall monitor for lead and copper at the tap no less frequently than once every 3 years using the reduced number of sample sites specified in sub. (3).

(g) *Pre−existing waivers.* Small water system waivers approved by the department in writing prior to April 11, 2000 shall remain in effect under the following conditions:

1. If the system has demonstrated that it is both free of lead−containing and copper−containing materials, as required by par. (a) and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of par. (b), the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of par. (e). The first round of tap water monitoring conducted pursuant to par. (d) shall be completed no later than 9 years after the last time the system has monitored for lead and copper at the tap.

2. If the system has met the materials criteria of par. (a) but has not met the monitoring criteria of par. (b), the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of par. (b) to meet initial monitoring requirements. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of par. (e). The first round of tap water monitoring conducted pursuant to par. (d) shall be completed no later than 9 years after the round of monitoring conducted pursuant to par. (b).

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; correction in (2) made under s. 13.93 (2m) (b) 1., Stats., Register, October, 1997, No. 502**;** correction in (2) made under s. 13.93 (2m) (b) 1., Stats., am. (2) (c), Register, October, 1997, No. 502, eff. 11−1−97; CR 00−161: am. (1) (e) and (g), (2) (a) and (b), (3) and (4) (d) 2. to 4., r. (1) (h), cr. (2) (e), (4) (d) 4. a. and b., 6. to 8., (6) and (7), r. and recr. (4) (d) 5., Register November 2002 No. 563, eff. 12−1−02.

**NR 809.548 Monitoring requirements for water quality parameters.** Owners or operators of all large systems, and of all small and medium−size systems that exceed the lead or copper action level, shall monitor water quality parameters in addition to lead and copper in accordance with this section. The requirements of this section are summarized in the table at the end of this section.

**(1)** GENERAL REQUIREMENTS. (a) *Sample collection methods.* 1. Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system owner or operator, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under s. NR 809.547 (1).

2. Samples collected at the entry points to the distribution system shall be from locations representative of each source after treatment. If a system draws water from more than one source and the sources are combined before distribution, the system owner or operator shall sample at an entry point to the distribution system during periods of normal operating conditions, i.e., when water is representative of all sources being used.

(b) *Number of samples.* 1. System owners or operators shall collect 2 tap samples for applicable water quality parameters dur-

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ing each monitoring period specified under subs. (2) to (5) from the following number of sites.

| System Size (# People Served) | # of Sites For Water Quality Parameters |
|---|---|
| >100,000 | 25 |
| 10,001−100,000 | 10 |
| 3,301 to 10,000 | 3 |
| 501 to 3,300 | 2 |
| 101 to 500 | 1 |
| ≤ 100 | 1 |

2. Except as provided in sub. (3) (c), water suppliers shall collect 2 samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in sub. (2).

**(2)** INITIAL SAMPLING. Owners or operators of all large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each 6−month monitoring period specified in s. NR 809.547 (4) (a). Owners or operators of all small and medium−size systems shall measure the applicable water quality parameters at the locations specified below during each 6−month monitoring period specified in s. NR 809.547 (4) (a) during which the system exceeds the lead or copper action level.

(a) At taps:

1. pH;

2. Alkalinity;

3. Orthophosphate, when an inhibitor containing a phosphate compound is used;

4. Silica, when an inhibitor containing a silicate compound is used;

5. Calcium;

6. Conductivity; and

7. Water temperature.

(b) At each entry point to the distribution system: all of the applicable parameters listed in par. (a).

**(3)** MONITORING AFTER INSTALLATION OF CORROSION CONTROL. The owner or operator of any large system which installs optimal corrosion control treatment pursuant to s. NR 809.542 (4) (d) shall measure the water quality parameters at the following locations and frequencies during each 6−month monitoring period specified in s. NR 809.547 (4) (b) 1. The owner or operator of any small or medium−size system which installs optimal corrosion control treatment shall conduct such monitoring during each 6−month monitoring period specified in s. NR 809.547 (4) (b) 2. in which the system exceeds the lead or copper action level.

(a) At taps, 2 samples for:

1. pH;

2. Alkalinity;

3. Orthophosphate, when an inhibitor containing a phosphate compound is used;

4. Silica, when an inhibitor containing a silicate compound is used; and

5. Calcium, when calcium carbonate stabilization is used as part of corrosion control.

(b) Except as provided in par. (c), at each entry point to the distribution system, one sample every 2 weeks (bi−weekly) for:

1. pH;

2. When alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity and the alkalinity concentration; and

3. When a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used and the concentration of orthophosphate or silica, whichever is applicable.

(c) Any ground water system can limit entry point sampling described in par. (b) to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated ground water sources mixes with water from treated ground water sources, the system shall monitor for water quality parameters both at representative entry points receiving treatment and representative entry points receiving no treatment. Prior to the start of any monitoring under this subsection, the system shall provide to the department written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

**(4)** MONITORING AFTER THE DEPARTMENT SPECIFIES WATER QUALITY PARAMETER VALUES FOR OPTIMAL CORROSION CONTROL. After the department specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under s. NR 809.543 (6), water system owners or operators for all large systems shall measure the applicable water quality parameters in accordance with sub. (3) and determine compliance with the requirements of s. NR 809.543 (8) every 6 months with the first 6−month period to begin on the date the department specifies the optimal values under s. NR 809.543 (6). Water system owners or operators for any small or medium−size system shall conduct monitoring during each 6−month period specified in s. NR 809.547 (4) (c) in which the system exceeds the lead or copper action level. For any small and medium−size system that is subject to a reduced monitoring frequency pursuant to s. NR 809.547 (4) (d) at the time of the action level exceedance, the end of the applicable 6−month period under this paragraph shall coincide with the end of the applicable monitoring period under s. NR 809.547 (4) (d). Compliance with department−designated optimal water quality parameter values shall be determined as specified under s. NR 809.543 (8).

**(5)** REDUCED MONITORING. (a) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of 2 consecutive 6−month monitoring periods under sub. (4) shall continue monitoring at the entry points to the distribution system as specified in sub. (3) (b). Such system may collect 2 tap samples for applicable water quality parameters from the following reduced number of sites during each 6−month monitoring period.

| (# People Served) System Size | Reduced # of Sites for Water Quality Parameters |
|---|---|
| >100,000 | 10 |
| 10,001 to 100,000 | 7 |
| 3,301 to 10,000 | 3 |
| 501 to 3,300 | 2 |
| 101 to 500 | 1 |
| ≤ 100 | 1 |

(b) 1. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the department under s. NR 809.543 (6) during 3 consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in par. (a) from every 6 months to annually.

2. A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in par. (a) to every 3 years if it demonstrates during 2 consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the practical quantitation limit for lead specified in s. NR 809.725 (1), Table A, that its tap water copper level at the 90th percentile is less than or equal to 0.65

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mg/L for copper in s. NR 809.541 (3) (b), and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the department under s. NR 809.543 (6).

(c) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the department under s. NR 809.543 (6) during 3 consecutive years of annual monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in par. (a) from annually to every 3 years.

(d) A water system owner or operator that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

(e) Any owner or operator that has a water system subject to reduced monitoring frequency that fails to operate within the range of values for the water quality parameters specified by the department under s. NR 809.543 (6) for more than 9 days in any 6−month period specified in s. NR 809.543 (8) shall resume distribution system tap water sampling in accordance with the number and frequency requirements in sub. (4). A system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in par. (a) after it has completed 2 subsequent consecutive 6−month rounds of monitoring that meet the criteria of that paragraph or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds or monitoring that it meets the criteria of either par. (b) 1. or 2., or both.

**Summary of Monitoring Requirements for Water Quality Parameters[1]**

| Monitoring period | Parameters[2] | Location | Frequency |
|---|---|---|---|
| Initial monitoring | pH, alkalinity, orthophosphate or silica[3], calcium, conductivity, temperature. | Taps and at entry points to distribution system. | Every 6 months. |
| After installation of corrosion control | pH, alkalinity, orthophosphate or silica[3], calcium[4]. | Taps | Every 6 months. |
| | pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]. | Entry points to the distribution system[6]. | No less frequently than every 2 weeks. |
| After department specifies parameter values for optimal corrosion control | pH, alkalinity, orthophosphate or silica[3], calcium[4]. | Taps | Every 6 months. |
| | pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]. | Entry points to the distribution system[6]. | No less frequently than every 2 weeks |
| Reduced monitoring | pH, alkalinity, orthophosphate or silica[3], calcium[4]. | Taps | Every 6 months, annually[7]or every 3 years[8]; reduced number of sites |
| | pH, alkalinity, dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]. | Entry points to the distribution system[6]. | No less frequently than every 2 weeks |

**Note:** [1] Table is for illustrative purposes; consult the text of this section for precise regulatory requirements.

2 Small and medium−size systems have to monitor for water quality parameters only during monitoring periods in which the system exceeds the lead or copper action level.

3 Orthophosphate must be measured only when an inhibitor containing a phosphate compound is used. Silica must be measured only when an inhibitor containing silicate compound is used.

4 Calcium must be measured only when calcium carbonate stabilization is used as part of corrosion control.

5 Inhibitor dosage rates and inhibitor residual concentrations (orthophosphate or silica) must be measured only when an inhibitor is used.

6 Ground water systems may limit monitoring to representative locations throughout the system.

7 Water systems may reduce frequency of monitoring for water quality parameters at the tap from every 6 months to annually if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during 3 consecutive years of monitoring.

8 Water systems may further reduce the frequency of monitoring for water quality parameters at the tap from annually to once every 3 years if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during 3 consecutive years of annual monitoring. Water systems may accelerate to triennial monitoring for water quality parameters at the tap if they have maintained 90th percentile lead levels less than or equal to 0.005 mg/L, 90th percentile copper levels less than or equal to 0.65 mg/L, and the range of water quality parameters designated by the department under s. NR 809.543(7) as representing optimal corrosion control during 2 consecutive 6−month monitoring periods.

**(6)** ADDITIONAL MONITORING BY SYSTEM OWNER OR OPERATORS. The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the department in making any determinations, i.e., determining concentrations of water quality parameters, under this section or s. NR 809.543.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; am. (intro.), Register, October, 1997, No. 502, eff. 11−1−97; CR 00−161: am. (1) (b) 2., (3) (b) (intro.), (4) and (5) (e), renum. (5) (b) to be (5) (b) 1., cr. (3) (c), (5) (b) 2. and (5) (e) table, Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (3) (a) 4. Register October 2003 No. 574, eff. 11−1−03.

**NR 809.549 Monitoring requirements for lead and copper in source water. (1)** SAMPLE LOCATION, COLLECTION METHODS AND NUMBER OF SAMPLES. (a) The owner or operator of a water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with s. NR 809.547 shall collect lead and copper source water samples in accordance with the requirements regarding sample location, number of samples and collection methods:

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1. The owner or operator of groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment. The system shall take one sample at the same sampling location unless conditions make another sampling location more representative of each source or treatment plant.

2. The owner or operator of surface water systems shall take a minimum of one sample 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. The system shall take each sample at the same sampling location unless conditions make another sampling location more representative of each source or treatment plant. For the purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

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

4. The department may reduce the total number of samples which are to be analyzed by allowing the use of compositing. Compositing of samples shall be done by certified laboratory personnel. Composite samples from a maximum of 5 samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/ L, either:

a. A follow−up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or

b. If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

(b) Where the results of sampling indicate an exceedance of maximum permissible source water levels established under s. NR 809.544 (2) (d), the department may require that one additional sample be collected as soon as possible after the initial sample was taken, but not to exceed 2 weeks, at the same sampling point. If a department−required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the department−specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below 5 ug/l, shall be considered as the measured value.

**(2)** MONITORING FREQUENCY AFTER SYSTEM EXCEEDS TAP WATER ACTION LEVEL. Any owner or operator of a system that exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system within 6 months after the exceedance.

**(3)** MONITORING FREQUENCY AFTER INSTALLATION OF SOURCE WATER TREATMENT. Any system owner or operator which installs source water treatment pursuant to s. NR 809.544 (1) (b) shall collect an additional source water sample from each entry point to the distribution system during 2 consecutive 6−month monitoring periods by the deadline specified in s. NR 809.544 (1) (d).

**(4)** MONITORING FREQUENCY AFTER DEPARTMENT SPECIFIES MAXIMUM PERMISSIBLE SOURCE WATER LEVELS OR DETERMINES THAT SOURCE WATER TREATMENT IS NOT NEEDED. (a) A system owner or operator shall monitor at the frequency specified below in cases where the department specifies maximum permissible source water levels under s. NR 809.544 (2) (d) or determines that the system owner or operator is not required to install source water treatment under s. NR 809.544 (2) (b).

1. An owner or operator of a water system using only groundwater shall collect samples once during the 3−year compliance period in effect when the applicable department determination under par. (a) is made. System owners or operators shall collect samples once during each subsequent compliance period.

2. An owner or operator of a water system using surface water, or a combination of surface and groundwater, shall collect samples once during each year, the first annual monitoring period to begin on the date on which the applicable department determination under par. (a) is made.

(b) A system owner or operator is not required to conduct source water sampling for lead or copper, or both if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system under par. (a) 1. or 2.

**(5)** REDUCED MONITORING FREQUENCY. (a) A water system using only groundwater may reduce the monitoring frequency for lead or copper or both in source water to once during each 9−year compliance cycle if the system meets one of the following criteria:

1. The system demonstrates that the finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the department in s. NR 809.544 (2) (d) during at least 3 consecutive compliance periods under sub. (4) (a).

2. The department has determined that source water treatment is not needed and the system demonstrates that, during at least 3 consecutive compliance periods in which sampling was conducted under sub. (4) (a), the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(b) A water system using surface water, or a combination of surface and groundwater may reduce the monitoring frequency in sub. (4) (a) to once during each 9−year compliance cycle, if the system meets one of the following criteria:

1. The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the department in s. NR 809.544 (2) (d) for at least 3 consecutive years.

2. The department has determined that source water treatment is not needed and the system demonstrates that, during at least 3 consecutive years, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(c) A water system that uses a new source of water is not eligible for reduced monitoring for lead or copper or both until concentrations in samples collected from the new source during 3 consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the department in s. NR 809.544 (1) (e).

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93; am. (1) (a), Register, October, 1997, No. 502, eff. 11−1−97; CR 00−161: am. (1) (a) and (5) (b), cr. (1) (a) 1. to 4., (5) (a) 1. and 2. and (5) (b) 1. and 2., Register November 2002 No. 563, eff. 12−1−02.

**NR 809.55 Reporting requirements.** All water system owners or operators shall report all of the following information to the department in accordance with this section:

**(1)** REPORTING REQUIREMENTS FOR TAP WATER MONITORING FOR LEAD AND COPPER AND FOR WATER QUALITY PARAMETER MONITORING. (a) All lead samples that are detected shall be quantified. Any sample below the method detection limit shall be calculated at zero for the purposes of determining compliance with s. NR 809.541 (3) (c).

(b) All copper samples that are detected shall be quantified. Any sample below the method detection limit shall be calculated as zero for the purposes of determining compliance with s. NR 809.541 (3) (c).

(c) Except as provided in subd. 8., a water system owner or operator shall report the following information for all tap water

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samples specified in s. NR 809.547 and for all water quality parameter samples specified in s. NR 809.548 within the first 10 days following the end of each applicable monitoring period specified in ss. NR 809.547, 809.548 and 809.549, i. e., 6 months, annually, or every 3 years:

1. The results of all tap samples for lead and copper including the location of each site and the criteria under s. NR 809.547 (1) (c), (d), (e), (f) or (g) under which the site was selected for the system's sampling pool;

2. Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to s. NR 809.547 (6) (b).

4. The 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, calculated in accordance with s. NR 809.541 (3) (c), unless the department calculates the system's 90th percentile lead and copper levels under sub. (8).

5. With the exception of initial tap sampling conducted pursuant to s. NR 809.547 (4) (a), the system owner or operator shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

6. The results of all tap samples for pH and, where applicable, alkalinity, calcium, conductivity, temperature and orthophosphate or silica collected under s. NR 809.548 (2) to (5);

7. The results of all samples collected at the entry points to the distribution system for applicable water quality parameters under s. NR 809.548 (2) to (5).

8. A water system owner or operator shall report the results of all water quality parameter samples collected under s. NR 809.548 (3) to (6) during each 6−month monitoring period specified in s. NR 809.548 (4) within the first 10 days following the end of the monitoring period unless the department has specified a more frequent reporting requirement.

(d) For the owner or operator of a non−transient non−community water system, or the owner or operator of a community water system meeting the criteria of s. NR 809.546 (3) (g) 1. and 2., that does not have enough taps that can provide first−draw samples, the system owner or operator shall complete one of the following:

1. Provide written documentation to the department identifying standing times and locations for enough non−first−draw samples to make up its sampling pool under s. NR 809.547 (1) by the start of the first applicable monitoring period under s. NR 809.547 (4) that commences after April 11, 2000, unless the department has waived prior departmental approval of non−first−draw sample sites selected by the system pursuant to s. NR 809.547 (2) (e).

2. If the department has waived prior approval of non−first−draw sample sites selected by the system, identify, in writing, each site that did not meet the 6−hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to s. NR 809.547 (2) (e) and include this information with the lead and copper tap sample results required to be submitted pursuant to par. (c) 1.

(e) No later than 60 days after the addition of a new source or any change in water treatment, unless the department requires earlier notification, a water system deemed to have optimized corrosion control under s. NR 809.542 (2) (c), a water system subject to reduced monitoring pursuant to s. NR 809.547 (4) (d), or a water system subject to a monitoring waiver pursuant to s. NR 809.547 (7), shall send written documentation to the department describing the change.

**Note:** In those instances where prior department approval of the treatment change or new source is not required, the water system owners or operators are encouraged to provide the notification to the department beforehand to minimize the risk the treatment change or new source will adversely affect optimal corrosion control.

(f) The owner or operator of any small water system applying for a monitoring waiver under s. NR 809.547 (7) or subject to a waiver granted pursuant to s. NR 809.547 (7) (c), shall provide the following information to the department in writing by the specified deadline:

1. By the start of the first applicable monitoring period in s. NR 809.547 (4), the owner or operator of any small water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of s. NR 809.547 (7) (a) and (b).

2. No later than 9 years after the monitoring previously conducted pursuant to s. NR 809.547 (7) (b) or (d) 1., the owner or operator of each small water system desiring to maintain its monitoring waiver shall provide the information required by s. NR 809.547 (7) (d) 1. and 2.

3. No later than 60 days after it becomes aware that it is no longer free of lead−containing or copper−containing material, as appropriate, the owner or operator of each small water system with a monitoring waiver shall provide written notification to the department, setting forth the circumstances resulting in the lead−containing and copper−containing materials being introduced into the system and what corrective action, if any, the system plans to remove these materials.

4. The owner or operator of any small water system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of s. NR 809.547 (7) (b) shall provide the information required by that paragraph as required by the department.

(g) Each groundwater system that limits water quality parameter monitoring to a subset of entry points under s. NR 809.548 (3) (c) shall provide, by the commencement of the monitoring, written correspondence to the department that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

**(2)** SOURCE WATER MONITORING REPORTING REQUIREMENTS. (a) A water system owner or operator shall report the sampling results for all source water samples collected in accordance with s. NR 809.549 within the first 10 days following the end of each source water monitoring period, i.e., annually, per compliance period, per compliance cycle specified in s. NR 809.549.

(b) With the exception of the first round of source water sampling conducted pursuant to s. NR 809.549 (2), the system owner or operator shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.

**(3)** CORROSION CONTROL TREATMENT REPORTING REQUIREMENTS. By the applicable dates under s. NR 809.542, system owners or operators shall report the following information:

(a) For owners or operators of systems demonstrating that they have already optimized corrosion control, information required in s. NR 809.542 (2) (b) or (c).

(b) For owners or operators of systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under s. NR 809.543 (1).

(c) For owners or operators of systems required to evaluate the effectiveness of corrosion control treatments under s. NR 809.543 (3), the information required by that section.

(d) For owners or operators of systems required to install optimal corrosion control approved by the department under s. NR 809.543 (4), a letter certifying that the system owner or operator has completed installing that treatment.

**(4)** SOURCE WATER TREATMENT REPORTING REQUIREMENTS. By the applicable dates in s. NR 809.544, system owners or operators shall provide the following information to the department:

(a) If required under s. NR 809.544 (2) (a), their recommendation regarding source water treatment;

(b) For system owners or operators required to install source water treatment under s. NR 809.544 (2) (b), a letter certifying that

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the system owner or operator has completed installing the treatment approved by the department within 24 months after the department approved the treatment.

**(5)** LEAD SERVICE LINE REPLACEMENT REPORTING REQUIREMENTS. System owners or operators shall report the following information to the department to demonstrate compliance with the requirements of s. NR 809.545:

(a) Within 12 months after a system exceeds the lead action level in sampling referred to in s. NR 809.545 (1), the system owner or operator shall demonstrate in writing to the department that materials evaluations were conducted, including the evaluation in s. NR 809.547 (1), to identify the initial number of lead service lines in the distribution system, and shall provide the department with the system owner or operator's schedule for replacing annually at least 7% of the initial number of lead service lines in the distribution system.

(b) Within 12 months after a system exceeds the lead action level in sampling referred to in s. NR 809.545 (1), and every 12 months thereafter, the system owner or operator shall demonstrate to the department in writing that the system owner or operator has either:

1. Replaced in the previous 12 months at least 7% of the initial lead service lines, or a greater number of lines specified by the department under s. NR 809.545 (6), in its distribution system, or

2. Conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line, taken pursuant to s. NR 809.547 (2) (cm), is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced or which meet the criteria in s. NR 809.545 (2) shall equal at least 7% of the initial number of lead lines identified under sub. (1), or the percentage specified by the department under s. NR 809.545 (6).

(c) The annual letter submitted to the department under par. (b) shall contain the following information:

1. The number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

2. The number and location of each lead service line replaced during the previous year of the system's replacement schedule; and

3. If measured, the water lead concentration and location of each lead service line sampled, the sampling method and the date of sampling.

(d) Any system which collects lead service line samples following partial lead service line replacement required by s. NR 809.545 shall report the results to the department within the first 10 days of the month following the month in which the system receives the laboratory results, or as specified by the department. The department may eliminate this requirement to report these monitoring results. Systems shall also report any additional information as specified by the department, and in a time and manner prescribed by the department, to verify that all partial lead service line replacement activities have taken place.

**(6)** PUBLIC EDUCATION PROGRAM REPORTING REQUIREMENTS. By December 31st of each year, any water system that is subject to the public education requirements in s. NR 809.546 shall submit a letter to the department demonstrating that the system owner or operator has delivered the public education materials that meet the content requirements in s. NR 809.546 (1) and (2) and the delivery requirements in s. NR 809.546 (3). This information shall include a list of all the newspapers, radio stations, television stations, facilities and organization to which the system owner or operator delivered public education materials during the previous year. The water system owner or operator shall submit the letter required by this subsection annually for as long as it exceeds the lead action level.

(a) The owner or operator of any water system that is subject to the public education requirements in s. NR 809.546 shall, within 10 days after the end of each period in which the system is required to perform public education tasks in accordance with s. NR 809.546 (3), send written documentation to the department that contains the following:

1. A demonstration that the system has delivered the public education materials that meet the content requirements in s. NR 809.546 (1) and (2) and the delivery requirements in s. NR 809.546 (3).

2. A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

(b) Unless required by the department, the owner or operator of a system that previously has submitted the information required by par. (a) 2. is not required to resubmit the information required by par. (a) 2., as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

**(7)** REPORTING OF ADDITIONAL MONITORING DATA. Any system owner or operator who collects sampling data in addition to that required by this subchapter shall report the results to the department within the first 10 days following the end of the applicable monitoring period under ss. NR 809.547, 809.548 and 809.549 during which the samples are collected.

**(8)** REPORTING OF 90TH PERCENTILE LEAD AND COPPER CONCENTRATIONS WHERE THE DEPARTMENT CALCULATES A SYSTEM'S 90TH PERCENTILE CONCENTRATIONS. The owner or operator of a water system is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, as required by sub. (1) (c) 4. if any of the following are met:

(a) The department has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to par. (b) 1., and has specified a date before the end of the applicable monitoring period by which the system shall provide the results of lead and copper tap water samples.

(b) The system owner or operator has provided all of the following information to the department by the date specified in par. (a):

1. The results of all tap samples for lead and copper including the location of each site and the criteria under s. NR 809.547 (1) (c), (d), (e), (f) or (g) under which the site was selected for the system's sampling pool, pursuant to sub. (1) (c) 1.

2. An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed.

(c) The department has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system before the end of the monitoring period.

**History:** Cr. Register, July, 1993, No. 451, eff. 8−1−93**;** correction made in (3) (a) and (5) (b) 2., made under s. 13.93 (2m) (b) 7., Stats., am. (7), Register, October, 1997, No. 502, eff. 11−1−97; CR 00−161: am. (1) (c) (intro.) and 4., r. and recr. (1) (c) 2., (d) to (g), (5) (d) and (6), r. (1) (c) 3., cr. (1) (c) 8. and (8), Register November 2002 No. 563, eff. 12−1−02; correction in (8) (b) 1. made under s. 13.93 (2m) (b) 7., Stats., Register November 2002 No. 563; CR 02−147: am. (5) (c) 2. Register October 2003 No. 574, eff. 11−1−03.

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## Subchapter III — Maximum Contaminant Levels, Maximum Residual Disinfectant Levels, Monitoring, Analytical Requirements and Control of Disinfection Byproducts and Disinfection Residuals

**NR 809.561 Maximum contaminant level goals (MCLGs), maximum residual disinfectant level goals (MRDLGs), and maximum contaminant levels (MCLs) for disinfection byproducts, maximum residual disinfectant levels (MRDLs) and best available treatment.** **(1)** MAXIMUM CONTAMINANT LEVEL GOALS. The MCLGs for the following disinfection byproducts are as indicated:

| Disinfection byproduct | MCLG (mg/L) |
|---|---|
| Chloroform | Zero |
| Bromodichloromethane | Zero |
| Bromoform | Zero |
| Bromate | Zero |
| Dichloroacetic acid | Zero |
| Trichloroacetic acid | 0.3 |
| Chlorite | 0.8 |
| Dibromochloromethane | 0.06 |

**(2)** MAXIMUM RESIDUAL DISINFECTANT LEVEL GOALS. MRDLGs for disinfectants are as follows:

| Disinfectant residual | MRDLG (mg/L) |
|---|---|
| Chlorine | 4 (as $Cl_2$) |
| Chloramines | 4 (as $Cl_2$) |
| Chlorine dioxide | 0.8 (as $ClO_2$) |

**(3)** MAXIMUM CONTAMINANT LEVELS. When the MCLs for total trihalomethanes lapse as provided in s. NR 809.22, the maximum contaminant levels (MCLs) for disinfection byproducts shall be:

| Disinfection byproduct | Milligrams per liter |
|---|---|
| Total trihalomethanes (TTHM) | 0.080 |
| Haloacetic acids (five) (HAA5) | 0.060 |
| Bromate | 0.010 |
| Chlorite | 1.0 |

**(4)** MAXIMUM RESIDUAL DISINFECTANT LEVELS. (a) The maximum residual disinfectant levels (MRDLs) for disinfection byproducts shall be:

| Residual Disinfectant levels | Milligrams per liter |
|---|---|
| Chlorine | 4.0 (as $C1_2$) |
| Chloramines | 4.0 (as $C1_2$) |
| Chlorine dioxide | 0.8 (as $ClO_2$) |

(b) Other means available for achieving compliance with the maximum residual disinfectant levels identified in this subsection are to control treatment processes to reduce disinfectant demand and to control disinfection treatment processes to reduce disinfectant levels.

**(5)** BEST AVAILABLE TREATMENT. The department, pursuant to section 1412 of the Safe Drinking Water Act and related regulations applicable to public water systems, identifies the following as the best available treatment technology, treatment techniques or other means available for achieving compliance with the maximum contaminant levels for disinfection byproducts identified in sub. (1):

| Disinfectant byproduct | Best available treatment |
|---|---|
| TTHM | Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant. |
| HAA5 | Enhanced coagulation or enhanced softening or GAC10, with chlorine as the primary and residual disinfectant. |
| Bromate | Control of ozone treatment process to reduce production of bromate. |
| Chlorite | Control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels. |

**History:** Cr. Register, December, 2000, No. 540. eff. 1−1−01; CR 00−162: renum. (1) to (3) to be (3), (4) (a) and (5), cr. (1), (2) and (4) (b) Register November 2002 No. 562, eff. 12−1−02; correction in (5) made under s. 13.93 (2m) (b) 7., Stats., Register October 2003 No. 574.

**NR 809.562 General requirements.** **(1)** The following requirements establish criteria under which community water systems (CWSs) and nontransient, noncommunity water systems (NTNCWSs) which add a chemical disinfectant to the water in any part of the drinking water treatment process shall modify their practices to meet MCLs and MRDLs in s. NR 809.561 (3) and (4) (a), respectively, and shall meet the treatment technique requirements for disinfection byproduct precursors in s. NR 809.561 (5). Transient noncommunity water systems (TNCWSs) that use chlorine dioxide as a disinfectant or oxidant shall modify their practices to meet the MRDL for chlorine dioxide in s. NR 809.561 (4) (a) according to the criteria established as follows.

**(2)** MCLs have been established for TTHM and HAA5 and treatment technique requirements for disinfection byproduct precursors to limit the levels of known and unknown disinfection byproducts which may have adverse health effects. These disinfection byproducts may include chloroform, bromodichloromethane, dibromochloromethane, bromoform, dichloroacetic acid, and trichloroacetic acid.

**(3)** Unless otherwise noted, all public drinking water systems shall comply with the requirements of this subchapter as follows:

(a) All systems serving 10,000 or more persons that are CWSs or NTNCWSs and that are supplied by a surface water source or by a ground water source under the direct influence of surface water shall comply with this subchapter beginning January 1, 2002.

(b) Systems serving fewer than 10,000 persons that are CWSs or NTNCWSs and that are supplied by a surface water source or by a ground water source under the direct influence of surface water and all systems using only ground water not under the direct influence of surface water shall comply with this subchapter beginning January 1, 2004.

(c) Systems serving 10,000 or more persons that are transient NCWSs and use chlorine dioxide as a disinfectant or oxidant and are supplied by a surface water source or by a ground water source under the direct influence of surface water shall comply with any requirements for chlorine dioxide and chlorite in this subchapter beginning January 1, 2002.

(d) Systems that are transient NCWSs and use chlorine dioxide as a disinfectant or oxidant and that serve fewer than 10,000 persons and are supplied by a surface water source or by a ground water source under the direct influence of surface water or that are systems using only ground water not under the direct influence of surface water shall comply with any requirements for chlorine dioxide in this subchapter beginning January 1, 2004.

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(e) CWS and NTNCW systems installing GAC or membrane technology to comply with this subchapter may apply to the department for an extension of up to 24 months past the dates in par. (a) but not beyond December 31, 2003. In granting the extension, the department shall set a schedule for compliance and may specify any interim measures that the system shall take. Failure to meet the schedule or interim treatment requirements constitutes a violation of a national primary drinking water regulation.

**(4)** Each CWS and NTNCWS regulated under s. NR 809.561 shall be operated by qualified personnel who meet the requirements specified in subch. III of ch. NR 114, and are included in a department register of qualified operators.

**(5)** Notwithstanding the MRDLs in s. NR 809.561 (4) (a), systems may increase in the distribution system residual disinfectant levels of chlorine or chloramines, but not chlorine dioxide, to a level and for a time necessary to protect public health, to address specific microbiological contamination problems caused by circumstances such as, but not limited to, distribution line breaks, storm run−off events, source water contamination events or cross−connection events.

**(6)** The owner or operator of a public water system shall provide public notification in compliance with subch. X when the MCL or MRDL or disinfectant residual is exceeded.

**(7)** CWS that detect TTHM above 0.080 mg/l, but below the MCL in s. NR 809.561 (3), as an annual average, monitored and calculated under the provisions of s. NR 809.565, shall provide copies of health effects language prescribed in subch. X and s. NR 809.835 to the users of the CWS.

**History:** Cr. Register, December, 2000, No. 540. eff. 1−1−01; CR 02−147: am. (3) (a) to (d) Register October 2003 No. 574, eff. 11−1−03.

**NR 809.563 Analytical requirements. (1)** Systems shall use only the analytical methods specified in this section, or otherwise approved by the department or EPA for monitoring under this subchapter, to demonstrate compliance with the requirements of this subchapter. The methods specified in this section are effective for use in compliance monitoring as of February 16, 1999.

**(2)** The analytical methods required for testing under this subchapter are contained in s. NR 809.725 (1), Table I.

**(3)** Systems shall measure disinfection byproducts by the methods, as modified by the footnotes, prescribed in Table 1. Samples for TTHM shall be dechlorinated upon collection to prevent further production of trihalomethanes, according to the procedures described in the methods, except acidification is not required if only THMs or TTHMs are to be determined. Samples for maximum TTHM potential may not be dechlorinated or acidified, and shall be held for 7 days at 25° C or above prior to analysis. Samples shall be collected using the containers, preservative and holding times specified in s. NR 809.725 (1), Table G.

**Table 1**
**Approved Methods for Disinfectant Byproduct Compliance Monitoring**

| Methodology[2] | EPA Meth. | Standard Method | Byproduct measured[1] | | | |
|---|---|---|---|---|---|---|
| | | | TTHM | HAA5 | Chlorite[4] | Bromate |
| P&T/GC/ElCD& PID | 502.2 | | X | | | |
| P&T/GC/MS | 524.2 | | X | | | |
| LLE/GC/ECD | 551.1 | | X | | | |
| LLE/GC/ECD | | 6251 B | | X | | |
| SPE/GC/ECD | 552.1 | | | X | | |
| LLE/GC/ECD | 552.2 | | | X | | |
| Amperometric Titration[3] | | 4500−$CIO_2$E | | | X | |
| IC | 300.0 | | | | X | |
| IC | 300.1 | | | | X | X |

[1] X indicates method is approved for measuring specified disinfection byproduct.
[2] P&T = purge and trap; GC = gas chromatography; ElCD = electrolytic conductivity detector; PID = photoionization detector; MS = mass spectrometer; LLE = liquid/liquid extraction; ECD = electron capture detector; SPE = solid phase extractor; IC = ion chromatography.
[3] If TTHMs are the only analytes being measured in the sample, then a PID is not required.
[4] Amperometric titration may be used for routine daily monitoring of chlorite at the entrance to the distribution system, as prescribed in s. NR 809.565 (4) (a) 1. Ion chromatography shall be used for routine monthly monitoring of chlorite and additional monitoring of chlorite in the distribution system, as prescribed in s. NR 809.565 (4) (a) 2. and 3.

**(4)** Laboratories that are certified by the department or EPA shall conduct the analysis under this section for disinfection byproducts.

(a) To receive certification to conduct analyses for the contaminants in this subchapter, a laboratory shall carry out annual analyses of performance evaluation samples approved by the department or EPA.

(b) When analyzing performance evaluation samples, the laboratory shall achieve quantitative results within the acceptance limit on a minimum of 80% of the analytes included in each PE sample.

(c) The acceptance limit shall be the 95% confidence interval calculated around the mean of the PE study data between a maximum and minimum acceptance limit of +/−50% and +/−15% of the study mean.

**(5)** A person approved by the department or EPA shall measure residual disinfectant concentration.

**(6)** Systems shall measure residual disinfectant concentrations for free chlorine, combined chlorine (chloramines), and chlorine dioxide by the methods listed in Table 2. Systems may also measure residual disinfectant concentrations for chlorine, chloramines and chlorine dioxide by using N,N−diethly−p−phenylenediamine (DPD) colorimetric test kits.

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**Table 2**
**Standard Methods for Measuring Residual Disinfectant Concentrations**

| Methodology | Standard Method | ASTM method | Residual Measured[1] | | | |
|---|---|---|---|---|---|---|
| | | | Free chlorine | Combined chlorine | Total chlorine | Chlorine dioxide |
| Amperometric Titration | 4500−CL D | D 1253−86 | X | X | X | |
| Low Level Amperometric Titration | 4500−CL E | | | | X | |
| DPD Ferrous Titrimetric | 4500−CL F | | X | X | X | |
| DPD Colorometric | 4500−CL G | | X | X | X | |
| Syringaldazine (FACTS) | 4500−CL H | | X | | | |
| Iodometric Electrode | 4500−CL I | | | | X | |
| DPD | 4500−$ClO_2$ D | | | | | X |
| Amperometric Method II | 4500−$ClO_2$ E | | | | | X |

[1] X indicates method is approved for measuring specified disinfectant residual.

**(7)** Systems required to analyze for additional analytical methods parameters not included in subs. (3) and (6) shall have these parameters analyzed by a person approved by the department or EPA using the following methods:

(a) *Alkalinity.* For measuring alkalinity use the methods allowed in s. NR 809.725 Table E.

(b) *Bromide.* For measuring bromide use EPA Method 300.0 or EPA Method 300.1.

(c) *Total Organic Carbon (TOC).* For measuring total organic carbon, use Standard Method 5310 B (High−Temperature Combustion Method) or Standard Method 5310 C (Persulfate−Ultraviolet or Heated−Persulfate Oxidation Method) or Standard Method 5310 D (Wet−Oxidation Method).

1. TOC samples may not be filtered prior to analysis.

2. TOC samples shall either be analyzed or shall be acidified to achieve pH less than 2.0 by minimal addition of phosphoric or sulfuric acid as soon as practical after sampling, not to exceed 24 hours.

3. Acidified TOC samples shall be analyzed within 28 days.

(d) *Specific ultraviolet absorbance (SUVA).* SUVA is equal to the UV absorption at 254nm ($UV_{254}$) measured in $m^{-1}$ divided by the dissolved organic carbon (DOC) concentration measured as mg/L.

1. In order to determine SUVA, it is necessary to separately measure $UV_{254}$ and DOC.

2. When determining SUVA, systems shall use the methods stipulated in par. (e) to measure DOC and the method stipulated in par. (f) to measure $UV_{254}$ SUVA shall be determined on water prior to the addition of disinfectants or oxidants, or both, by the system.

3. DOC and $UV_{254}$ samples used to determine a SUVA value shall be taken at the same time and at the same location.

(e) *Dissolved organic carbon (DOC).* For measuring dissolved organic carbon, use Standard Method 5310 B (High−Temperature Combustion Method) or Standard Method 5310 C (Persulfate−Ultraviolet or Heated−Persulfate Oxidation Method) or Standard Method 5310 D (Wet−Oxidation Method). Prior to analysis, DOC samples shall be filtered through a 0.45 µm pore−diameter filter. Water passed through the filter prior to filtration of the sample shall serve as the filtered blank. This filtered blank shall be analyzed using procedures identical to those used for analysis of the samples and shall meet the following criteria: DOC < 0.5 mg/L. DOC samples shall be filtered through the 0.45 µm pore−diameter filter prior to acidification. DOC samples shall either be analyzed or shall be acidified to achieve pH less than 2.0 by minimal addition of phosphoric or sulfuric acid as soon as practical after sampling, not to exceed 48 hours. Acidified DOC samples shall be analyzed within 28 days.

(f) *Ultraviolet absorption at 254 nm ($UV_{254}$).* For measuring ultraviolet absorption at 254 nm, use Method 5910 B (Ultraviolet Absorption Method). UV absorption shall be measured at 253.7 nm (may be rounded off to 254 nm). Prior to analysis, $UV_{254}$ samples shall be filtered through a 0.45 µm pore−diameter filter. The pH of $UV_{254}$ samples may not be adjusted. Samples shall be analyzed as soon as practical after sampling, not to exceed 48 hours.

(g) *pH.* For measuring pH, use any method allowed in s. NR 809.725 Table E.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 02−147: am. (3) and Table 1 Register October 2003 No. 574, eff. 11−1−03.

**NR 809.565 Monitoring requirements. (1)** General requirements under this subchapter for analytical requirements, determining maximum contaminant levels, conducting monitoring and control of disinfection byproducts are as follows:

(a) Systems shall take all samples during normal operating conditions.

(b) Systems may consider multiple wells drawing water from a single aquifer as one treatment plant for determining the minimum number of TTHM and HAA5 samples required, on a case−by−case basis with department approval.

(c) Failure to monitor in accordance with the monitoring plan required under sub. (8) is a monitoring violation.

(d) Failure to monitor shall be treated as a violation for the entire period covered by the annual average where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MCLs or MRDLs.

(e) Systems may use only data collected under the provisions of this subchapter or the information collection rule (ICR) or s. NR 809.775 to qualify for reduced monitoring.

**(2)** Systems shall monitor at the following frequency and locations for TTHMs and HAA5 disinfection byproducts:

(a) Systems serving at least 10,000 persons which are supplied by a surface water source or by a ground water source under the direct influence of surface water shall collect and have analyzed 4 water samples per quarter per treatment plant.

1. At least 25% of all samples collected each quarter at each treatment plant shall be at locations representing the maximum residence time in the system.

2. The remaining samples shall be taken in the distribution system at locations representing at least average residence time in the system and representative of the entire distribution system, taking into account the number of people served, different sources of water and different treatment methods.

(b) Systems serving from 500 to 9,999 persons which are supplied by a surface water source or by a ground water source under the direct influence of surface water shall collect and have ana-

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lyzed one water sample per quarter per treatment plant. The samples shall be collected at locations representing the maximum residence time in the system.

(c) Systems serving fewer than 500 people which are supplied by a surface water source or by a ground water source under the direct influence of surface water shall collect one sample per treatment plant annually. The samples shall be collected during the month with the warmest water temperature at locations representing the maximum residence time in the system.

(d) Systems using chemical disinfection, using only groundwater not under the direct influence of surface water, and serving at least 10,000 people shall collect one sample per treatment plant per quarter. The sample or samples shall be collected at the location representing the maximum residence time in the system.

(e) Systems using chemical disinfection, using only groundwater not under the direct influence of surface water, and serving fewer than 10,000 people shall collect one sample per treatment plant annually. The sample shall be collected during the month with the warmest water temperature, at locations representing the maximum residence time, in the system.

**(2m)** If a sample or the average of samples, if more than one sample is taken, exceeds the MCL for TTHMs or HAA5 disinfection byproducts, the system shall collect quarterly samples until the system meets the requirements of reduced monitoring in sub. (3).

**(3)** Systems may reduce monitoring for TTHMs and HAA5s as follows, except as otherwise provided:

(a) Surface water systems or ground water systems under the direct influence of surface water with an annual average of TTHM of ≤0.040 mg/L and HAA5 ≤0.030 mg/L with an annual average TOC concentration of ≤ 4.0 mg/L, before any treatment may reduce monitoring to the following:

1. A system serving at least 10,000 people may reduce monitoring to one sample per quarter per treatment plant so long as the sample is taken at a location representing maximum residence time in the system.

2. A system serving from 500 to 9,999 people may reduce monitoring to one sample per year per treatment plant so long as the sample is taken at a location representing maximum residence time in the system during the month of warmest water temperature.

3. A system serving less than 500 people may not reduce monitoring to less than one sample during the month of warmest water temperature per treatment plant per year.

(b) Systems using only groundwater not under the direct influence of surface water using chemical disinfection with an annual average of TTHM of ≤ 0.040 mg/L and HAA5 ≤ 0.030 mg/L may reduce sampling to the following:

1. Systems serving at least 10,000 people may reduce monitoring to one sample per year per treatment plant during the month of warmest water temperature at a location representing maximum residence time in the system.

2. Systems serving fewer than 10,000 people may reduce monitoring to one sample per treatment plant per 3 year monitoring cycle during the month of warmest water temperature at a location representing maximum residence time in the system. The reduced monitoring will begin on January 1 following the quarter in which the system first qualifies for reduced monitoring.

(c) Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year, for systems which shall monitor quarterly, or the result of the sample, for systems which shall monitor no more frequently than annually, is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively. Systems that do not meet these levels shall resume monitoring at the frequency identified in sub. (2) in the quarter immediately following the quarter in which the system exceeds 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively.

(d) The department may return a system to routine monitoring at the department's discretion.

**(4)** Systems shall monitor at the following frequency and locations for chlorite and bromate disinfection byproducts:

(a) *Chlorite.* Community and nontransient noncommunity water systems using chlorine dioxide, for disinfection or oxidation, shall conduct monitoring for chlorite as follows:

1. Routine daily monitoring. Systems shall take daily samples at the entrance to the distribution system. For any daily sample that exceeds the chlorite MCL, the system shall take additional samples in the distribution system the following day at the locations required by subd. 3. in addition to the sample required at the entrance to the distribution system.

2. Routine monthly monitoring. Systems shall take a 3−sample set each month in the distribution system. The system shall take one sample at each of the following locations: near the first customer, at a location representative of average residence time, and at a location reflecting maximum residence time in the distribution system. Any additional routine sampling shall be conducted in the same manner, as 3−sample sets, at the specified locations. The system may use the results of additional monitoring conducted under subd. 3. to meet the requirement for monitoring in this subdivision.

3. Additional monitoring. On each day following a routine sample monitoring result that exceeds the chlorite MCL at the entrance to the distribution system, the system shall take 3 chlorite distribution system samples at the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible, reflecting maximum residence time in the distribution system.

4. Reduced monitoring. Chlorite monitoring at the entrance to the distribution system required by subd. 1. may not be reduced. Chlorite monitoring in the distribution system required by subd. 2. may be reduced to one 3−sample set per quarter after one year of monitoring where no individual chlorite sample taken in the distribution system under subd. 2. has exceeded the chlorite MCL and the system has not been required to conduct monitoring under subd. 3. The system may remain on the reduced monitoring schedule until either any of the 3 individual chlorite samples taken quarterly in the distribution system under subd. 2. exceeds the chlorite MCL or the system is required to conduct monitoring under subd. 3., at which time the system shall revert to routine monitoring.

(b) *Bromate.* 1. Routine monitoring. Community and nontransient noncommunity systems using ozone, for disinfection or oxidation, shall take one sample per month for each treatment plant in the system using ozone. Systems shall take samples monthly at the entrance to the distribution system while the ozonation system is operating under normal conditions.

2. Reduced monitoring. Systems required to analyze for bromate may reduce monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly bromide measurements for one year. The system may remain on reduced bromate monitoring until the running annual average source water bromide concentration, computed quarterly, is 0.05 mg/L or greater based upon representative monthly measurements. If the running annual average source water bromide concentration is equal to or greater than 0.05 mg/L, the system shall resume routine monitoring required by subd. 1.

**(5)** Systems shall monitor at the following frequency and locations for disinfectant residuals:

(a) *Chlorine and chloramines.* Systems shall perform routine monitoring by measuring the residual disinfectant level at the

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same points in the distribution system and at the same time as total coliforms are sampled, as specified in s. NR 809.31. Surface water systems may use the results of residual disinfectant concentration sampling conducted under s. NR 809.78 (1) (f) for unfiltered systems or s. NR 809.78 (2) (c) for systems that filter, in lieu of taking separate samples. Monitoring may not be reduced.

(b) *Chlorine dioxide.* 1. Routine monitoring. Community, nontransient noncommunity, and transient noncommunity water systems that use chlorine dioxide for disinfection or oxidation shall take daily samples at the entrance to the distribution system. For any daily sample that exceeds the MRDL, the system shall take samples in the distribution system the following day at the locations required by subd. 2., in addition to the sample required at the entrance to the distribution system.

2. Additional monitoring. On each day following a routine sample monitoring result that exceeds the MRDL, the system shall take 3 chlorine dioxide distribution system samples. If chlorine dioxide or chloramines are used to maintain a disinfectant residual in the distribution system, or if chlorine is used to maintain a disinfectant residual in the distribution system and there are no disinfection addition points after the entrance to the distribution system, i.e., no booster chlorination, the system shall take 3 samples as close to the first customer as possible, at intervals of at least 6 hours. If chlorine is used to maintain a disinfectant residual in the distribution system and there are one or more disinfection addition points after the entrance to the distribution system, i.e., booster chlorination, the system shall take one sample at each of the following locations: as close to the first customer as possible, in a location representative of average residence time, and as close to the end of the distribution system as possible, reflecting maximum residence time in the distribution system.

3. Reduced monitoring. Chlorine dioxide monitoring may not be reduced.

**(6)** Systems shall monitor at the following frequency and locations for disinfection byproduct precursors (DBPP):

(a) *Routine monitoring.* 1. Systems which use conventional filtration treatment and are supplied by a surface water source or by a ground water source under the direct influence of surface water shall monitor each treatment plant for TOC no later than the point of combined filter effluent turbidity monitoring and representative of the treated water.

2. All systems required to monitor under subd. 1. shall also monitor for TOC in the source water prior to any treatment at the same time as monitoring for TOC in the treated water.

**Note:** These samples, source water and treated water, are referred to as paired samples.

3. At the same time as the source water sample is taken, all systems shall monitor for alkalinity in the source water prior to any treatment. Systems shall take one paired sample and one source water alkalinity sample per month per plant at a time representative of normal operating conditions and influent water quality.

(b) *Reduced monitoring.* Systems which use conventional filtration treatment and are supplied by a surface water source or by a ground water source under the direct influence of surface water and which have an average treated water TOC of less than 2.0 mg/L for 2 consecutive years, or less than 1.0 mg/L for one year, may reduce monitoring for both TOC and alkalinity to one paired sample and one source water alkalinity sample per plant per quarter. The system shall revert to routine monitoring in the month following the quarter when the annual average treated water TOC ≥ 2.0 mg/L.

**(7)** Systems required to analyze for bromate may reduce bromate monitoring from monthly to once per quarter, if the system demonstrates that the average source water bromide concentration is less than 0.05 mg/L based upon representative monthly measurements for one year. The system shall continue bromide monitoring to remain on reduced bromate monitoring.

**(8)** Each system required to monitor under this subchapter shall develop and implement a monitoring plan, and shall maintain the plan and make it available for inspection by the department and the general public no later than 30 days following the applicable compliance dates in s. NR 809.562 (3).

(a) Systems which are supplied by a surface water source or by a ground water source under the direct influence of surface water and which serve more than 3,300 people shall submit a copy of the monitoring plan to the department no later than the date of the first report required under s. NR 809.567. The department may also require any other public water system to submit a monitoring plan. After review, the department may require changes in any plan elements.

(b) The plan shall include at least the following elements:

1. Specific locations and schedules for collecting samples for any parameters included in this subchapter.

2. How the system will calculate compliance with MCLs, MRDLs and treatment techniques.

3. If approved for monitoring as a consecutive system, or if providing water to a consecutive system, under s. NR 809.73, the sampling plan shall reflect the entire distribution system.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (1) (c) Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (2) (a) 2. Register October 2003 No. 574, eff. 11−1−03.

**NR 809.566 Compliance requirements. (1)** GENERAL REQUIREMENTS. The general requirements for compliance with this subchapter are as follows:

(a) Where compliance is based on a running annual average of monthly or quarterly samples or an annual average and the system fails to monitor for TTHM, HAA5 or bromate, this failure to monitor shall be treated as a monitoring violation for the entire period covered by the annual average.

(b) Where compliance is based on a running annual average of monthly or quarterly samples or averages and the system's failure to monitor makes it impossible to determine compliance with MRDLs for chlorine and chloramines, failure to monitor shall be treated as a monitoring violation for the entire period covered by the annual average.

(c) All samples taken and analyzed under the provisions of this subchapter shall be included in determining compliance, even if that number is greater than the minimum required.

(d) If, during the first year of monitoring under s. NR 809.565, any individual quarter's average will cause the running annual average of that system to exceed the MCL, the system is out of compliance at the end of that quarter.

**(2)** DISINFECTION BYPRODUCTS. (a) *TTHMs and HAA5s.* Compliance for TTHMs and HAA5s shall be based one of the following:

1. For systems monitoring quarterly, compliance with MCLs in s. NR 809.561 (3) shall be based on a running annual arithmetic average, computed quarterly, of quarterly arithmetic averages of all samples collected by the system as prescribed by s. NR 809.565 (2) to (3). If the running annual arithmetic average of quarterly averages covering any consecutive 4−quarter period exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to subch. X, in addition to reporting to the department pursuant to s. NR 809.567. If a public water system fails to complete 4 consecutive quarters of monitoring, compliance with the MCL for the last 4−quarter compliance period shall be based on an average of the available data.

2. For systems monitoring less frequently than quarterly, compliance with MCLs in s. NR 809.561 (3) shall be based on an average of samples taken that year under the provisions of s. NR 809.565 (2) to (3). If the average of these samples exceeds the

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MCL, the system shall increase monitoring to once per quarter per treatment plant and the system is not in violation of the MCL until it has completed one year of quarterly monitoring, unless the result of fewer than 4 quarters of monitoring will cause the running annual average to exceed the MCL, in which case the system is in violation at the end of that quarter. Systems required to increase monitoring frequency to quarterly monitoring shall calculate compliance by including the sample which triggered the increased monitoring plus the following 3 quarters of monitoring.

3. If the running annual arithmetic average of quarterly averages covering any consecutive 4−quarter period exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to subch. X, in addition to reporting to the department pursuant to s. NR 809.567.

(b) *Bromate.* Compliance for bromate shall be based on a running annual arithmetic average, computed quarterly, of monthly samples or, for months in which the system takes more than one sample, the average of all samples taken during the month, collected by the system as prescribed by s. NR 809.565 (4) (b). If the average of samples covering any consecutive 4−quarter period exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to subch. X, in addition to reporting to the department pursuant to s. NR 809.567. If a public water system fails to complete 12 consecutive months monitoring, compliance with the MCL for the last 4−quarter compliance period shall be based on an average of the available data.

(c) *Chlorite.* Compliance for chlorite shall be based on an arithmetic average of each 3−sample set taken in the distribution system as prescribed by ss. NR 809.565 (4) (a) 2. and 3. If the arithmetic average of any 3−sample set exceeds the MCL, the system is in violation of the MCL and shall notify the public pursuant to subch. X, in addition to reporting to the department pursuant to s. NR 809.567.

**(3)** DISINFECTANT RESIDUALS. (a) *Chlorine and chloramines.* 1. Compliance shall be based on a running annual arithmetic average, computed quarterly, of monthly averages of all samples collected by the system under s. NR 809.565 (5) (a). If the average of quarterly averages covering any consecutive 4−quarter period exceeds the MRDL, the system is in violation of the MRDL and shall notify the public pursuant to subch. X, in addition to reporting to the department pursuant to s. NR 809.567.

2. In cases where systems switch between the use of chlorine and chloramines for residual disinfection during the year, compliance shall be determined by including together all monitoring results of both chlorine and chloramines in calculating compliance. Reports submitted pursuant to s. NR 809.567 shall clearly indicate which residual disinfectant was analyzed for each sample.

(b) *Chlorine dioxide.* Compliance shall be based on consecutive daily samples collected by the system under s. NR 809.565 (5) (b).

1. A system has an acute violation of the MRDL for chlorine dioxide when any daily sample taken at the entrance to the distribution system exceeds the MRDL and on the following day one or more of the 3 samples taken in the distribution system exceeds the MRDL. If both exceedances occur, the system is in violation of the MRDL and shall take immediate corrective action to lower the level of chlorine dioxide below the MRDL and shall notify the public pursuant to the procedures for acute health risks in s. NR 809.951. Failure to take samples in the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system shall also be considered an MRDL violation and the system shall notify the public of the violation in accordance with the provisions for acute violations under s. NR 809.951

2. A system has a nonacute violation for chlorine dioxide when any 2 consecutive daily samples taken at the entrance to the distribution system exceed the MRDL and all distribution system samples taken are below the MRDL. A system with a nonacute violation shall take corrective action to lower the level of chlorine dioxide below the MRDL at the point of sampling and shall notify the public pursuant to the procedures for nonacute health risks in subch. X. Failure to monitor at the entrance to the distribution system the day following an exceedance of the chlorine dioxide MRDL at the entrance to the distribution system is also an MRDL violation and the system shall notify the public of the violation in accordance with the provisions for nonacute violations under subch. X.

**(4)** DISINFECTION BYPRODUCT PRECURSORS (DBPP). Compliance with disinfection byproduct precursors shall be determined as specified in s. NR 809.569 (1). Systems may begin monitoring to determine whether Step 1 TOC removals can be met 12 months prior to the compliance date for the system. This monitoring is not required and failure to monitor during this period is not a violation. However, any system that does not monitor during this period, and then determines in the first 12 months after the compliance date that it is not able to meet the Step 1 requirements in s. NR 809.569 (1) (b) and therefore applies for alternate minimum TOC removal (Step 2) requirements, is not eligible for retroactive approval of alternate minimum TOC removal (Step 2) requirements as allowed pursuant to s. NR 809.569 (1) (c) and is in violation. Systems may apply for alternate minimum TOC removal (Step 2) requirements any time after the compliance date. For systems required to meet Step 1 TOC removals, if the value calculated under s. NR 809.569 (3) (a) or (b) is less than 1.00, the system is in violation of the treatment technique requirements and shall notify the public pursuant to subch. X in addition to reporting to the department pursuant to s. NR 809.567.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (2) (a) 2. and (4), cr. (2) (a) 3. Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (4) Register October 2003 No. 574, eff. 11−1−03.

**NR 809.567 Reporting and recordkeeping requirements. (1)** REPORTING REQUIREMENTS. Systems required to sample quarterly or more frequently shall report to the department within 10 days after the end of each quarter in which samples were collected, not withstanding the provisions of s. NR 809.563. Systems required to sample less frequently than quarterly shall report to the department within 10 days after the end of each monitoring period in which samples were collected.

**(2)** DISINFECTION BYPRODUCTS. Systems monitoring for disinfection byproducts shall report the information specified in the following:

(a) Systems monitoring TTHM and HAA5 under the requirements of s. NR 809.565 (2) on a quarterly or more frequent basis shall report all of the following:

1. The number of samples taken during the last quarter.

2. The location, date and result of each sample taken during the last quarter.

3. The arithmetic average of all samples taken in the last quarter.

4. The annual arithmetic average of the quarterly arithmetic averages for the last 4 quarters.

5. Whether the MCL was exceeded, as determined according to s. NR 809.566 (2).

(b) Systems monitoring TTHMs and HAA5s under the requirements of s. NR 809.565 (2) less frequently than quarterly but at least annually shall report all of the following:

1. The number of samples taken during the last year.

2. The location, date and result of each sample taken during the last quarter.

3. The arithmetic average of all samples taken over the last year.

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4. Whether the MCL was exceeded, as determined according to s. NR 809.566 (2).

(c) Systems monitoring TTHMs and HAA5s under the requirements of s. NR 809.565 (2) less frequently than annually shall report all of the following:

1. The location, date and result of the last sample taken.

2. Whether the MCL was exceeded, as determined according to s. NR 809.566 (2).

(d) Systems monitoring chlorite under the requirements of s. NR 809.565 (4) (a) shall report all of the following:

1. The number of samples taken each month for the last 3 months.

2. The location, date and result of each sample taken during the last quarter.

3. For each month in the reporting period, the arithmetic average of all samples taken in each 3 sample set collected in the distribution system.

4. Whether, based on s. NR 809.566 (2) (c), the MCL was exceeded, and how many times it was exceeded each month.

(e) Systems monitoring bromate under the requirements of s. NR 809.565 (4) (b) shall report all of the following:

1. The number of samples taken during the last quarter.

2. The location, date and result of each sample taken during the last quarter.

3. The arithmetic average of the monthly arithmetic averages of all samples taken in the last year.

4. Whether the MCL was exceeded, as determined according to s. NR 809.566 (2) (b).

**(3)** DISINFECTANTS. Systems monitoring for disinfectants shall report the information specified in the following:

(a) Systems monitoring chlorine or chloramines under the requirements of s. NR 809.565 (5) (a) shall report all of the following:

1. The number of samples taken during each month of the last quarter.

2. The monthly arithmetic average of all samples taken in each month for the last 12 months.

3. The arithmetic average of all monthly averages for the last 12 months.

4. Whether the MRDL was exceeded, as determined according to s. NR 809.566 (3) (a).

(b) Systems monitoring chlorine dioxide under the requirements of s. NR 809.565 (5) (b) shall report all of the following information:

1. The dates, results and locations of samples taken during the last quarter.

2. Whether the MRDL was exceeded, as determined according to s. NR 809.566 (3) (b).

3. Whether the MRDL was exceeded in any 2 consecutive daily samples and whether the resulting violation was acute or nonacute as determined according to s. NR 809.566 (3) (b).

**(4)** DISINFECTION BYPRODUCT PRECURSORS, ENHANCED COAGULATION OR ENHANCED SOFTENING SYSTEMS. Systems containing disinfection byproduct precursors or using enhanced coagulation or enhanced softening, shall report the information specified in the following:

(a) Systems monitoring monthly or quarterly for TOC under the requirements of s. NR 809.565 (6) and required to meet the enhanced coagulation or enhanced softening requirements in s. NR 809.569 (1) (b) or (c) shall report all of the following:

1. The number of paired samples of source water and treated water, both prior to continuous disinfection, taken during the last quarter.

2. The location, date and result of each paired sample and associated alkalinity taken during the last quarter.

3. For each month in the reporting period that paired samples were taken, the arithmetic average of the percent reduction of TOC for each paired sample and the required TOC percent removal.

4. Calculations for determining compliance with the TOC percent removal requirements, as provided in s. NR 809.569 (3).

5. Whether the system is in compliance with the enhanced coagulation or enhanced softening percent removal requirements in s. NR 809.569 (1) for the last 4 quarters.

(b) Systems monitoring monthly or quarterly for TOC under the requirements of s. NR 809.565 (6) and meeting one or more of the alternative compliance criteria in s. NR 809.569 (2) (b) or (c) shall report all of the following:

1. The alternative compliance criterion that the system is using.

2. The number of paired samples taken during the last quarter.

3. The location, date and result of each paired sample and associated alkalinity taken during the last quarter.

4. The running annual arithmetic average based on monthly averages or quarterly samples of source water TOC for systems meeting a criterion in s. NR 809.569 (2) (b) 1. and 3. or of treated water TOC for systems meeting the criterion in s. NR 809.569 (2) (b) 2.

5. The running annual arithmetic average based on monthly averages or quarterly samples of source water SUVA for systems meeting the criterion in s. NR 809.569 (2) (b) 6. or of treated water SUVA for systems meeting the criterion in s. NR 809.569 (2) (b) 7.

6. The running annual average of source water alkalinity for systems meeting the criterion in s. NR 809.569 (2) (b) 3. and 4. and of treated water alkalinity for systems meeting the criterion in s. NR 809.569 (2) (c) 1.

7. The running annual average for both TTHM and HAA5 for systems meeting the criterion in s. NR 809.569 (2) (b) 3., 4., and 5.

8. The running annual average of the amount of magnesium hardness removal (as $CaCO_3$ mg/L) for systems meeting the criterion in s. NR 809.567 (2) (c) 2.

9. Whether the system is in compliance with the particular alternative compliance criterion in s. NR 809.569 (2) (b) and (c).

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (2) (a) 5., (b) 4., (c) 2., (d) 3. and 4., (e) 4., (3) (a) 4., (b) 2. and 3. Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (4) (b) 8. Register October 2003 No. 574, eff. 11−1−03.

**NR 809.569 Treatment technique for control of disinfection byproduct (DBP) precursors.** For systems using conventional treatment which are supplied by a surface water source or by a ground water source under the direct influence of surface water, the department identifies enhanced coagulation or enhanced softening as treatment techniques to control the level of disinfection byproduct precursors in drinking water and distribution systems. Treatment technique requirements for DBP precursors shall comply with the following:

**(1)** ENHANCED COAGULATION AND ENHANCED SOFTENING PERFORMANCE REQUIREMENTS. (a) Systems using enhanced coagulation or enhanced softening shall achieve the percent reduction of TOC specified in par. (b) between the source water and the combined filter effluent, unless the department approves a system's request for alternate minimum TOC removal (Step 2) requirements under par. (c).

(b) Required Step 1 TOC reductions, indicated in the following table, are based upon specified source water parameters measured in accordance with s. NR 809.563 (7). Systems practicing softening are required to meet the Step 1 TOC reductions in the far−right

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column, source water alkalinity >120 mg/L, for the specified source water TOC:

Step 1 Required Removal of TOC by Enhanced Coagulation and Enhanced Softening for Surface Water Systems Using Conventional Treatment [1,2]

| **Source water TOC, mg/l** | **Source water alkalinity, mg/L as $CaCO_3$** | | |
|---|---|---|---|
| | 0 − 60 % | > 60 − 120 % | > 120% [3] |
| >2.0−4.0 | 35.0 | 25.0 | 15.0 |
| >4.0−8.0 | 45.0 | 35.0 | 230.0 |
| >8.0 | 50.0 | 40.0 | 5.0 |

[1] Systems meeting at least one of the conditions in sub. (2) (b) 1. to 7. are not required to operate with enhanced coagulation.

[2] Softening systems meeting one of the alternative compliance criteria in sub. (2) (c) are not required to operate with enhanced softening.

[3] Systems practicing softening shall meet the TOC removal requirements in this column.

(c) Systems using conventional treatment which are supplied by a surface water source or by a ground water source under the direct influence of surface water which cannot achieve the Step 1 TOC removals required by par. (b) due to water quality parameters or operational constraints shall apply to the department, within 3 months of failure to achieve the TOC removals required by par. (b), for approval of alternative minimum TOC (Step 2) removal requirements submitted by the system. If the department approves the alternative minimum TOC removal (Step 2) requirements, the department may make those requirements retroactive for the purposes of determining compliance. Until the department approves the alternate minimum TOC removal (Step 2) requirements, the system shall meet the Step 1 TOC removals contained in par. (b).

(d) Applications made to the department by enhanced coagulation systems for approval of alternative minimum TOC removal (Step 2) requirements under par. (c) shall include, as a minimum, results of bench− or pilot−scale testing conducted under subd. 1. and used to determine the alternate enhanced coagulation level.

1. Alternate enhanced coagulation level shall be determined to be coagulation at a coagulant dose and pH as determined by the method described in this subdivision and subds. 2. to 5. such that an incremental addition of 10 mg/L of alum, or equivalent amount of ferric salt, results in a TOC removal of ≤ 0.3 mg/ L. The percent removal of TOC at this point on the "TOC removal versus coagulant dose" curve shall be determined to be the minimum TOC removal required for the system. Once approved by the department, this minimum requirement supersedes the minimum TOC removal required by the table in par. (b). This requirement will be effective until the department approves a new value based on the results of a new bench− and pilot−scale test. Failure to achieve department−set alternative minimum TOC removal levels is a violation of this chapter and the federal national primary drinking water regulations.

2. Bench− or pilot−scale testing of enhanced coagulation shall be conducted by using representative water samples and adding 10 mg/L increments of alum, or equivalent amounts of ferric salt, until the pH is reduced to a level less than or equal to the enhanced coagulation Step 2 target pH shown in the following table:

Enhanced Coagulation Step 2 Target pH

| Alkalinity (mg/L as $CaCO_3$) | Target pH |
|---|---|
| 0−60 | 5.5 |
| >60−120 | 6.3 |
| >120−240 | 7.0 |
| >240 | 7.5 |

3. For waters with alkalinity of less than 60 mg/L for which addition of small amounts of alum or equivalent addition of iron coagulant drives the pH below 5.5 before significant TOC removal occurs, the system shall add necessary chemicals to maintain the pH between 5.3 and 5.7 in samples until the TOC removal of 0.3 mg/L per 10 mg/L alum added, or equivalent addition of iron coagulant, is reached.

4. The system may operate at any coagulant dose or pH necessary, consistent with other NPDWRs, to achieve the minimum TOC percent removal approved under par. (c).

5. If the TOC removal is consistently less than 0.3 mg/L of TOC per 10 mg/L of incremental alum dose at all dosages of alum, or equivalent addition of iron coagulant, the water is deemed to contain TOC not amenable to enhanced coagulation. The system may then apply to the department for a waiver of enhanced coagulation requirements.

**(2)** CONVENTIONAL FILTRATION TREATMENT. (a) Systems using conventional filtration treatment which are supplied by a surface water source or by a ground water source under the direct influence of surface water shall operate with enhanced coagulation or enhanced softening to achieve the TOC percent removal levels specified in sub. (1) unless the system meets at least one of the alternative compliance criteria listed in par. (b) or (c).

(b) Systems using conventional filtration treatment which are supplied by a surface water source or by a ground water source under the direct influence of surface water may use the alternative compliance criteria in subds. 1. to 6. to comply with this section in lieu of complying with sub. (1). Systems shall still comply with monitoring requirements in s. NR 809.565 (6).

1. The system's source water TOC level, measured according to s. NR 809.563 (7) (c), is less than 2.0 mg/L, calculated quarterly as a running annual average.

2. The system's treated water TOC level, measured according to s. NR 809.563 (7) (c), is less than 2.0 mg/L, calculated quarterly as a running annual average.

3. The system's source water TOC level, measured as required by s. NR 809.563 (7) (c), is less than 4.0 mg/L, calculated quarterly as a running annual average; the source water alkalinity, measured according to s. NR 809.563 (7) (a), is greater than 60 mg/L (as $CaCO_3$), calculated quarterly as a running annual average; and either the TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively; or prior to the effective date for compliance in s. NR 809.562 (3), the system has made a clear and irrevocable financial commitment not later than the effective date for compliance in s. NR 809.562 (3) to use technologies that will limit the levels of TTHMs and HAA5 to no more than 0.040 mg/L and 0.030 mg/L, respectively.

4. Systems shall submit evidence of a clear and irrevocable financial commitment, in addition to a schedule containing milestones and periodic progress reports for installation and operation of appropriate technologies, to the department for approval not later than the effective date for compliance in s. NR 809.562 (3).

a. These technologies shall be installed and operating not later than June 30, 2005.

b. Failure to install and operate these technologies by the date in the approved schedule will constitute a violation of this chapter and the national primary drinking water regulations.

5. The TTHM and HAA5 running annual averages are no greater than 0.040 mg/L and 0.030 mg/L, respectively, and the system uses only chlorine for primary disinfection and maintenance of a residual in the distribution system.

6. The system's source water SUVA, prior to any treatment and measured monthly according to s. NR 809.563 (7) (d), is less than or equal to 2.0 L/mg−m, calculated quarterly as a running annual average.

7. The system's finished water SUVA, measured monthly according to s. NR 809.563 (7) (d), is less than or equal to 2.0 L/mg−m, calculated quarterly as a running annual average.

(c) Systems practicing enhanced softening that cannot achieve the TOC removals required by sub. (1) (b) may use the alternative compliance criteria in subds. 1. and 2. in lieu of complying with

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sub. (1) (b). Systems shall still comply with monitoring requirements in s. NR 809.565 (6).

1. Softening that results in lowering the treated water alkalinity to less than 60 mg/L (as $CaCO_3$), measured monthly according to s. NR 809.563 (7) (a) and calculated quarterly as a running annual average.

2. Softening that results in removing at least 10 mg/L of magnesium hardness (as $CaCO_3$), measured monthly and calculated quarterly as an annual running average.

**(3)** COMPLIANCE CALCULATIONS. (a) Systems which are supplied by a surface water source or by a ground water source under the direct influence of surface water, other than those identified in sub. (2) (b) or (c) shall comply with requirements contained in sub. (1) (b) or (c). Systems shall calculate compliance quarterly, beginning after the system has collected 12 months of data, by determining an annual average using the following method:

1. Determine actual monthly TOC percent removal, by using the following equation: (1−(treated water TOC/source water TOC)) x 100 = percent TOC removal.

2. Determine the required monthly TOC percent removal from either the table in sub. (1) (b) or from sub. (1) (c).

3. Divide the value in subd. 1. by the value in subd. 2.

4. Add together the results of subd. 3. for the last 12 months and divide by 12.

5. If the value calculated in subd. 4. is less than 1.00, the system is not in compliance with the TOC percent removal requirements.

(b) Systems may use the provisions in subds. 1. to 5. in lieu of the calculations in par. (a) 1. to 5. to determine compliance with TOC percent removal requirements.

1. In any month that the system's treated or source water TOC level, measured according to s. NR 809.563 (7) (c), is less than 2.0 mg/L, the system may assign a monthly value of 1.0, in lieu of the value calculated in par. (a) 3. when calculating compliance under the provisions of par. (a).

2. In any month that a system practicing softening removes at least 10 mg/L of magnesium hardness (as $CaCO_3$), the system may assign a monthly value of 1.0 in lieu of the value calculated in par. (a) 3. when calculating compliance under the provisions of par. (a).

3. In any month that the system's source water SUVA, prior to any treatment and measured according to s. NR 809.563 (7) (d), is $\leq$ 2.0 L/mg−m, the system may assign a monthly value of 1.0, in lieu of the value calculated in par. (a) 3. when calculating compliance under the provisions of par. (a).

4. In any month that the system's finished water SUVA, measured according to s. NR 809.563 (7) (d), is $\leq$ 2.0 L/mg−m, the system may assign a monthly value of 1.0 in lieu of the value calculated in par. (a) 3. when calculating compliance under the provisions of par. (a).

5. In any month that a system practicing enhanced softening lowers alkalinity below 60 mg/L as $CaCO_3$, the system may assign a monthly value of 1.0, in lieu of the value calculated in par. (a) 3. when calculating compliance under the provisions of par. (a).

(c) Systems which are supplied by a surface water source or by a ground water source under the direct influence of surface water and which are using conventional treatment may also comply with the requirements by meeting the criteria in sub. (2) (b) or (c).

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (2) (b) 4. a. and (3) (a) (intro.) Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (1 (b) Table, (d) 2., (2) (b) 3., (c) 1. and 2., (3) (a) 1. Register October 2003 No. 574, eff. 11−1−03.

## Subchapter IV — Secondary Chemical and Physical Standards and Monitoring Requirements

**NR 809.60 Secondary inorganic chemical and physical standards. (1)** Waters containing inorganic chemicals in quantities above the limits contained in this section are not hazardous to health but may be objectionable to an appreciable number of persons.

**(2)** The following are the secondary standards for inorganic chemicals:

| Standard | Milligrams per liter |
|---|---|
| Aluminum | 0.05 to 0.2 |
| Chloride | 250 |
| Color | 15 units |
| Copper | 1.0 |
| Corrosivity | Noncorrosive |
| Fluoride* | 2.0 |
| Foaming agents | 0.5 |
| MBAS (Methylene−Blue Active Substances) | |
| Hydrogen Sulfide | not detectable |
| Iron | 0.3 |
| Manganese | 0.05 |
| Odor | 3 (Threshold No.) |
| Silver | 0.1 |
| Sulfate | 250 |
| Total Residue | 500 |
| Zinc | 5 |

*The primary maximum contaminant level for fluoride is contained in s. NR 809.11.

**(3)** The secondary standards contained in this section apply to all public water systems. Compliance with these standards shall be calculated in accordance with s. NR 809.61.

**(4)** COMPLIANCE WITH THE SECONDARY DRINKING WATER STANDARD AND PUBLIC NOTIFICATION FOR FLUORIDE. Suppliers of water having community water systems that exceed the secondary maximum contaminant level for fluoride as determined by the last single sample taken in accordance with the requirement of s. NR 809.12, but do not exceed the maximum contaminant level for fluoride as specified in s. NR 809.11, shall provide the notice as specified in s. NR 809.957 to all billing units annually, all new billing units at the time service begins and annually to the department and the department of health services.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (2), Register, April, 1982, No. 316, eff. 3−1−82; am. (2), cr. (4), Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.60 and am. (2), Register, July, 1993, No. 451, eff. 8−1−93; correction in (4) made under s. 13.93 (2m) (b) 6., Stats., Register November 2002 No. 563; correction in (4) made under s. 13.93 (2m) (b) 7., Stats., Register March 2004 No. 579; **correction in (4) made under s. 13.92 (4) (b) 6., Stats.**

**NR 809.61 Sampling and analytical requirements for secondary standards. (1)** If the department receives complaints regarding the aesthetic quality of the water the supplier of water may be required to implement a monitoring program to determine compliance with s. NR 809.60.

**(2)** If it is determined by the department that physical or chemical substances or both in excess of those standards contained in s. NR 809.60 are objectionable to an appreciable number of persons and are detrimental to the public welfare the department may, on its own motion, require remedial action by the supplier of water to insure that the public receives the highest quality water practicably obtainable.

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**(3)** The department may require that laboratory test results submitted to the department under this section be performed by a laboratory certified or registered under ch. NR 149.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (2), Register, April, 1982, No. 316, eff. 4−1−82; cr. (3), Register, April, 1986, No. 364, eff. 8−28−86; renum. from NR 109.61, Register, July, 1993, No. 451, eff. 8−1−93; correction in (3) made under s. 13.93 (2m) (b) 7., Stats., Register November 2002 No. 563.

## Subchapter V — Miscellaneous Chemical Monitoring Requirements, Raw Surface Water Standards, Certified Laboratories and Approved Methods for Safe Drinking Water Analysis

**NR 809.70 General requirements.** Public water systems shall meet applicable minimum monitoring requirements stated in this chapter. The department may increase monitoring requirements of any section of this chapter, if the department deems such an increase is necessary to protect public health, safety and welfare. The department may decrease the monitoring requirements of any section of this chapter, if the department determines that such a decrease will not adversely affect protection of public health, safety or welfare.

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.70, Register, July, 1993, No. 451, eff. 8−1−93.

**NR 809.705 Additional requirements for systems which chlorinate or fluoridate water. (1)** FLUORIDE. (a) The supplier of water for a community water system artificially fluoridating the water shall establish a monitoring program in order to maintain the fluoride concentration within the range of 1.0 to 1.5 milligrams per liter as recommended by the dental health section of the department of health services for optimum dental benefits.

(b) The monitoring program shall include:

1. Submission of the results of daily fluoride tests of samples from the distribution system, and

2. One sample per month taken from a representative location in the distribution system and submitted to the state laboratory of hygiene.

**Note:** For waterworks with large distribution systems and multiple sources, more than one fluoride test per day may be necessary to assure proper feed rates. See NR 811.54 (5) for testing equipment requirements. Exceptions to the daily fluoride test requirement may be approved by the department if it is demonstrated that the optimum fluoride concentration in par. (a) will be maintained by a reduced monitoring program.

(c) The sample submitted to the state laboratory of hygiene shall be a portion of a split sample so that the operator can determine the fluoride concentration with the operator's equipment and compare it to the state laboratory results. The fluoride concentration obtained by the operator shall be noted on the data sheet prior to submission to the state laboratory.

**(2)** CHLORINE. The suppliers of water for all waterworks which chlorinate water shall test chlorine residuals at locations and intervals necessary to control the chlorination process. At ground water supplies, the chlorine residual of a sample from a representative location in the distribution system shall be checked at least twice per week. Waterworks having surface water treatment plants shall determine the chlorine residual in the plant effluent at least every 2 hours and in the distribution system at least daily in representative locations. Where water quality changes rapidly, residuals shall be tested at more frequent intervals as specified by the department and in those individual cases, continuous monitoring equipment may be required if the department determines it is necessary to protect public health. Chlorine residual testing is required when bacteriological samples are taken.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (1) (b)1., Register, April, 1982, No. 316, eff. 5−1−82; renum. from NR 809.70 and am. (2), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.705, Register, July, 1993, No. 451, eff. 8−1−93; correction in (1) (a) made under s. 13.93 (2m) (b) 6., Stats., Register November 2002 No. 563; **correction in (1) (a) made under s. 13.92 (4) (b) 6., Stats.**

**NR 809.71 Raw surface water standards.** The intake water shall be the highest quality reasonably available and which, with appropriate treatment and adequate safeguards, will meet the drinking water standards in this chapter.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.71, Register, July, 1993, No. 451, eff. 8−1−93.

**NR 809.72 Laboratories. (1)** For the purpose of compliance with ss. NR 809.12, 809.13, 809.14, 809.21, 809.23, 809.25, 809.26, 809.547 and 809.549, samples shall be analyzed at the state laboratory of hygiene, at a laboratory facility acceptable to the U.S. environmental protection agency, or at a laboratory certified for the safe drinking water test category under ch. NR 149. For the purpose of compliance with ss. NR 809.31, 809.52 and 809.78, bacteriological and radiological samples shall be analyzed at a laboratory facility certified or approved by the department of agriculture, trade and consumer protection, or at a laboratory facility acceptable to the U.S. environmental protection agency.

**(2)** All community water systems utilizing surface water sources shall analyze bacteriological samples for in−plant operational control at a laboratory facility approved by the department of agriculture, trade and consumer protection.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; renum. to be (1), cr. (2), Register, April, 1982, No. 316, eff. 5−1−82; am. (1), Register, April, 1986, No. 364, eff. 8−28−86; am. (1), Register, August, 1989, No. 404, eff. 9−1−89; am. (1), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.72 and am. (1), Register, July, 1993, No. 451, eff. 8−1−93**;**corrections made under s. 13.93 (2m) (b) 6., Stats., Register, October, 1997, No. 502.

**NR 809.725 Approved analytical methods for safe drinking water analyses. (1)** Only the following analytical methods are approved for analysis by this chapter:

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**TABLE A**

**Approved Methodology for Primary Inorganic Contaminants**

| Contaminant | Methodology [21] | EPA | ASTM[3] | SM, 18/ 19th [1,2] | SM, 20th [1] | SM−On-line[4] | Other |
|---|---|---|---|---|---|---|---|
| **Antimony** | Atomic absorption; gaseous hydride [15] | | D3697−92, 02 | | | | |
| | Atomic Absorption; Furnace technique | | | 3113 B | | 3113 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| | Inductively Coupled Plasma−Mass Spectrometry (ICP/MS) | 200.8[5] | | | | | |
| **Asbestos** | Transmission Electron Microscopy | 100.1[6] | − | − | − | | |
| | Transmission Electron Microscopy | 100.2[7] | − | − | − | | |
| **Arsenic**[8] | ICP/MS | 200.8[5] | | | | | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| | Atomic Absorption; Furnace technique | | D2972−97, 03 C | 3113 B | | 3113 B−99 | |
| | Hydride Atomic Absorption | | D2972−97, 03 B | 3114 B | | 3114 B−97 | |
| **Barium** | ICP/MS | 200.8[5] | | | | | |
| | Inductively Coupled Plasma | 200.7[5] | | 3120 B | 3120 B | 3120 B−99 | |
| | Atomic Absorption; Direct Aspiration | | | 3111 D | | 3111 D−99 | |
| | Atomic Absorption; Furnace technique | | | 3113 B | | 3113 B−99 | |
| **Beryllium** | ICP/MS | 200.8[5] | | | | | |
| | Inductively Coupled Plasma | 200.7[5] | | 3120 B | 3120 B | 3120 B−99 | |
| | Atomic Absorption; Furnace technique | | D3645−97, 03 B | 3113 B | | 3113 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| **Cadmium** | ICP/MS | 200.8[5] | | | | | |
| | Inductively Coupled Plasma | 200.7[5] | | | | | |
| | Atomic Absorption; Furnace technique[9] | | | 3113 B | | 3113 B−99 | |
| | Atomic absorption; platform furnace | | | | | | |
| **Copper** | ICP/MS | 200.8[5] | | | | | |
| | Inductively Coupled Plasma | | | 3120 B | 3120 B | 3120 B−99 | |
| | Atomic Absorption; Furnace technique | | D1688−95, 02 C | 3113 B | | 3113 B−99 | |
| | Atomic Absorption; Direct Aspiration | | D1688−95, 02 A | 3111 B | | 3111 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| **Chromium** | ICP/MS | 200.7[5] | | | | | |
| | Inductively Coupled Plasma | | | 3120 B | 3120 B | 3120 B−99 | |
| | Atomic Absorption; Furnace technique | | | 3113 B | | 3113 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |

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**TABLE A − Continued**

**Approved Methodology for Primary Inorganic Contaminants**

| Contaminant | Methodology [21] | EPA | ASTM[3] | SM, 18/19th [1,2] | SM, 20th [1] | SM−On-line[4] | Other |
|---|---|---|---|---|---|---|---|
| **Cyanide** | Manual Distillation | | D2036−98 A | 4500−CN⁻ C | 4500−C-N⁻ C | | |
| | Spectrophotometric, Amenable | | D2036−98 B | 4500−CN⁻ G | 4500−C-N⁻ G | 4500−CN⁻ G−99 | |
| | Spectrophotometric, Manual | | D2036−98 A | 4500−CN⁻ E | 4500−C-N⁻ E | 4500−CN⁻ E−99 | I−3300−85[15] |
| | Selective Electrode | | | 4500−CN⁻ F | 4500−C-N⁻ F | 4500−CN⁻ F−99 | |
| | UV, Distillation, Spectrophotometric | | | | | | Kelada−01[18] |
| | Micro Distillation, Flow Injection, Spectrophotometric | | | | | | QuikChem 10−204−00−1−X[16] |
| | Ligand Exchange and Amperometry | | D6888−04 | | | | OIA−1677, DW[14] |
| | Semi−automated | 335.4[9] | | | | | |
| **Fluoride** | Ion Chromatography | 300.1[17] | 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 Alizarin | | | 4500−F E | 4500−F E | 4500−F E−97 | 129−71W[10] |
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[11] |
| | Automated ion selective electrode | | | | | | 380−75WE[10] |
| **Lead** | ICP/MS | 200.8[5] | | | | | |
| | Atomic Absorption; Furnace technique | | D3559−96, 03 D | 3113 B | | 3113 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| | Differential Pulse Anodic Stripping Voltammetry | | | | | | Method 1001 |
| **Mercury** | ICP/MS | 200.8[5] | | | | | |
| | Manual, Cold Vapor[6] | 245.1[13] | D3223−97, 02 | 3112 B | | 3112 B−99 | |
| | Automated, Cold Vapor[6] | 245.2[5] | | | | | |
| **Nickel** | ICP/MS | 200.8[5] | | | | | |
| | Inductively Coupled Plasma | 200.7[5] | | 3120 B | 3120 B | 3120 B−99 | |
| | Atomic Absorption; Furnace technique | | | 3113 B | | 3113 B−99 | |
| | Atomic Absorption; Direct Aspiration | | | 3111 B | | 3111 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| **Nitrate** | Ion Chromatography | 300.1[17] | D4327−97, 03 | 4110 B | 4110 B | 4110 B−00 | B−1011[20] |
| | Automated Cadmium Reduction | 353.2 | | 4500−NO3 F | 4500−N-O3 F | 4500−NO3 F−00 | |
| | Ion Selective Electrode | | | 4500−NO3 D | 4500−N-O3 D | 4500−NO3 D−00 | 601[22] |
| | Manual Cadmium Reduction | | | 4500−NO3 E | 4500−N-O3 E | 4500−NO3 E−00 | |
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[11] |

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**TABLE A − Continued**

**Approved Methodology for Primary Inorganic Contaminants**

| Contaminant | Methodology [21] | EPA | ASTM[3] | SM, 18/ 19th [1,2] | SM, 20th [1] | SM−On-line[4] | Other |
|---|---|---|---|---|---|---|---|
| **Nitrite** | Ion Chromatography | 300.1[17] | D4327−97, 03 | 4110 B | 4110 B | 4110 B−00 | |
| | Automated Cadmium Reduction | | | 4500−NO 3 F | 4500−N-O3 F | 4500−NO 3 F−00 | |
| | Manual Cadmium Reduction | | D3867−90 B | 4500−NO 3 E | | | |
| | Spectrophotometric | | | 4500−NO 2 B | 4500−N-O2 B | 4500−NO 2 B−00 | |
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[11] |
| **Selenium** | ICP/MS | 200.8[5] | | | | | |
| | Hydride−Atomic Absorption | | D3859−98, 03 A | 3114 B | | 3114 B−97 | |
| | Atomic Absorption; Furnace technique | | D3859−98, 03 B | 3113 B | | 3113 B−99 | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| **Thallium** | ICP/MS | 200.8[5] | | | | | |
| | Atomic absorption; platform furnace | 200.9[5] | | | | | |
| **Turbidity** | Nephelometric | 180.1[9] | | 2130 B | | | |
| | Great Lakes Instruments | | | | | | Method 2[19] |

1 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.

2 The procedures shall be done in accordance with the "Standard Methods for the Examination of Water and Wastewater", 18th and 19th Editions, American Public Health Association, American Water Works Association, 1992 and 1995. 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, NW, Washington, D.C., 20005. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington DC.

3 The procedures shall be done in accordance with the "Annual Book of ASTM Standards", 1994, Vols 11.01 and 11.02. American Society for Testing and Material. 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 Society for Testing and Material, 1916 Race Street, Philadelphia, Pennsylvania 19103. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

4 Standard 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.

5 "Methods for the Determination of Metals in Environmental Samples−Supplement I", ORD Publications, EPA/600/R−94−111 May, 1994. Available from National Technical Information Service, Order #PB94−184942 PB95−125472, 5285 Port Royal Road, Springfield, VA 22161.

6 Method 100.1, "Analytical Method for Determination of Asbestos Fibers in Water", EPA−600/4−83−043, September 1983. U.S. EPA, Environmental Research Laboratory, Athens, GA 30613. Available at NTIS, PB83−260471.

7 Method 100.2, "Determination Of Asbestos Structures over 10−um In Length In Drinking Water", EPA−600/R−94−134, June 1994. Available at NTIS, PB94−201902

8 If 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 100ml of solution. For direct analysis of arsenic with method 200.8 using ultrasonic nebulization, samples and standards must contain one mg/L of sodium hypochlorite

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

10 The procedures shall be done in accordance with the Industrial Method No. 129−71 W, "Fluoride in Water and Wastewater", December 1972, and Method No. 380−75WE, "Fluoride in Water and Wastewater", February 1976, Technicon Industrial Systems. 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 Technicon Industrial Systems, Tarrytown, NY 10591. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

11 Method 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.

12 "Methods for the Determination of Metals in Environmental Samples−Supplement I", ORD Publications, EPA/600/R−94−111 May, 1994. Available from National Technical Information Service, Order #PB94−184942 PB95−125472, 5285 Port Royal Road, Springfield, VA 22161.

13 Method 245.2 is available from US EPA, EMSL, Cincinnati, OH 45268. The identical methods were formerly in "Methods for Chemical Analysis of Water and Wastes", EPA−600/4−79−020, March 1983, Available at National Technical Information Services, PB84−128677, 5285 Port Royal Road, Springfield, VA 22161

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

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[15] Method 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.

[16] The 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

[17] "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.

[18] The 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.

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

[20] "Waters Test Method for the Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography", Method B−1011, Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

[21] Because method detection limits reported in EPA Methods 200.7 and 200.9 were determined using a 2X preconcentration step during sample digestion, method detection limits 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 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.

[22] The 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. 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 ATI Orion, 529 Main Street, Boston, MA 02129. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

**TABLE B**
**SDWA Approved Methodology for Organic Contaminants**

| Contaminant | EPA Methods [1,2] | SM | ASTM | Other |
|---|---|---|---|---|
| **Regulated Parameters:** | | | | |
| **Volatile Organic Chemical** | | | | |
| Benzene | 502.2, 524.2 | | | |
| Carbon tetrachloride | 502.2, 524.2, 551.1 | | | |
| Chlorobenzene | 502.2, 524.2 | | | |
| Dibromochloropropane (DBCP) | 504.1, 551.1 | | | |
| 1,2−Dichlorobenzene | 502.2, 524.2 | | | |
| 1,4−Dichlorobenzene | 502.2, 524.2 | | | |
| 1,2−Dichloroethane | 502.2, 524.2 | | | |
| cis−Dichloroethylene | 502.2, 524.2 | | | |
| trans−Dichloroethylene | 502.2, 524.2 | | | |
| Dichloromethane | 502.2, 524.2 | | | |
| 1,2−Dichloropropane | 502.2, 524.2 | | | |
| Ethylbenzene | 502.2, 524.2 | | | |
| Styrene | 502.2, 524.2 | | | |
| Tetrachloroethylene | 502.2, 524.2, 551.1 | | | |
| 1,1,1−Trichloroethane | 502.2, 524.2, 551.1 | | | |
| Trichloroethylene | 502.2, 524.2, 551.1 | | | |
| Toluene | 502.2, 524.2 | | | |
| 1,2,4−Trichlorobenzene | 502.2, 524.2 | | | |
| 1,1−Dichloroethylene | 502.2, 524.2 | | | |
| 1,1,2−Trichloroethane | 502.2, 524.2, 551.1 | | | |
| Vinyl chloride | 502.2, 524.2 | | | |
| Xylenes (total) | 502.2, 524.2 | | | |
| **Synthetic Organic Chemicals** | | | | |
| 2,3,7,8−TCDD (dioxin) | | 1613[3] | | |
| 2,4−D [4] (as acids, salts and esters) | 515.2, 555, 515.1, 515.3, 515.4 | | D5317−93, 98 (Reapproved 2003) | |

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**TABLE B − Continued**
**SDWA Approved Methodology for Organic Contaminants**

| Contaminant | EPA Methods [1,2] | SM | ASTM | Other |
|---|---|---|---|---|
| 2,4,5−TP [4] (Silvex) | 515.2, 555, 515.1, 515.3, 515.4 | | D5317−93, 98 (Reapproved 2003) | |
| Alachlor | 507, 525.2, 508.1, 505[8], 551.1 | | | |
| Atrazine [5] | 507, 525.2, 508.1, 505[8], 551.1 | | | Syngenta [6] AG−625 |
| Benzo(a)pyrene | 525.2, 550, 550.1 | | | |
| Carbofuran | 531.1 | 6610[7] | | |
| 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 | | | |
| 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 | | | |
| Glyphosate | 547 | 6651[10] | | |
| 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[7] | | |
| PCBs (as decachlorobiphenyl) | 508A[9] | | | |
| (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, 515.4 | | D5317−93, 98 s(Reapproved 2003) | |
| Simazine | 507, 525.2, 508.1, 505[8], 551.1 | | | |
| Toxaphene | 508, 508.1, 525.2, 505 | | | |
| Total Trihalomethanes | 502.2, 524.2, 551.1 | | | |
| **Unregulated Parameters:** | | | | |
| Aldicarb | 531.1 | 6610[7] | | |
| Aldicarb sulfone | 531.1 | 6610[7] | | |
| Aldicarb Sulfoxide | 531.1 | 6610[7] | | |
| Aldrin | 505, 508, 525.2, 508.1 | | | |
| Butachlor | 507, 525.2 | | | |
| Carbaryl | 531.1 | 6610[7] | | |
| Dicamba | 515.1, 555, 515.2 | | | |
| Dieldrin | 505, 508, 525.2, 508.1 | | | |
| 3−Hydroxcarbofuran | 531.1 | 6610[7] | | |
| Methomyl | 531.1 | 6610[7] | | |
| Metolachlor | 507, 525.2, 508.1 | | | |
| Metribuzin | 507, 525.2, 508.1 | | | |
| Propachlor | 507, 525.2, 508.1 | | | |

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

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Water, Supplement I", EPA−600/4−90/020, July 1990. Methods 548.1, 549.1and 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 For previously approved EPA methods which remain available for compliance monitoring until June 1, 2001, see paragraph (e)(2) of this section. (e)(2) states: *"T*he following EPA methods will remain available for compliance monitoring until June 1, 2001. The following documents are incorporated by reference. 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 inspected at EPA's Drinking Water Docket, 401 M St., SW., Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. EPA methods 502.2 Rev. 2.0, 505 Rev. 2.0, 507 Rev. 2.0, 508 Rev. 3.0, 531.1 Rev. 3.0 are in ''Methods for the Determination of Organic Compounds in Drinking Water'', December 1988, revised July 1991; methods 506 and 551 are in ''Methods for the Determination of Organic Compounds in Drinking Water—Supplement I'', July 1990; methods 515.2 Rev. 1.0 and 524.2 Rev. 4.0 are in ''Methods for the Determination of Organic Compounds in Drinking Water—Supplement II,'' August 1992; and methods 504.1 Rev. 1.0, 508.1 Rev. 1.0, 525.2 Rev.1.0 are available from US EPA NERL, Cincinnati, OH 45268."

3 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.

4 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).

5 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.

6 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 word, greater than 0.0015 mg/L or 1.5 ìg/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.

7 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., 2005. 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.

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 simizine, if lower detection limits are required.

9 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.

10 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.

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**TABLE C**
**SDWA Approved Methodology for Microbiological Measurements**

| | **Methodology** | **Standard Methods (18th Edition[1])** |
|---|---|---|
| Total Coliform Bacteria[8] | Multiple tube fermentation[3,4,5] | 9221 A,B,C |
| | Membrane | 9222 A,B,C |
| | Minimal Media ONPG−MUG Test[7] | 9223 |
| | Chromogenic/Fluorogenic[10] | see footnote 10 |
| | Presence − Absence (P−A) Coliform Test[5,6] | 9221D |
| Fecal Coliform, | Fecal Coliform Multiple Tube(MPN)[9] Tests | 9221E |
| | Fecal Coliform Membrane Filter (MF) Procedure | 9222D |
| *Escherichia coli* | EC Medium + MUG[7] | 908C (pp. 879) |
| | Nutrient Agar + MUG[7] | 908B (pp. 874) |
| | Minimal Medium + MUG (MMO−MUG)[5,7] | 908C or908D, (pp. 878−882) |
| Heterotrophic Plate Count[2] | Pour Plate Method | 9215B |

[1] Except where noted, all methods refer to the "Standard Methods for the Examination of Water and Wastewater", 18th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1992.

[2] The time from sample collection to initiation of analysis may not exceed 8 hours. Sample must be iced.

[3] Lactose broth, as commercially available, may be used in lieu of lauryl tryptse broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false−positive rate for total coliforms, using lactose broth, is less than 10 percent.

[4] If inverted tubes are used to detect gas production, the media should cover these tubes at least one−half to two−thirds after the sample is added.

[5] No requirement exists to run the completed phase on 10 percent of all total coliform−positive confirmed tubes.

[6] Six−times formulation strength may be used if the medium is filter−sterilized rather than autoclaved.

[7] The ONPG−MUG Test is also known as the Autoanalysis Colilert System.

[8] The time from sample collection to initiation of analysis should not exceed 30 hours. If the laboratory analyzes the sample between 30 and 48 hours after collection results are indicated as possibly invalid.

[9] A−1 broth may be held up to three months in a tightly closed screwcap tube at 4°C.

[10] This is also known as the Colisure Test. The Colisure Test must be incubated for 28 hours before examining the results. If an examination if the results at 28 hours is not convenient, the results may be examined at any time between 28 and 48 hours. A description of the Colisure Test may be obtained from the Millipore Corp., Technical Services Department, 80 Ashby Road, Bedford, MA 01730.

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**TABLE D**
**SDWA Approved Methodology for Radiological Measurements**
**Reference (method or page number)**

| Parameter | Method | EPA[1] | EPA[2] | EPA[3] | EPA[4] | SM[5] | ASTM[6] | USGS[7] | DOE[8] | Others |
|---|---|---|---|---|---|---|---|---|---|---|
| **Naturally Occurring:** | | | | | | | | R−1120−76 | −−− | |
| Gross alpha[11] & beta | Evaporation | 900 | p1 | 00−01 | p1 | 302, 7110 B | | R−1120−76 | −−− | |
| Gross alpha[11] | co−precipitation | −−− | | 00−02 | | 7110 C | −−− | −−− | −−− | |
| Radium 226 | Radon emanation, Radiochemical | 903.1<br>903.0 | P 16<br>p13 | Ra−04<br>Ra−03 | p19 | 7500−Ra C<br>304,305,<br>7500−Ra B | D 3454−91<br>D 2460−90 | R−1141−76<br>R−1140−76 | Ra−05 | N.Y.[9] |
| Radium 228 | Radiochemical | 904.0 | P 24 | Ra−05 | p19 | 304,7500 Ra D | −−− | R−1142−76 | −−− | N.Y.[9]<br>N.J.[10] |
| Uranium[12] | Radiochemical Fluorometric | 908.0<br>908.1 | | | | 7500−UB<br>7500−UC<br>(17th Ed) | D2907−91 | R−1180−76<br>R−1181−76<br>R−1182−76 | U−04<br>U−2 | |
| | Alpha spectrometry | −−− | | 00−07 | p33 | 7500−UC (18th or 19th Ed) | D3972−90 | −−− | −−− | |
| | Laser Phosphorimetry | −−− | | | | − | D5174−91 | | | |
| **Man−Made:** | | | | | | | | | | |
| Radioactive | | | | | | 303,7500− | −−− | | | |
| Strontium − 89,90 | Radiochemical | 905.0 | p 29 | Sr−04 | p65 | Sr B | −−− | R1160−76 | Sr−01<br>Sr−02 | |
| Tritium | Liquid Scintillation | 906.0 | p 34 | H−02 | p 87 | 306,<br>7500−3H B | | D 4107-91 | R 1171−76 | −−− |
| Radioactive Cesium − | Radiochemical, Gamma ray spectrophotometry | 901.0<br>901.1 | p 4 | | p 92 | 7500−Cs B<br>7120 (19th Ed.) | D 2459−72<br>D 3649−91 | −−−<br>R−1110−76 | 4.5.2.3 | |
| Radioactive Iodine | Radiochemical, Gamma ray spectrophotometry | 902.0<br>901.1 | P 6<br>p 9 | | p 92 | 7500−I B<br>7500−I C<br>7500−I D<br>7120 (19th Ed) | D 3649−91<br>D 4785−88 | −−− | 4.5.2.3 | |
| Gamma Emitters | Gamma ray spectrometry | 901.1<br>902.0<br>901.0 | | | p 92 | 7120 (19th Ed.)<br>7500−Cs B<br>7500−I B | D 3649−91<br>D 4785−88 | −−− | 4.5.2.3 | |

[1]"Prescribed Procedures for Measurement of Radioactivity in Drinking Water", EPA−600/4−80/032. August, 1980. Available from the EMSL, Office of Research and Development, U.S. EPA, 26 W. Martin Luther King Drive, Cincinnati, Ohio, 45268.
[2]"Interim Radiochemical Methodology for Drinking Water", EPA 600/4−75/008 (revised), March 1976, Available at NTIS, ibid PB 253258.
[3]"Radiochemistry Procedures Manual", EPA 520/5−84/006, December 1987, Available at NTIS, ibid, PB 84−215581.
[4]"Radiochemical Analytical Procedures for Analysis of Environmental Samples", March 1979, Available at NTIS, ibid, EMSL LV 053917
[5]"Standard Methods for the Examination of Water and Wastewater", 13th Edition, 17th, 18th, 19th Editions, 1971, 1989, 1992, 1995, Available at APHA, 1015 Fifteenth Street, N.W. Washington, D.C. 20005. All methods are in the 17th, 18th and 19th editions except 7500−U C Flurometric Uranium was discontinued after the 17th Edition. 7120 Gamma Emitters is only in the 19th Edition and 302, 303, 304, 305 and 306 are only in the 13th Edition.
[6]Annual Book of ASTM Standards, Vol. 11.02, 1994. Available at American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428.
[7]"Methods for Determination of Radioactive Substances in Water and Fluvial Sediments", Chapter A5 in Book 5 of Techniques of Water Resources Investigations of the United States Geological Survey, 1997. Available at U.S. Geological Survey (USGS) Information Services, Box 25286 Federal Center, Denver, CO 80225−0425.
[8]"EML Procedures Manual", 27th Edition, Volume 1, 1990. Available at the Environmental Measurements Laboratory, U.S. Department of Energy (DOE), 376 Hudson Street, New York, NY 10014−3621.
[9]"Determination of Ra−226 and Ra−228 (Ra−02)", January 1980, Revised June 1982. Available at Radiological Sciences Institute Center for Laboratories and Research, New York State Department of Health, Empire State Plaza, Albany, NY 12201.
[10]"Determination of Radium 228 in Drinking Water", August 1980. Available at State of New Jersey, Department of Environmental Protection, Division of Environmental Quality, Bureau of Radiation and Inorganic Analytical Services, 9 Ewing Street, Trenton, N.J. 08625.
[11]Natural uranium and thorium−230 or approved as gross alpha calibration standards for gross alpha with co−precipitation and evaporation methods, americium−241 is approved with co−precipitation methods.
[12]If uranium (U) is determined by mass a 0.67 pCi/g of uranium conversion factor must be used. This conservative factor is based on the 1:1 activity ratio of U−234 to U−238 that is characteristic of naturally occurring uranium.

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**TABLE E**
**SDWA Approved Methodology for Physical Parameters, Residual Chlorine, Sodium, Corrosivity, and Secondary Contaminants**

| Parameter and Method | EPA[2] | Standard Methods[3] | ASTM[4] | USGS[5] | Other |
|---|---|---|---|---|---|
| **Alkalinity**−Titrimetric | | 2320B | D1067−92(B) | I−1030−85 | − |
| **Aluminum − Total[6],** Digestion, followed by: | | | | | |
| Atomic absorption (AA); direct aspiration | | 3111D | | | − |
| Atomic absorption (AA); graphite furnace | | 3113 B | | − | − |
| Inductively−coupled plasma (ICP) | 200.7 | 3120 B | − | − | − |
| Inductively−coupled plasma; mass spectrometry (ICP/MS) | 200.8 | − | − | − | − |
| Atomic absorption (AA); platform furnace | 200.9 | − | − | − | − |
| **Calcium** | | | | | |
| EDTA titrimetric | | 3500−Ca D | D511−93(A) | − | − |
| AA; direct aspiration | − | 3111 B | D511−93(B) | − | − |
| ICP | 200.7 | 3120 B | − | − | − |
| **Chloride** | | | | | |
| Potentiometric | − | 4500−Cl− D | − | − | − |
| Ion Chromatography | 300.0[1] | 4110 | D4327−91 | − | − |
| **Chlorine dioxide residual** | | | | | |
| Amperometric | − | 4500−$ClO_2$ C or E | − | − | − |
| DPD | − | 4500−$ClO_2$ D | − | − | − |
| **Color** | | | | | |
| Colorimetric, Pt−Co | − | 2120 B | − | − | − |
| **Combined chlorine** | | | | | |
| Amperometric titration | | 4500−C1 D | | | |
| DPD Ferrous titrimetric | | 4500−C1 F | | | |
| DPD Colorimetric | | 4500−C1 G | | | |
| **Corrosivity** | | | | | |
| Langelier Index | − | 2330 | − | − | − |
| Aggressive Index | − | − | − | − | C400−77[7] |
| **Foaming Agents (MBAS)** | | | | | |
| Colorimetric | | 5540 C | − | − | − |
| **Free chlorine residual[11]** | | | | | |
| Colorimetric or ferrous titrimetric DPD | − | 4500−Cl G or F | − | − | − |
| Amperometric | | 4500−Cl D | D 1253−86 | − | − |
| Syringaldazine | | 4500−Cl H | | − | − |
| **Total Chlorine** | | | | | |
| Amperometric titration | − | 4500−Cl D | D 1253−86 | − | − |
| Amperometric titration (low level) | − | 4500−Cl E | | − | − |
| DPD Ferrous titrimetric | − | 4500−Cl F | | − | − |
| DPD Colorimetric | − | 4500−Cl G | | − | − |
| Iodometric Electrode | − | 4500−Cl I | | − | − |
| **Iron − Total[6], Digestion, followed by:** | | | | | |
| AA; direct aspiration | | 3111 B | | | |
| AA; graphite furnace | 200.9 | 3111 B | − | − | − |
| ICP | 200.7 | 3120 B | − | − | − |
| **Manganese − Total[6], Digestion, followed by:** | | | | | |
| AA; direct aspiration | | 3111 B | | | |

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**TABLE E − Continued**

| Parameter and Method | EPA[2] | Standard Methods[3] | ASTM[4] | USGS[5] | Other |
|---|---|---|---|---|---|
| AA; graphite furnace | 200.9 | 3113 B | − | − | − |
| ICP | 200.7 | 3113 B | − | − | − |
| Inductively−coupled plasma; mass spectrometry | 200.8 | − | − | − | − |
| (ICP/MS) | − | − | − | − | − |
| **Odor − Threshold Odor** | | 2150 B | − | − | − |
| Orthophosphate, Unfiltered, no digestion or hydrolysis | | | | | |
| Colorimetric, automated, ascorbic acid | 365.1[1] | 4500−P F | − | − | − |
| Colorimetric, ascorbic acid | | 4500−P E | D515−88(A) | − | − |
| Colorimetric, phosphomolybdate;<br>automated segment flow<br>automated discrete | − | − | − | I−1601−85<br>I−2601−90<br>I−2598−85 | − |
| Ion chromatography | 300.0A[1] | 4110 | D4327−91 | − | − |
| **Ozone** | | | | | |
| Indigo Method | − | 4500−$0_3$B | − | − | |
| **pH** | | | | | |
| Electrometric | 150.1,<br>150.2 | 4500−$H^+$ B | D1293−95 | − | − |
| **Silica** | | | | | |
| Colorimetric, molybdate blue | − | − | − | I−1700−85 | − |
| Automated−segmented flow:<br>Colorimetric<br>Molybodosilicate<br>Heteropoly blue | −<br>−<br>−<br>− | −<br>−<br>4500−Si D<br>4500−Si E | −<br>D859−88<br>−<br>− | I−2700−85<br>−<br>−<br>− | −<br>−<br>−<br>− |
| Automated method for molybdate−reactive silica | − | 4500−Si F | − | − | − |
| ICP | 200.7 | 3120 B | − | − | − |
| **Sodium − Total[6], Digestion, followed by:** | | | | | |
| AA; direct aspiration | − | 3111 B | − | − | − |
| ICP | 200.7 | − | − | − | − |
| **Silver − Total[6], Digestion, followed by:** | | | | | |
| AA; direct aspiration | − | 3111 B | − | I−3720−85 | − |
| AA; graphite furnace | − | 3113 B | − | − | − |
| AA; platform furnace | 200.9 | − | − | − | − |
| ICP | 200.7 | 3120 B | − | − | − |
| ICP/MS | 200.8 | − | − | − | − |
| **Sulfate** | | | | | − |
| Spectrophotometric | 375.2[1] | − | 4500−$SO_4$−F | | − |
| Gravimetric | − | − | 4500−$SO_4$−C, D | | − |
| Ion chromatography | 300.0[1] | D4327−91 | 4110 | | − |
| **Temperature, Thermometric** | − | 2550 B | − | − | − |
| **Total Filterable Residue (TDS), gravimetric** | − | 2540 C | − | − | − |
| **Zinc − Total[6], Digestion followed by:** | | | | | |
| AA; direct aspiration | − | 3111 B | − | − | − |
| ICP | 200.7 | 3120 B | − | − | − |
| ICP/MS | 200.8 | − | − | − | − |

[1] "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA−600/R−93−100, August 1993, Available at NTIS, Order #PB94−12811, 5285 Port Royal Road, Springfield, VA 22161.
[2] Unless otherwise noted, methods are in "Methods for the Determination of Metals in Environmental Samples − Supplement I", EPA−600/R−94/111, May 1994. Available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. PB94−184942
[3] "Standard Methods for the Examination of Water and Wastewater", American Public Health Association, American Water Works Association, Water Pollution Control Federation, 18th edition, 1989, 1015 Fifteenth Street, N.W., Washington, D.C. 20005.

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[4] "Annual Book of ASTM Standards, Vols. 11.01 and 11.02, 1994. Available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. The same method in the current edition may be used if the date of method revision is the same as the 1991 edition.
[5] Available from Books and Open−File reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO. 80225−0425.
[6] Samples that contain less than 1 NTU (nephelometric turbidity unit) and are properly preserved (conc. $HNO_3$ to pH < 2) may be analyzed directly without digestion) for total metals, otherwise, digestion is required. Turbidity must be measured on the preserved samples just prior to the initiation of metal analysis. When digestion is required the total recoverable technique as defined in the method must be used.
[7] "AWWA Standards for Asbestos − Cement Pipe, 4 in. through 16 in. for Water and Other Liquids", AWWA C400−77, Revision of C400−75. Available from the AWWA, 6666 West Quincy Avenue, Denver Colorado, 80235.
[11] Residual disinfectant concentrations for free chlorine and combined chlorine may also be measured by using DPD colorimetric test kits if approved by the department.

**TABLE F**

**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<br>NaOH to pH>12<br>0.6 g Ascorbic acid | 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 |
| Nitrite (as N) | Cool, 4°C | P or G | 48 hours |
| Nitrate + Nitrite[6] | Conc. $H_2SO_4$ 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 $HNO_3$ 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 $HNO_3$ to pH < 2. At time of analysis, sample container should be thoroughly rinsed with 1:1 $HNO_3$; 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.

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**TABLE G**
**Sample Preservation Requirements and Holding Times for Organic Parameters**

| Parameter/Method | Preservation | Container | Holding Time | |
|---|---|---|---|---|
| | | | 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 | – |
| 525.1 | Sodium Sulfite (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 Silanized Amber Glass | 7 days | 21 days |
| 550, 550.1 | Sodium Thiosulfate (100 mg/L), Cool, 4°C, HCl pH < 2 | 1L, Amber G[2] | 7 days | 4°C, dark, 40 days |
| 551.1 | Ammonium chloride Sodium sulfite (100 mg/L), Cool, 4°C, HC1 pHt 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.

**TABLE H**
**Sample Preservation Requirements and Holding Times for Microbiological and Radiological Parameters**

| Parameter/Method | Preservation | Container | HOLDING TIME | |
|---|---|---|---|---|
| | | | Sample | Extract |
| Coliform, E.Coli, Fecal Coliform | Cool, < 10°, Sodium Thiosulfate | | 30 hours | |
| Heterotrophs | Room temperature or Cool 4° | | 6 hours or 24 hours | 100 mL |
| All Radionuclides except the following | $HNO_3$ or HCl pH < 2 | 1L, P or G | 1 year | |
| | none | 30 mL, G[1] | 4 days | |
| Radon 222 | HCl to pH < 2 | 1L, P or G | 1 year | |
| Cesium | none | 1L, P or G | 7 days | |
| Iodine | none | 1L, P or G | 1 year | |
| Tritium | | | | |

[1]Teflon lined septa required.

**TABLE I**
**SDWA Approved Methodology for Disinfectant Byproducts and Disinfectant Residuals**

| Parameter | Reference (method number) |
|---|---|

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| **Disinfectant Byproducts** | **EPA[1,2]** | **Standard Methods[3]** | **ASTM[4]** |
|---|---|---|---|
| TTHM | 502.2, 524.2, 551.1 | | – |
| HAA5 | 552.2 | 6251 B | |
| Chlorite | 300.0, 300.1 | 4500−$ClO_2$ | |
| Bromate | 300.1 | | |
| **Disinfectant Residuals** | | | |
| Free Chlorine | | 4500−CL D, 4500−CL F,4500−CL G, 4500−CL H | D 1253−86 |
| Combined Chlorine | | 4500−CL D,4500−CL F, 4500−CL G | |
| Total Chlorine | | 4500−CL D, 4500−CL E, 4500−CL F, 4500−CL G, 4500−CL I | D 1253−86 |
| Chlorine Dioxide | | 4500−$CLO_2$ D, 4500−$CLO_2$ E | |

[1] EPA Method 552.1 is in Methods for the Determination of Organic Compounds in Drinking Water−Supplement II, USEPA, August 1992, EPA/600/R−92/129 (available through National Information Technical Service (NTIS), PB92−207703). EPA Methods 502.2, 524.2, 551.1, and 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water−Supplement III, USEPA, August 1995, EPA/600/R−95/131. (available through NTIS, PB95−261616).

[2] EPA Method 300.0 is in Methods for the Determination of Inorganic Substances in Environmental Samples, USEPA, August 1993, EPA/600/R−93/100. (available through NTIS, PB94−121811). EPA Method 300.1is titled USEPA Method 300.1, Determination of Inorganic Anions in Drinking Water by Ion Chromatography, Revision 1.0, USEPA, 1997, EPA/600/R−98/118 (available through NTIS, PB98−169196); also available from: Chemical Exposure Research Branch, Microbiological & Chemical Exposure Assessment Research Division, National Exposure Research Laboratory, U.S. Environmental Protection Agency, Cincinnati, OH 45268,Fax Number: 513−569−7757, Phone number: 513−569−7586.

[3] Standard Methods 4500−Cl D, 4500−Cl E, 4500−Cl F, 4500−Cl G, 4500−Cl H, 4500−Cl I, 4500−$ClO_2$D, 4500−$ClO_2$ E, 6251 B, and 5910 B shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 19th Edition, American Public Health Association, 1995; copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005. Standard Methods 5310 B, 5310 C, and 5310 D shall be followed in accordance with the Supplement to the 19th Edition of Standard Methods for the Examination of Water and Wastewater, American Public Health Association, 1996; copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC 20005

[4] ASTM Method D 1253−86 shall be followed in accordance with the Annual Book of ASTM Standards, Volume 11.01, American Society for Testing and Materials, 1996 edition; copies may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohoken, PA 19428.

**(2)** The following procedure is to be used for compositing VOC samples prior to GC analysis.

(a) Add 5 ml or equal larger amounts of each sample, up to 5 samples are allowed, to a 25 ml glass syringe. Special precautions shall be made to maintain zero headspace in the syringe.

(b) The samples shall be cooled at 4°C during this step to minimize volatilization losses.

(c) Mix well and draw out a 5 ml aliquot for analysis.

(d) Follow sample introduction, purging and desorption steps described in the method.

(e) If fewer than 5 samples are used for compositing, a proportionately smaller syringe may be used.

**(3)** The following procedure is to be used to composite VOC samples prior to GC/MS analysis.

(a) Inject 5−ml or equal larger amounts of each aqueous sample, up to 5 samples are allowed, into a 25−ml purging device using the sample introduction technique described in the method.

(b) The total volume of the sample in the purging device shall be 25 ml.

(c) Purge and desorb as described in the method.

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.725, r. and recr. (1) Tables A to E, cr. (1) Tables F to H, (2) and (3), Register, July, 1993, No. 451, eff. 8−1−93; am. (1) Table A, Register, August, 1994, No. 464, eff. 9−1−94; am. Tables A, B, C, D, E, F, Register, October, 1997, No. 502, eff. 11−1−97; am. Table E, F, and G, cr. Table I, Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. Table E Register November 2002 No. 563, eff. 12−1−02; CR 03−067: r. and recr. Tables A and F Register March 2004 No. 579. eff. 4−1−04; **CR 07−025: r. and cr. (1) Tables A and B, am. (1) Table F Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.73 Monitoring of consecutive public water systems.** When a public water system supplies water to one or more other public water systems, the department may modify the monitoring requirements imposed by this chapter to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the department and concurred in by the administrator of the U.S. environmental protection agency.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; renum. from NR 109.73, Register, July, 1993, No. 451, eff. 8−1−93.

**NR 809.74 Sampling and analytical requirements for other chemicals. (1)** If the department determines that the public health, safety or welfare requires testing for chemical or physical constituents in water which are not contained in this chapter the department may order such testing as it deems necessary.

(a) The department shall provide public notice and an opportunity for public hearing within 90 days after any order under this subsection.

(b) Hearings under this subsection shall be class 1 hearings and shall be held in accordance with ch. 227, Stats.

(c) Such testing shall be done at a laboratory certified or registered under ch. NR 149 as the department may require on a case−by−case basis.

**(2)** Testing for other constituents shall be performed at water systems as determined necessary by the department for design and control of treatment processes for contaminants which may affect public health or welfare. Such testing shall be done at a laboratory certified or registered under ch. NR 149 as the department may require on a case−by−case basis.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; cr. (1) (c), am. (2), Register, April, 1986; renum. from NR 109.74, Register, July, 1993, No. 451, eff. 8−1−93.

## Subchapter VI — Filtration and Disinfection

**NR 809.75 General requirements. (1)** These regulations establish criteria under which filtration is required as a treatment technique for public water systems supplied by a surface water source or a groundwater source under the direct influence of surface water. Direct influence shall be determined for individual sources by the department. The department determination of direct influence may be based on site−specific measurements of

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water quality characteristics such as those stated in s. NR 809.04 (34) or documentation of well construction characteristics and geology with field evaluation. These regulations also establish requirements for treatment techniques in lieu of maximum contaminant levels for *Giardia lamblia*, viruses, heterotrophic plate count bacteria, *Legionella*, *Cryptosporidium* and turbidity. Treatment technique requirements apply to every public water system which utilizes surface water or ground water under the direct influence of surface water and the requirements consist of installing and properly operating water treatment processes which reliably achieve:

(a) At least 99.9% (3 log) removal or inactivation of *Giardia lamblia* cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer; and

(b) At least 99.99% (4 logs) removal of inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

**(2)** A public water system using a surface water source or a ground water under the direct influence of surface water is considered to be in compliance with the requirements of sub. (1) if it meets the filtration requirements in s. NR 809.76 and the disinfection requirements in s. NR 809.77, or it meets the criteria for avoiding filtration in s. NR 809.755 and it meets the disinfection requirements in s. NR 809.77.

**(3)** Each public water system using a surface water source or a ground water under the direct influence of surface water shall be operated by qualified personnel who meet the requirements specified by the department.

**(4)** After December 31, 2001, systems shall install and operate water treatment processes that will reliably achieve all of the following:

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

(b) Compliance with the profiling and benchmark requirements under the requirements in s. NR 809.775.

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.70 and am. (1) (b) and (2), Register, July, 1993, No. 451, eff. 8−1−93; am. (1) (intro.), cr. (4), Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (1) (a) Register November 2002 No. 563, eff. 12−1−02; correction in (1) (intro.) made under s. 13.93 (2m) (b) 7., Stats., Register November 2002 No. 563; CR 02−147: am. (4) (intro.) Register October 2003 No. 574, eff. 11−1−03; **CR 07−025: am. (4) (intro.) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.755 Criteria for avoiding filtration.** A public water system that uses ground water under the direct influence of surface water as a water supply source shall meet all of the conditions of subs. (1) and (2), and is subject to sub. (3), unless the department has determined, in writing, that filtration is required. If the department determines in writing, before December 30, 1991, that filtration is required, the system owner shall install filtration and shall meet the criteria for filtered systems specified in ss. NR 809.77 and 809.78. Within 18 months of the failure of a public water system using a ground water source under the direct influence of surface water to meet any one of the requirements of subs. (1) and (2), the system owner shall install filtration and shall meet the criteria for filtered systems specified in ss. NR 809.77 and 809.78.

**(1)** SOURCE WATER QUALITY CONDITIONS. (a) The fecal coliform concentration shall be equal to or less than 20/100ml, or the total coliform concentration shall be equal to or less than 100/100 ml, measured as specified in s. NR 809.725 (1) Table C, in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90% of the measurements made for the 6 previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliforms, the fecal coliform criterion, but not the total coliform criterion, in this paragraph shall be met.

(b) The turbidity level may not exceed 5 NTU, measured as specified in s. NR 809.725 (1) Table A, in representative samples of the source water immediately prior to the first or only point of disinfectant application unless:

1. The department determines that any such event was caused by circumstances that were unusual and unpredictable; and

2. There have not been more than 2 events in the past 12 months the system served water to the public, or more than 5 events in the past 120 months the system served water to the public, in which the turbidity level exceeded 5 NTU. An "event" is a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

**(2)** SITE−SPECIFIC CONDITIONS. (a) 1. The public water system shall meet the disinfection requirements of s. NR 809.77 (1) (a) at least 11 of the 12 previous months that the system served water to the public, on an ongoing basis, unless the system fails to meet the requirements during 2 of the 12 previous months that the system served water to the public, and the department determines that at least one of these failures was caused by circumstances that were unusual and unpredictable.

2. The public water system shall meet the requirements of s. NR 809.77 (1) (b) at all times the system serves water to the public.

3. The public water system shall meet the requirements of s. NR 809.77 (1) (c) at all times the system serves water to the public unless the department determines that any such failure was caused by circumstances that were unusual and unpredictable.

4. The public water system shall meet the requirements of s. NR 809.77 (1) (d) on an ongoing basis unless the department determines that failure to meet these requirements was not caused by a deficiency in treatment of the source water.

(b) The public water system shall maintain a department approved well head protection program which minimizes the potential for contamination by *Cryptosporidium*, *Giardia lamblia* cysts and viruses in the source water. The department shall determine whether the well head protection program is adequate to meet this goal. At a minimum, the program shall:

1. Characterize the watershed hydrology, hydrogeology and land ownership;

2. Identify watershed characteristics and activities which may have an adverse effect on source water quality; and

3. Monitor the occurrence of activities which may have an adverse effect on source water quality.

(c) The public water system is subject to an annual on−site inspection to assess the well head protection program and disinfection treatment process. Either the department or a party approved by the department shall conduct the on−site inspection. The inspection shall be conducted by competent individuals and shall include:

1. A review of the effectiveness of the watershed control program;

2. A review of the physical condition of the source intake and how well it is protected;

3. A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;

4. An inspection of the disinfection equipment for physical deterioration;

5. A review of operating procedures;

6. A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and

7. Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.

8. A review of the adequacy of the watershed control program to limit potential contamination by *Cryptosporidium* including:

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comprehensiveness of the watershed review, the effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed, and the extent to which the water system has maximized land ownership or controlled land use, or both, within the watershed.

(d) The public water system may not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system shall be modified sufficiently to prevent another such occurrence, as determined by the department.

(e) The public water system shall comply with the maximum contaminant level (MCL) for total coliforms in s. NR 809.30 at least 11 months of the previous 12 months that the system served water to the public, on an ongoing basis, unless the department determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water.

(f) The public water system shall comply with the requirements for trihalomethanes in s. NR 809.22 until December 31, 2001. After December 31, 2001, the system shall comply with the requirements for total trihalomethanes, haloacetic acids (five), bromate, chlorite, chlorine, chloramines and chlorine dioxide in s. NR 809.561.

**(3)** TREATMENT TECHNIQUE VIOLATIONS. (a) A system that fails to meet any one of the criteria in subs. (1) and (2), and which the department has determined in writing that filtration is required, is in violation of a treatment technique requirement.

(b) A system that has not installed filtration is in violation of a treatment technique if:

1. The turbidity level in a representative sample of the source water immediately prior to the first or only point of disinfection application exceeds 5 NTU; or

2. The system is identified as a source of a waterborne disease outbreak.

**(4)** ADDITIONAL CIRCUMSTANCES WHEN FILTRATION WOULD BE REQUIRED. The department may require a public water system to install filtration even when the system meets the requirements of subs. (1) and (2) if other water quality characteristics or site specific conditions present a threat to public health which could not be eliminated by disinfection alone.

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.755 and am. (1) (a) and (b) (intro.), Register, July, 1993, No. 451, eff. 8−1−93; am. (2) (f) and (3) (a), Register, December, 2000, No. 540, eff. 1−1−01.

**NR 809.76 Filtration requirements.** Public water systems that use a surface water source shall provide filtration, which complies with the requirements of sub. (1), (2), (3), (4) or (5) and meets the disinfection criteria for filtered systems specified in s. NR 809.77 (2). Public water systems that use a ground water source under the direct influence of surface water shall provide filtration, which complies with the specifications of sub. (1), (2), (3), (4) or (5) and meets the disinfection criteria for filtered systems specified in s. NR 809.77 within 18 months of the date that a source is determined, by the department, to be under the direct influence of surface water. Failure to meet any requirement of this section is a treatment technique violation.

**(1)** CONVENTIONAL FILTRATION TREATMENT. (a) For systems using conventional filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 0.5 NTU in at least 95% of the measurements taken each month, measured as specified in s. NR 809.725 (1), Table E. Beginning January 1, 2002, the turbidity level of filtered water of a system using conventional filtration shall be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured as specified in s. NR 809.725 (1), Table E.

(b) The turbidity level of representative samples of a system's filtered water may not exceed 5 NTU, measured as specified in s. NR 809.725 (1) Table E. Beginning January 1, 2002, the turbidity level of filtered water of a system using conventional filtration shall at no time exceed 1 NTU, measured as specified in s. NR 809.725 (1) Table E.

(c) To determine compliance with par. (a), turbidity measurements shall be performed on representative samples of filtered water at least every 4 hours that the system serves water to the public.

(d) In lieu of the requirements of par. (c), turbidity measurements from a continuous reading and recording turbidity monitoring device shall be recorded at predetermined 4 hour intervals to determine compliance with par. (a). The highest turbidity measurement recorded at any time during the day shall be reported under s. NR 809.80 (6) (a) 1.

(e) A system that uses lime softening may acidify representative samples prior to analysis if using an approved protocol.

**(2)** DIRECT FILTRATION. (a) For systems using direct filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 0.5 NTU in at least 95% of the measurements taken each month, measured as specified in s. NR 809.725 (1), Table E. The department may approve a turbidity limit up to 1 NTU if the water supplier provides the department with documentation which reliably indicates the system achieves at least 99.9% removal or inactivation of *Giardia lamblia* cysts at a turbidity level above 0.5 NTU at least 95% of the time that the system delivers water to the public. Beginning January 1, 2002, the turbidity level of filtered water of a system using direct filtration shall be less than or equal to 0.3 NTU in at least 95% of the measurements taken each month, measured as specified in s. NR 809.725 (1), Table E.

(b) The turbidity level of representative samples of a system's filtered water may not exceed 5 NTU, measured as specified in s. NR 809.725 (1), Table E. Beginning January 1, 2002, the turbidity level of filtered water of a system using direct filtration shall at no time exceed 1 NTU, measured as specified in s. NR 809.725 (1), Table E.

**(3)** SLOW SAND FILTRATION. (a) For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 1 NTU in at least 95% of the measurements taken each month, measured as specified in s. NR 809.725 (1), Table E.

(b) The turbidity level of representative samples of a system's filtered water may not exceed 5 NTU, measured as specified in s. NR 809.725 (1), Table E.

**(4)** DIATOMACEOUS EARTH FILTRATION. (a) For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 1 NTU in at least 95% of the measurements taken each month, measured as specified in s. NR 809.725 (1), Table E.

(b) The turbidity level of representative samples of a system's filtered water may not exceed 5 NTU, measured as specified in s. NR 809.725 (1), Table E.

**(5)** OTHER FILTRATION TECHNOLOGIES. A public water system may use a filtration technology not listed in subs. (1) to (4) if the system demonstrates to the department, using pilot studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of s. NR 809.78, consistently achieves 99.9% removal or inactivation of *Giardia lamblia* cysts and 99.99% removal or inactivation of viruses, and 99% removal of *Cryptosporidium* oocysts, and the department approves the use of the filtration technology. For each approval, the department will set turbidity performance requirements that the system shall meet at least 95% of the time at a level that consistently achieves 99.9% removal or inactivation of *Giardia lamblia* cysts, 99.99% removal or inactivation of viruses, and 99% removal of *Cryptosporidium* oocysts. The department may set

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other performance requirements to assure the integrity of the technology.

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.76 and am., Register, July, 1993, No. 451, eff. 8−1−93; cr. (1) (c) and (d), Register, August, 1994, No. 464, eff. 9−1−94; am. (intro.), (1), (2) and (5), Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (5) Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (intro.) and (5) Register October 2003 No. 574, eff. 11−1−03; **CR 07−025: am. (1) (a), (b) and (2) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.765 Filtration sampling requirements. (1)** Monitoring requirements for systems using filtration treatment. In addition to monitoring required by s. NR 809.76, a public water system using conventional or direct filtration shall conduct continuous monitoring of turbidity for each individual filter using a method approved in s. NR 809.725 (1) and shall calibrate turbidimeters using the procedure specified by the manufacturer. Systems shall record the results of individual filter monitoring every 15 minutes.

**(2)** If there is a failure in the continuous monitoring equipment, the system shall conduct grab sampling every 4 hours in lieu of continuous monitoring, until the turbidimeter is repaired and back on−line. A system has a maximum of 5 working days after failure to repair the equipment or is in violation.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; **CR 07−025: am. (1) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.77 Disinfection requirements.** A system that uses ground water under the direct influence of surface water and does not provide filtration treatment shall provide disinfection treatment specified in sub. (1) within 18 months after the department determines that the ground water source is under the influence of surface water. A system that filters and uses surface water or ground water under the direct influence of surface water as a source shall provide the disinfection treatment specified in sub. (2) when filtration is installed. Failure to meet any requirement of this section is a treatment technique violation.

**(1)** DISINFECTION REQUIREMENTS FOR PUBLIC WATER SYSTEMS THAT DO NOT PROVIDE FILTRATION. (a) The disinfection treatment shall be sufficient to ensure at least 99.9% (3 log) inactivation of *Giardia lamblia* cysts and 99.99% (4 log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the water supplier shall calculate the CT value from the system's treatment parameters using the procedure specified in s. NR 809.78 (2), and determine whether this value is sufficient to achieve the specified inactivation rates for *Giardia lamblia* cysts and viruses. Systems using a disinfectant other than chlorine shall demonstrate to the department through on−site challenge studies or other information that the system is achieving required minimum inactivation rates.

(b) The disinfection system shall have either redundant components, including an auxiliary power supply with automatic start−up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system, or automatic shut−off of water delivery to the distribution system whenever there is less than 0.2 mg/l of residual disinfectant concentration in the water. If the department determines that automatic shut−off of delivery of water to the distribution system would cause an unreasonable risk to health or property, the system shall have redundant components.

(c) The residual disinfectant concentration in the water entering the distribution system, measured as specified in s. NR 809.725 (1), Table E, may not be less than 0.2 mg/l for more than 4 hours.

(d) 1. The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in s. NR 809.725 (1) Table E, may not be undetectable in more than 5% of the samples each month, for any 2 consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in s. NR 809.725 (1), Table C, is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5% in one month for any 2 consecutive months.

$$V = c + d + e/a + b \times 100$$

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where the HPC is > 500/ml; and

e = number of instances where the residual disinfectant concentration is not measured and HPC is > 500/ml.

2. If the department determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions required in s. NR 809.725 (1), Table C, and that the system is providing adequate disinfection in the distribution system, the requirements of subd. 1. do not apply.

**(2)** DISINFECTION REQUIREMENTS FOR PUBLIC WATER SYSTEMS WHICH PROVIDE FILTRATION. Each public water system that provides filtration treatment shall provide disinfection treatment as follows:

(a) Disinfection treatment shall be sufficient to ensure that the total treatment processes of that system achieve at least 99.9% (3 log) inactivation or removal of *Giardia lamblia* cysts and at least 99.99% (4 log) inactivation or removal of viruses, as determined by the department.

(b) The residual disinfectant concentration in the water entering the distribution system, measured as specified in s. NR 809.725 (1), Table E, may not be less than 0.2 mg/l for more than 4 hours.

(c) 1. The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine or chlorine dioxide, as specified in s. NR 809.725 (1), Table E, may not be undetectable in more than 5% of the samples each month, for any 2 consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in s. NR 809.725 (1), Table C, is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula may not exceed 5% in one month, for any 2 consecutive months.

$$V = c + d + e/a + b \times 100$$

where:

a = number of instances where the residual disinfectant concentration is measured;

b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d = number of instances where no residual disinfectant concentration is detected and where the HPC is > 500/ml; and

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e = number of instances where the residual disinfectant concentration is not measured and HPC is > 500/ml.

2. If the department determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions required in s. NR 809.725 (1), Table C, and that the system is providing adequate disinfection in the distribution system, the requirements of subd. 1. do not apply.

**(3)** The department may require continuous disinfection of public water systems using ground water not under the direct influence of surface water if it determines that an existing or potential public health threat to the water system warrants such a requirement. Additional treatment including disinfectant contact time may be required by the department on a case−by−case basis.

(a) The following conditions, as well as other conditions, are considered by the department to be existing or potential water system public health threats:

1. A public water system history of microbiological contamination in the water source or distribution system by either coliform or noncoliform bacteria.

2. The presence of color in raw water from a well serving a public system.

3. Inadequate construction, i.e. construction which does not meet current requirements of ch. NR 811 or 812, of a well which serves a public water system.

(b) Disinfectant treatment required under this section shall meet the requirements of sub. (1).

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.77 and am. (intro.), (1) (c), (d), (2) (b) and (c), Register, July, 1993, No 451, eff. 8−1−93; correction in (3) (a) 3. made under s. 13.93 (2m) (b) 7., Stats., Register, August, 1994, No. 464; am. (intro.), Register, December, 2000, No. 540, eff. 1−1−01.

**NR 809.775 Disinfection profiling and benchmarking. (1)** DETERMINATION OF SYSTEMS REQUIRED TO PROFILE. A public water system serving at least 10,000 people shall determine its TTHM annual average using the procedure in par. (a) and its HAA5 annual average using the procedure in par. (b). The annual average is the arithmetic average of the quarterly averages of 4 consecutive quarters of monitoring.

(a) The TTHM annual average shall be the annual average during the same period as is used for the HAA5 annual average.

1. Those systems that collected disinfection byproduct data under the provisions of the information collection rule shall use the results of the samples collected during the last 4 quarters of required monitoring under the information collection rule.

2. Those systems that use "grandfathered" HAA5 occurrence data that meet the provisions of par. (b) 2. shall use TTHM data collected at the same time under the provisions of ss. NR 809.22 and 809.23.

3. Those systems that use HAA5 occurrence data that meet the provisions of par. (b) 3. a. shall use TTHM data collected at the same time under the provisions of ss. NR 809.22 and 809.23.

(b) The HAA5 annual average shall be the annual average during the same period as is used for the TTHM annual average.

1. Those systems that collected data under the provisions of the information collection rule shall use the results of the samples collected during the last 4 quarters of required monitoring under the information collection rule.

2. Those systems that have collected 4 quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM in ss. NR 809.22 and 809.23 and handling and analytical method requirements of the information collection rule may use those data to determine whether the requirements of this section apply.

3. Those systems that have not collected 4 quarters of HAA5 occurrence data that meets the provisions of either subd. 1. or 2. by March 16, 1999 shall either:

a. Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM in ss. NR 809.22 and 809.23 and handling and analytical method requirements of the information collection rule to determine the HAA5 annual average and whether the requirements of sub. (2) apply. This monitoring shall be completed so that the applicability determination can be made no later than March 31, 2000, or

b. Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with sub. (2).

(c) The system may request that the department approve a more representative annual data set than the data set determined under par. (a) or (b) for the purpose of determining applicability of the requirements of this section.

(d) The department may require that a system use a more representative annual data set than the data set determined under par. (a) or (b) for the purpose of determining applicability of the requirements of this section.

(e) The system shall submit data to the department on the schedule in subds. 1. to 5.

1. Those systems that collected TTHM and HAA5 data under the provisions of the information collection rule, as required by pars. (a) 1. and (b) 1., shall submit the results of the samples collected during the last 12 months of required monitoring under the information collection rule not later than December 31, 1999.

2. Those systems that have collected 4 consecutive quarters of HAA5 occurrence data that meets the routine monitoring sample number and location for TTHM in ss. NR 809.22 and 809.23 and handling and analytical method requirements of the information collection rule, as allowed by pars. (a) 2. and (b) 2., shall submit those data to the department not later than April 16, 1999. Until the department has approved the data, the system shall conduct monitoring for HAA5 using the monitoring requirements specified under subd. 3.

3. Those systems that conduct monitoring for HAA5 using the monitoring requirements specified by pars. (a) 3. and (b) 3. a., shall submit TTHM and HAA5 data not later than March 31, 2000.

4. Those systems that elect to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under par. (b) 3. b., shall notify the department in writing of their election not later than December 31, 1999.

5. If the system elects to request that the department approve a more representative annual data set than the data set determined under par. (b) 1., the system shall submit this request in writing not later than December 31, 1999.

(f) Any system having either a TTHM annual average $\geq$ 0.064 mg/L or an HAA5 annual average $\geq$ 0.048 mg/L during the period identified in pars. (a) and (b) shall comply with sub. (2).

**Note:** The information collection rule refers to 40 CFR 1, part 141, Subpart M, ss. 141.140 through 141.144.

**(2)** DISINFECTION PROFILING. (a) Any system that meets the criteria in sub. (1) (f) shall develop a disinfection profile of its disinfection practice for a period of up to 3 years.

(b) The system shall monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in s. NR 809.78 (1) (c) 6., Tables 1−8 as appropriate, through the entire treatment plant. This system shall begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system shall conduct the monitoring in subds. 1. to 4. A system with more than one point of disinfectant application shall conduct the monitoring

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in subds. 1. to 4. for each disinfection segment. The system shall monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in s. NR 809.725, as follows:

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

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

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

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

(c) In lieu of the monitoring conducted under the provisions of par. (b) to develop the disinfection profile, the system may elect to meet the requirements of subd. 1. In addition to the monitoring conducted under the provisions of par. (b) to develop the disinfection profile, the system may elect to meet the requirements of subd. 2.

1. A public water system that has 3 years of existing operational data may submit those data, a profile generated using those data, and a request that the department approve use of those data in lieu of monitoring under the provisions of par. (b) not later than March 31, 2000. The department shall determine whether these operational data are substantially equivalent to data collected under the provisions of par. (b). These data shall also be representative of *Giardia lamblia* inactivation through the entire treatment plant and not just of certain treatment segments. Until the department approves this request, the system is required to conduct monitoring under the provisions of par. (b).

2. In addition to the disinfection profile generated under par. (b), a public water system that has existing operational data may use those data to develop a disinfection profile for additional years. Systems may use these additional yearly disinfection profiles to develop a benchmark under sub. (3). The department shall determine whether these operational data are substantially equivalent to data collected under par. (b). These data shall also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.

(d) The system shall calculate the total inactivation ratio as follows:

1. If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio for the disinfection segment based on either of the methods in subd. 1. a. or b.

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

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

2. If the system uses more than one point of disinfectant application before the first customer, the system shall determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The ($CTcalc/CT_{99.9}$) value of each segment and ($\Sigma$ ($CTcalc/CT_{99.9}$)) shall be calculated using the method in subd. 1.

3. The system shall determine the total logs of inactivation by multiplying the value calculated in subd. 1. or 2. by 3.0.

(e) A system that uses either chloramines or ozone for primary disinfection shall also calculate the logs of inactivation for viruses using a method approved by the department.

(f) The system shall retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the department for review as part of sanitary surveys conducted by the department.

**(3)** DISINFECTION BENCHMARKING. (a) Any system required to develop a disinfection profile under subs. (1) and (2) and that decides to make a significant change to its disinfection practice shall consult with the department prior to making the change. Significant changes to disinfection practice include any of the following:

1. Changes to the point of disinfection.

2. Changes to the disinfectants used in the treatment plant.

3. Changes to the disinfection process.

4. Any other modification identified by the department.

(b) Any system that modifies its disinfection practice shall calculate its disinfection benchmark using the following procedure:

1. For each year of profiling data collected and calculated under sub. (2), the system shall determine the lowest average monthly *Giardia lamblia* inactivation in each year of profiling data. The system shall determine the average *Giardia lamblia* inactivation for each calendar month for each year of profiling data by dividing the sum of daily *Giardia lamblia* inactivation by the number of values calculated for that month.

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

(c) A system that uses either chloramines or ozone for primary disinfection also shall calculate the disinfection benchmark for viruses using a method approved by the department.

(d) The system shall submit all of the following information to the department as part of its consultation process:

1. A description of the proposed change.

2. The disinfection profile for *Giardia lamblia* and, if necessary, viruses, under par. (b) and benchmark as required by par. (b) 2.

3. An analysis of how the proposed change will affect the current levels of disinfection.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (1) (f) Register November 2002 No. 563, eff. 12−1−02.

**NR 809.78 Monitoring requirements. (1)** MONITORING REQUIREMENTS FOR GROUND WATER SYSTEMS UNDER THE DIRECT INFLUENCE OF SURFACE WATER THAT DO NOT PROVIDE FILTRATION. A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment shall begin monitoring as specified in sub. (1) on December 31, 1990, or 6 months after the department determines that the ground water source is under the direct influence of surface water, whichever is later.

(a) Fecal coliform or total coliform density measurements as required by s. NR 809.755 (1) (a) shall be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The system owner or operator shall sample for fecal or total coliforms at the following minimum frequency each week the system serves water to the public:

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| System Size (persons served) | Samples/week[1] |
|---|---|
| < or = 500 | 1 |
| 501 to 3,300 | 2 |
| 3,301 to 10,000 | 3 |
| 10,001 to 25,000 | 4 |
| >25,000 | 5 |

[1] Shall be taken on separate days
In addition, one fecal or total coliform density measurement shall be performed every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU (these samples count toward the weekly coliform sampling requirement).

(b) Turbidity measurements as required by s. NR 809.755 (1) (b) shall be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every 4 hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the department.

(c) The total inactivation ratio for each day that the system is in operation shall be determined based on the $CT_{99.9}$ values in Tables 1 to 8 of subd. 6., as appropriate. The parameters necessary to determine the total inactivation ratio shall be monitored as follows:

1. Temperature of the disinfected water shall be measured at least once per day at each residual disinfectant concentration sampling point.

2. If the system uses chlorine, the pH of the disinfected water shall be measured at least once per day at each chlorine residual disinfectant concentration sampling point.

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

4. The residual disinfectant concentration ("C") of the water before or at the first customer shall be measured each day during peak hourly flow.

5. If a system uses a disinfectant other than chlorine, the system may demonstrate to the department, through the use of a department approved protocol for on−site disinfection challenge studies or other information satisfactory to the department, that CT values other than those specified in tables 7 and 8, and other operational parameters, are adequate to demonstrate that the system is achieving the minimum inactivation rates specified in s. NR 809.77 (1) (a).

6. CT Tables.

**Table 1**
**CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Free Chlorine at 0.5 ºC or Lower[1]**

| RESIDUAL (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | <=6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | <=9.0 |
| < or =0.4 | 137 | 163 | 195 | 237 | 277 | 329 | 390 |
| 0.6 | 141 | 168 | 200 | 239 | 286 | 342 | 407 |
| 0.8 | 145 | 172 | 205 | 246 | 295 | 354 | 422 |
| 1.0 | 148 | 176 | 210 | 253 | 304 | 365 | 437 |
| 1.2 | 152 | 180 | 215 | 259 | 313 | 376 | 451 |
| 1.4 | 155 | 184 | 221 | 266 | 321 | 387 | 464 |
| 1.6 | 157 | 189 | 226 | 273 | 329 | 397 | 477 |
| 1.8 | 162 | 193 | 231 | 279 | 338 | 407 | 489 |
| 2.0 | 165 | 197 | 236 | 286 | 346 | 417 | 500 |
| 2.2 | 169 | 201 | 242 | 297 | 353 | 426 | 511 |
| 2.4 | 172 | 205 | 247 | 298 | 361 | 435 | 522 |
| 2.6 | 175 | 209 | 252 | 304 | 368 | 444 | 533 |
| 2.8 | 178 | 213 | 257 | 310 | 375 | 452 | 543 |
| 3.0 | 181 | 217 | 261 | 316 | 382 | 460 | 552 |

[1] These CT values achieve greater than a 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

**Table 2**
**CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia Cysts* by Free Chlorine at 5.0 ºC[1]**

| RESIDUAL (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | <=6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | <=9.0 |
| < or = 0.4 | 97 | 117 | 139 | 166 | 198 | 239 | 279 |
| 0.6 | 100 | 120 | 143 | 171 | 204 | 244 | 291 |
| 0.8 | 103 | 122 | 146 | 175 | 210 | 252 | 301 |
| 1.0 | 105 | 125 | 149 | 179 | 216 | 260 | 312 |
| 1.2 | 107 | 127 | 152 | 183 | 221 | 267 | 320 |
| 1.4 | 809 | 130 | 155 | 187 | 227 | 274 | 329 |
| 1.6 | 111 | 132 | 158 | 192 | 232 | 281 | 337 |
| 1.8 | 114 | 135 | 162 | 196 | 238 | 287 | 345 |
| 2.0 | 116 | 138 | 165 | 200 | 243 | 294 | 353 |
| 2.2 | 118 | 140 | 169 | 204 | 248 | 300 | 361 |
| 2.4 | 120 | 143 | 172 | 209 | 253 | 306 | 368 |
| 2.6 | 122 | 146 | 175 | 213 | 258 | 312 | 375 |
| 2.8 | 124 | 148 | 178 | 217 | 263 | 318 | 382 |
| 3.0 | 126 | 151 | 182 | 221 | 268 | 324 | 389 |

[1] These CT values achieve greater than a 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

**Table 3**
**CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Free Chlorine at 10.0°C[1]**

| RESIDUAL (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | <= 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | <= 9.0 |
| < or = 0.4 | 73 | 88 | 104 | 125 | 149 | 177 | 209 |
| 0.6 | 75 | 90 | 107 | 128 | 153 | 183 | 218 |
| 0.8 | 78 | 92 | 110 | 131 | 158 | 189 | 226 |
| 1.0 | 79 | 94 | 112 | 134 | 162 | 195 | 234 |
| 1.2 | 80 | 95 | 114 | 137 | 166 | 200 | 240 |
| 1.4 | 82 | 98 | 116 | 140 | 170 | 206 | 247 |
| 1.6 | 83 | 99 | 119 | 144 | 174 | 211 | 253 |
| 1.8 | 86 | 101 | 122 | 147 | 179 | 215 | 259 |
| 2.0 | 87 | 104 | 124 | 150 | 182 | 221 | 265 |
| 2.2 | 89 | 105 | 127 | 153 | 186 | 225 | 271 |
| 2.4 | 90 | 107 | 129 | 157 | 190 | 230 | 276 |
| 2.6 | 92 | 110 | 131 | 160 | 194 | 234 | 281 |
| 2.8 | 93 | 111 | 134 | 163 | 197 | 239 | 287 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3.0 | 95 | 113 | 137 | 166 | 201 | 243 | 292 |

[1] These CT values achieve greater than a 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. $CT_{99.9}$ values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the CT value at the lower temperature and at the higher pH.

**Table 4**
**CT VAlues ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Free Chlorine at 15.0°C[1]**

| RESIDUAL (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | < =6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | <=9.0 |
| < or =0.40 | 49 | 59 | 70 | 83 | 99 | 118 | 140 |
| 0.6 | 50 | 60 | 72 | 86 | 102 | 122 | 146 |
| 0.8 | 52 | 61 | 73 | 88 | 105 | 126 | 151 |
| 1.0 | 53 | 63 | 75 | 90 | 108 | 130 | 156 |
| 1.2 | 54 | 64 | 76 | 92 | 111 | 134 | 160 |
| 1.4 | 55 | 65 | 78 | 94 | 114 | 137 | 165 |
| 1.6 | 56 | 66 | 79 | 96 | 116 | 141 | 169 |
| 1.8 | 57 | 68 | 81 | 98 | 119 | 144 | 173 |
| 2.0 | 58 | 69 | 83 | 100 | 122 | 147 | 177 |
| 2.2 | 59 | 70 | 85 | 102 | 124 | 150 | 181 |
| 2.4 | 60 | 72 | 86 | 105 | 127 | 153 | 184 |
| 2.6 | 61 | 73 | 88 | 107 | 129 | 156 | 188 |
| 2.8 | 62 | 74 | 89 | 809 | 132 | 159 | 191 |
| 3.0 | 63 | 76 | 91 | 111 | 134 | 162 | 195 |

[1] These CT values achieve greater than a 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

**Table 5**
**CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Free Chlorine at 20.0 °C[1]**

| RESIDUAL (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | <=6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | <=9.0 |
| <or=0.4 | 36 | 44 | 52 | 62 | 74 | 89 | 105 |
| 0.6 | 38 | 45 | 54 | 64 | 77 | 92 | 809 |
| 0.8 | 39 | 46 | 55 | 66 | 79 | 95 | 113 |
| 1.0 | 39 | 47 | 56 | 67 | 81 | 98 | 117 |
| 1.2 | 40 | 48 | 57 | 69 | 83 | 100 | 120 |
| 1.4 | 41 | 49 | 58 | 70 | 85 | 103 | 123 |
| 1.6 | 42 | 50 | 59 | 72 | 87 | 105 | 126 |
| 1.8 | 43 | 51 | 61 | 74 | 89 | 108 | 129 |
| 2.0 | 44 | 52 | 62 | 75 | 91 | 110 | 132 |
| 2.2 | 44 | 53 | 63 | 77 | 93 | 113 | 135 |
| 2.4 | 45 | 54 | 65 | 78 | 95 | 115 | 138 |
| 2.6 | 46 | 55 | 66 | 80 | 97 | 117 | 141 |
| 2.8 | 47 | 56 | 67 | 81 | 99 | 119 | 143 |
| 3.0 | 47 | 57 | 68 | 83 | 101 | 122 | 146 |

[1] These CT values achieve greater than a 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

**Table 6**
**CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Free Chlorine at 25.0 °C or Higher[1]**

| RESIDUAL (mg/l) | pH | | | | | | |
|---|---|---|---|---|---|---|---|
| | <=6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 8.5 | <=9.0 |
| < or = 0.4 | 24 | 29 | 35 | 42 | 50 | 59 | 70 |
| 0.6 | 25 | 30 | 36 | 43 | 51 | 61 | 73 |
| 0.8 | 26 | 31 | 37 | 44 | 53 | 63 | 75 |
| 1.0 | 26 | 31 | 37 | 45 | 54 | 65 | 78 |
| 1.2 | 27 | 32 | 38 | 46 | 55 | 67 | 80 |
| 1.4 | 27 | 33 | 39 | 47 | 57 | 69 | 82 |
| 1.6 | 28 | 33 | 40 | 48 | 58 | 70 | 84 |
| 1.8 | 29 | 34 | 41 | 49 | 60 | 72 | 86 |
| 2.0 | 29 | 35 | 41 | 50 | 61 | 74 | 88 |
| 2.2 | 30 | 35 | 42 | 51 | 62 | 75 | 90 |
| 2.4 | 30 | 36 | 43 | 52 | 63 | 77 | 92 |
| 2.6 | 31 | 37 | 44 | 53 | 65 | 78 | 94 |
| 2.8 | 31 | 37 | 45 | 54 | 66 | 80 | 96 |
| 3.0 | 32 | 38 | 46 | 55 | 67 | 81 | 97 |

[1] These CT values achieve greater than a 99.9 percent inactivation of viruses. CT values between the indicated pH values may be determined by linear interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

**Table 7**
**Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Chlorine Dioxide and Ozone[1]**

| DISINFECTANT | TEMPERATURE | | | | | |
|---|---|---|---|---|---|---|
| | <=1°C | 5°C | 10° C | 15° C | 20° C | >=25°C |
| Chlorine Dioxide | 63 | 26 | 23 | 19 | 15 | 11 |
| Ozone | 2.9 | 1.9 | 1.4 | 0.95 | 0.72 | 0.48 |

[1] These CT values achieve greater than 99.9 percent inactivation or viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the CT value at the lower temperature for determining the $CT^{99.9}$ values between indicated temperatures.

**Table 8**
**CT Values ($CT_{99.9}$) for 99.9 Percent Inactivation of *Giardia Lamblia* Cysts by Chloramines[1]**

| <1°C | 5°C | 10°C | 15°C | 20°C | 25°C |
|---|---|---|---|---|---|
| 3,800 | 2,200 | 1,850 | 1,500 | 1,100 | 750 |

[1] These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system shall demonstrate, based on site studies or other information, as approved by the department, that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

(d) The total inactivation ratio shall be calculated as follows:

1. If the system uses only one point of disinfectant application, the system owner or operator may determine the total inactivation ratio based on either of the following 2 methods:

a. One inactivation ratio ($CTcalc/CT_{99.9}$) is determined before or at the first customer during peak hourly flow and if the

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CTcalc/$CT_{99.9}$ is greater than or equal to 1.0, the 99.9% *Giardia lamblia* inactivation requirement has been achieved; or

b. Successive CTcalc/$CT_{99.9}$ values, representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method shall be used to calculate the total inactivation ratio:

Determine CTcalc/$CT_{99.9}$ for each sequence,

Add the CTcalc/CT values together (Σ(CTcalc)/CT))

If Σ (CTcalc/$CT_{99.9}$) > or = 1.0, the 99.9% *Giardia lamblia* inactivation requirement has been achieved.

2. If the system uses more than one point of disinfectant application before or at the first customer, the system owner or operator shall determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak flow. The CTcalc/$CT_{99.9}$ value of each sequence and

Σ (CTcalc/CT)

shall be calculated using the method in subd. 1. b. to determine if the system is in compliance with s. NR 809.77.

3. Although not required, the total percent inactivation for a system with one or more points of residual disinfectant concentration monitoring may be calculated by solving the following equation:

Percent inactivation = 100 − (100/10), where

z = 3 × summation of (CTcalc/$CT_{99.9}$)

(e) The residual disinfectant concentration of the water entering the distribution system shall be monitored continuously, and the lowest value shall be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the following prescribed frequencies:

| System Size by Population | Samples/day[1] |
|---|---|
| < or = 500 | 1 |
| 501 to 1,000 | 2 |
| 1,001 to 2,500 | 3 |
| 2,501 to 3,300 | 4 |

[1] The day's samples cannot be taken at the same time. The sampling intervals are subject to department review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system shall take a grab sample every 4 hours until the residual concentration is equal to or greater than 0.2 mg/l.

(f) 1. The residual disinfectant concentration shall be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, except that the department may allow a public water system which uses a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the department determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in s. NR 809.725 (1), Table C, may be measured in lieu of residual disinfectant concentration, when approved by the department.

2. If the department determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by s. NR 809.725, Table C, and that the system is providing adequate disinfection in the distribution system, the requirements of subd. 1. do not apply to that system.

**(2)** MONITORING REQUIREMENTS FOR SYSTEMS USING FILTRATION TREATMENT. A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment shall monitor in accordance with this section on or after June 29, 1993 or when filtration is installed whichever is later.

(a) Turbidity measurements as specified in s. NR 809.76 shall be performed on representative samples of the system's filtered water every 4 hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the department. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration or diatomaceous earth filtration, the department may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the department may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the department determines that less frequent monitoring is sufficient to indicate effective filtration performance.

(b) The residual disinfectant concentration of the water entering the distribution system shall be monitored continuously, and the lowest value shall be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed as follows:

| System Size by Population | Samples/day[1] |
|---|---|
| < or = 500 | 1 |
| 501 to 1,000 | 2 |
| 1,001 to 2,500 | 3 |
| 2,501 to 3,300 | 4 |

[1] The day's samples cannot be taken at the same time. The sampling intervals are subject to department review and approval.

If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system shall take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l.

(c) 1. The residual disinfectant concentration shall be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled. The department may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the department determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in s. NR 809.725 (1), Table C, may be measured in lieu of residual disinfectant concentration, when approved by the department.

2. If the department determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified in s. NR 809.725 (1), Table C, and that the system is providing adequate disinfection in the distribution system, the requirements of subd. 1. do not apply to that system.

**History:** Cr. Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.78 and am. (1) (intro.), (c) 2. and 6. Tables 2 and 4, (f) and (2) (c), Register, July, 1993, No. 451, eff. 8−1−93.

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## Subchapter VII — Reporting, Consumer Confidence Reports and Record Keeping

**NR 809.80 Reporting requirements. (1)** Except where a shorter reporting period is specified in this chapter, the supplier of water shall report to the department the results of any test measurement or analysis required by this chapter within:

(a) The first 10 days following the month in which the result is received; or

(b) The first 10 days following the end of the required monitoring period as stipulated by the department, whichever of these is shortest.

**(2)** Except where some other period is specified in this chapter, the supplier of water shall report to the department within 24 hours the failure to comply with any maximum contaminant level, or monitoring requirement, or treatment technique set forth in this chapter.

**(3)** The supplier of water is not required to report analytical results to the department in cases where the laboratory doing the analysis reports the results electronically to the department within the time frames contained in this section. The supplier of water is responsible for analytical results that are not reported within the required time frames.

**(4)** (a) When determining compliance with any water quality monitoring, or drinking water maximum contaminant levels specified in this chapter, the department shall accept analytical results only from laboratories that report results directly to the department in a department approved electronic format and are certified under ch. ATCP 77 or ch. NR 149 for safe drinking water analyses.

(b) Results of microbiological samples collected to satisfy requirements of subch. I, shall be reported to the department and the water supplier within 24 hours of the time the results are obtained by the laboratory. When results are obtained on a weekend or holiday, the results shall be provided to the water supplier and the department as soon as practicable.

(c) Analytical results other than those under par. (b) obtained to satisfy requirements of this chapter shall be reported as required under subs. (1) and (2).

(d) The department may approve submission of compliance data required under this chapter in alternate formats on a case−by−case basis if the alternate format does not create a delay in determining compliance with any requirement in this chapter or have the potential for delaying response to a public health threat.

**(5)** The supplier of water, within 10 days of completion of each public notification required under subch. X, shall submit to the department a certification that it has fully complied with the public notification regulations. The supplier of water shall include with this certification a representative copy of each type of notice distributed, published, posted, or made available to the persons served by the system or to the media, or both.

**(6)** A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment shall report monthly to the department the information specified in this subsection.

(a) Source water quality information shall be reported to the department within 10 days after the end of each month the system serves water to the public. Information that shall be reported includes:

1. The cumulative number of months for which results are reported.

2. The number of fecal or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliforms shall be reported), the dates of sample collection, and the dates when the turbidity level exceeded 1 NTU.

3. The number of samples during the month that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed.

4. The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous 6 months the system served water to the public.

5. The cumulative number of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous 6 months the system served water to the public.

6. The percentage of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous 6 months the system served water to the public.

7. The maximum turbidity level measured during the month, the dates of occurrence for any measurements which exceeded 5 NTU, and the dates the occurrences were reported to the department.

8. For the first 12 months of record keeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after one year of record keeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public.

9. For the first 120 months of record keeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after 10 years of record keeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months the system served water to the public.

(b) Disinfection information specified in s. NR 809.78 (1) shall be reported to the department within 10 days after the end of each month the system serves water to the public. Information that shall be reported includes:

1. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.

2. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the department was notified of the occurrence.

3. The daily residual disinfectant concentrations (in mg/l) and disinfectant contact times (in minutes) used for calculating the CT values.

4. If chlorine is used, the daily measurements of pH of disinfected water following each point of chlorine disinfection.

5. The daily measurements of water temperature in ºC following each point of disinfection.

6. The daily CTcalc and $CTcalc/CT_{99.9}$ values for each disinfectant measurement or sequence and the sum of all $CTcalc/CT_{99.9}$ values ($\Sigma(CTcalc/CT_{99.9})$) before or at the first customer.

7. The daily determination of whether disinfection achieves adequate *Giardia lamblia* cyst and virus inactivation, i.e., whether ($CTcalc/CT_{99.9}$) is at least 1.0, or where disinfectants other than chlorine are used, other indicator conditions that the department determines are appropriate, are met.

8. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to s. NR 809.77:

a. Number of instances where the residual disinfectant concentration is measured;

b. Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c. Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d. Number of instances where no residual disinfectant concentration is detected and where HPC is > 500/ml;

e. Number of instances where the residual disinfectant concentration is not measured and HPC is > 500/ml;

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f. For the current and previous month the system serves water to the public, the value of "V" in the following formula:

$$V = c + d + e/a + b \times 100$$

where:

a = the value in subd. 8. a.

b = the value in subd. 8. b.

c = the value in subd. 8. c.

d = the value in subd. 8. d.

e = the value in subd. 8. e.

g. If the department determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by s. NR 809.78 and that the system is providing adequate disinfection in the distribution system, the requirements of subd. 8. a. to f. do not apply.

9. A public water system owner or operator need not report the data listed in subds. 1. and 3. through 6. if all data listed in par. (b) remain on file at the system and department determines that:

a. The system owner or operator has submitted to the department all the information required by subds. 1. to 8. for at least 12 months; and

b. The department has determined that the system is not required to provide filtration treatment.

(c) No later than 10 days after the end of each federal fiscal year (September 30), each water supplier shall provide a report which summarizes their water system compliance with all well head protection program requirements specified in s. NR 809.755 (2) (b).

(d) No later than 10 days after the end of each federal fiscal year (September 30), each water supplier shall provide to the department a report of the on−site inspection conducted during that year pursuant to s. NR 809.755 (2) (c), unless the on−site inspection was conducted by the department. If the inspection was conducted by the department, the department shall provide a copy of its report to the public water system.

(e) 1. Each water supplier, upon discovering that a waterborne disease outbreak potentially attributable to their water system has occurred, shall report that occurrence to the department as soon as possible, but no later than by the end of the next business day.

2. If at any time the turbidity exceeds 5 NTU, the water supplier shall consult with the department as soon as possible, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under s. NR 809.952 (2) (c).

3. If at any time the disinfectant residual falls below 0.2 mg/l in the water entering the distribution system, the water supplier shall notify the department as soon as possible, but no later than by the end of the next business day. The water supplier also shall notify the department by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

**(7)** A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment shall report monthly to the department the information specified in this subsection.

(a) Turbidity measurements as required by s. NR 809.78 (2) (a) shall be reported within 10 days after the end of each month the system serves water to the public. Information that shall be reported includes:

1. The total number of filtered water turbidity measurements taken during the month and the highest daily turbidity measurement for each day.

2. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in s. NR 809.76 for the filtration technology being used.

3. The date and value of any turbidity measurements taken during the month which exceed 1.0 NTU for systems using conventional or direct filtration, or which exceed the maximum level set in s. NR 809.76.

(b) Disinfection information specified in s. NR 809.78 shall be reported to the department within 10 days after the end of each month the public serves water to the public. Information that shall be reported includes:

1. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.

2. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the department was notified of the occurrence.

3. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to s. NR 809.77:

a. Number of instances where the residual disinfectant concentration is measured;

b. Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

c. Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d. Number of instances where no residual disinfectant concentration is detected and where HPC is > 500/ml;

e. Number of instances where the residual disinfectant concentration is not measured and HPC is > 500/ml;

f. For the current and previous month the system serves water to the public, the value of "V" in the following formula:

$$V = c + d + e/a + b \times 100$$

where:

a = the value in subd. 3. a.

b = the value in subd. 3. b.

c = the value in subd. 3. c.

d = the value in subd. 3. d.

e = the value in subd. 3. e.

g. If the department determines, based on site specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by s. NR 809.78 and that the system is providing adequate disinfection in the distribution system, the requirements of subd. 3. a. to f. do not apply.

4. A water supplier need not report the data listed in subd. 1. if all data listed in par. (b) remain on file at the system and the department determines that the water supplier has submitted all the information required by par. (b) for at least 12 months.

(c) 1. If during any 4 hour monitoring period the turbidity exceeds 1.0 NTU or at any time during the month, turbidity measurements indicate the 95th percentile turbidity level of 0.5 NTU will be exceeded for that month, the water supplier shall inform the department as soon as possible, but no later than the end of the next business day.

2. If at any time the disinfectant residual falls below 0.2 mg/l in the water entering the distribution system, the water supplier shall notify the department as soon as possible, but no later than the end of the next business day. The water supplier also shall notify the department by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

**(8)** Systems shall maintain the results of individual filter monitoring taken under s. NR 809.765 for at least 3 years. Sys-

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tems shall report that they have conducted individual filter turbidity monitoring under s. NR 809.765 within 10 days after the end of each month the system serves water to the public. Systems shall report individual filter turbidity measurement results taken under s. NR 809.765 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in pars. (a) to (d). Systems that use lime softening may apply to the department for alternative exceedance levels for the levels specified in pars. (a) to (d) if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.

(a) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart, the system shall report the filter number, the turbidity measurement, and the dates on which the exceedance occurred. In addition, the system shall either produce a filter profile for the filter within 7 days of the exceedance, if the system is not able to identify an obvious reason for the abnormal filter performance, and report that the profile has been produced or report the obvious reason for the exceedance.

(b) For any individual filter that has a measured turbidity level of greater than 0.5 NTU in 2 consecutive measurements taken 15 minutes apart at the end of the first 4 hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system shall report the filter number, the turbidity, and the dates on which the exceedance occurred. In addition, the system shall either produce a filter profile for the filter within 7 days of the exceedance, if the system is not able to identify an obvious reason for the abnormal filter performance, and report that the profile has been produced or report the obvious reason for the exceedance.

(c) For any individual filter that has a measured turbidity level of greater than 1.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 3 consecutive months, the system shall report the filter number, the turbidity measurement, and the dates on which the exceedance occurred. In addition, the system shall conduct a self−assessment of the filter within 14 days of the exceedance and report that the self−assessment was conducted. The self−assessment shall consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self−assessment report.

(d) For any individual filter that has a measured turbidity level of greater than 2.0 NTU in 2 consecutive measurements taken 15 minutes apart at any time in each of 2 consecutive months, the system shall report the filter number, the turbidity measurement, and the dates on which the exceedance occurred. In addition, the system shall arrange for the conduct of a comprehensive performance evaluation by the department or a third party approved by the department no later than 30 days following the exceedance and have the evaluation completed and submitted to the department no later than 90 days following the exceedance.

(e) *Additional reporting requirements.* 1. If at any time the turbidity exceeds 1 NTU on representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system shall inform the department as soon as possible, but no later than the end of the next business day.

2. If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the department under s. NR 809.76 (5) for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration or diatomaceous earth filtration, the system shall inform the department as soon as possible, but no later than the end of the next business day.

**(9)** Each water supplier, upon discovering that a waterborne disease outbreak potentially attributable to their water system has occurred, shall report that occurrence to the department as soon as possible, but no later than by the end of the next business day.

**(10)** Upon the request of the department, the supplier of water shall submit to the department copies of any records required to be maintained under s. NR 809.82 or copies of any documents then in existence which the department is entitled to inspect under the authority of s. 281.97, Stats.

**(11)** The department may specify the format for reporting analytical results required under this chapter.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (1), cr. (4) and (5), Register, April, 1982, No. 316, eff. 5−1−82; am. (3), Register, August, 1989, No. 404, eff. 9−1−89; am. (2), renum. (5) to be (8), cr. (5) to (7), Register, March, 1991, No. 423, eff. 4−1−91; renum. from NR 109.80 and am. (2), (5) (b) 9. (intro.), (6) (a) and (b) (intro.), cr. (9), Register, July, 1993, No. 451, eff. 8−1−93; am. (6) (a) 1. and 3., (c) 1., Register, August, 1994, No. 464, eff. 9−1−94; correction in (5) (b) and (8) made under s. 13.93 (2m) (b) 7., Stats., Register, May, 1999, No. 521; renum. (4) to (9) to be (5) to (7) and (9) to (11) and am.(6) (intro.), (7) (intro.) and 3., cr. (4) and (8), Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (5) and (6) (e) 2., cr. (8) (e) Register November 2002 No. 563, eff. 12−1−02; CR 04−061: r. and recr. (4) Register May 2005 No. 593, eff. 6−1−05; **CR 07−025: am. (3) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.82 Record maintenance.** Any owner or operator of a public water system subject to the provisions of this chapter shall retain on the premises or at a convenient location near the premises the following records:

**(1)** Records of bacteriological analyses made pursuant to this part shall be kept for not less than 5 years. Records of chemical analyses made pursuant to this part shall be kept for not less than 10 years. Actual laboratory reports may be kept, or data may be transferred to tabular summaries, provided that the following information is included:

(a) The date, place, and time of sampling, and the name of the person who collected the sample;

(b) Identification of the sample as to whether it was a routine distribution system sample, check sample, raw or process water sample or other special purpose sample;

(c) Date of analysis;

(d) Laboratory and person responsible for performing analysis;

(e) The analytical technique/method used; and

(f) The results of the analysis.

**(2)** Records of action taken by the supplier of water to correct violations of this chapter shall be kept for a period not less than 3 years after the last action taken with respect to the particular violation involved.

**(3)** Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the supplier of water, by a private consultant, or by any local, state or federal agency, shall be kept for a period not less than 10 years after completion of the sanitary survey involved.

**(4)** Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than 5 years following the expiration of such variance or exemption.

**(5)** The owner or operator of any system subject to the requirements of subch. II shall retain on the premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, department determinations, and any other information required by ss. NR 809.542 to 809.549. Each water system owner or operator shall retain the records for no fewer than 12 years.

**(6)** The department shall keep copies of public notices issued pursuant to subch. X and certifications made to the department pursuant to s. NR 809.80 for 3 years after issuance.

**History:** Cr. Register, February, 1978, No. 266, eff. 3−1−78; am. (intro.), Register, April, 1982, No. 316, eff. 5−1−82; renum. from NR 109.82, cr. (5), Register, July, 1993, No. 451, eff. 8−1−93; CR 00−162: cr. (6) Register November 2002 No. 563, eff. 12−1−02.

**NR 809.83 Consumer confidence reports. (1)** PURPOSE AND APPLICABILITY. Suppliers of water to community water

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systems shall deliver to their customers an annual report containing information on the quality of the water and the characterization of risks, if any, from exposure to contaminants detected in the drinking water delivered by their water system. The report shall be written in an accurate and understandable manner.

(a) Customers under this paragraph are defined as billing units or service connections to which water is delivered by a community water system.

(b) Detected under this paragraph refers to all contaminants identified in subch. I and means any quantity reported by a safe drinking water certified laboratory.

**(2)** DEADLINES. (a) Each existing community water system shall deliver its report by July 1 annually. Reports shall contain data collected during, or prior to, the previous calendar year.

(b) A new community water system shall deliver its first report by July 1 of the year after its first full calendar year in operation and annually thereafter.

(c) A community water system that sells water to another community water system shall deliver the applicable information required in s. NR 809.833 to the buyer system:

1. No later than April 1 annually; or

2. On a date mutually agreed upon by the seller and the purchaser, and specifically included in a contract between the parties.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01.

**NR 809.833 Content of the reports.** Each community water system shall provide to its customers an annual report that contains all of the information specified in this section and s. NR 809.835.

**(1)** INFORMATION ON THE SOURCE OF THE WATER DELIVERED. Each report shall identify the sources of the water delivered by the community water system by providing information on all of the following:

(a) The type of the water, e.g., surface water, ground water.

(b) The commonly used name, if any, and location of the bodies of water.

(c) If a source water assessment has been completed, the report shall notify consumers of the availability of this information and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the department, the report shall include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the department or written by the water system owner or operator.

**(2)** DEFINITIONS. (a) Each report shall include all of the following definitions:

1. Maximum contaminant level goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

2. Maximum contaminant level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

(b) A report for a community water system operating under a variance or an exemption issued under subch. VIII shall include the following definition, "Variances and Exemptions: state or EPA permission not to meet an MCL or a treatment technique under certain conditions."

(c) A report which contains data on contaminants which EPA regulates using any of the following terms shall include the applicable definitions:

1. "Treatment technique: A required process intended to reduce the level of a contaminant in drinking water."

2. "Action level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system shall follow."

3. "Maximum residual disinfectant level goal or MRDLG: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants."

4. "Maximum residual disinfectant level or MRDL: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants."

**(3)** INFORMATION ON DETECTED CONTAMINANTS. With the exception of *Cryptosporidium*, reports shall contain the following information in the specified format, for regulated contaminants subject to a MCL, action level, maximum residual disinfectant level, or treatment technique, unregulated contaminants for which monitoring is required under subch. I, and disinfection by−products and microbial contaminants for which monitoring is required under subchs. IV and V:

(a) The data relating to these contaminants shall be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report shall be displayed separately.

(b) The data shall be derived from data collected to comply with EPA and state monitoring and analytical requirements during calendar year 1998 for the first report and subsequent calendar years thereafter except that:

1. Where a system is allowed to monitor for regulated contaminants less often than once a year, the tables shall include the date and results of the most recent sampling and the report shall include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than 5 years need be included.

2. Results of monitoring in compliance with requirements issued under 40 CFR, part 141, ss. 141.142 and 141.143 (information collection rule) need only be included for 5 years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

(c) For detected regulated contaminants, listed in Appendix A to this subchapter, the tables shall contain all of the following:

1. The MCL for that contaminant expressed as a number equal to or greater than 1.0, as provided in Appendix A to this subchapter.

2. The MCLG for that contaminant expressed in the same units as the MCL.

3. If there is no MCL for a detected contaminant, the table shall indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report shall include the definitions for treatment technique or action level, or both, as appropriate, specified in this paragraph.

4. For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with requirements of this chapter and the range of detected levels as follows:

a. When compliance with the MCL is determined annually or less frequently: the highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

b. When compliance with the MCL is determined by calculating a running annual average of all samples taken at a sampling point: the highest average of any of the sampling points and the range of all sampling points expressed in the same units as the MCL

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c. When compliance with the MCL is determined on a system–wide basis by calculating a running annual average of all samples at all sampling points: the average and range of detection expressed in the same units as the MCL.

**Note:** When rounding of results to determine compliance with the MCL is allowed by the regulations, rounding should be done prior to multiplying the results by the factor listed in Appendix A of this subchapter.

5. For turbidity:

a. When it is reported pursuant to s. NR 809.76, the highest average monthly value.

b. When it is reported pursuant to s. NR 809.76, the highest monthly value. The report should include an explanation of the reasons for measuring turbidity.

c. When it is reported pursuant to s. NR 809.76, the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in s. NR 809.76 for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity.

6. For lead and copper: the 90$^{th}$ percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level.

7. For total coliform:

a. The highest monthly number of positive samples for systems collecting fewer than 40 samples per month; or

b. The highest monthly percentage of positive samples for systems collecting at least 40 samples per month.

8. For fecal coliform, the total number of positive samples.

9. The likely sources of detected contaminants to the best of the water system owner or operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the water system owner or operator. If the water system owner or operator lacks specific information on the likely source, the report shall include one or more of the typical sources for that contaminant listed in Appendix A to this subchapter that are most applicable to the system.

(d) If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table should contain a separate column for each service area and the report should identify each separate distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

(e) The tables shall clearly identify any data indicating violations of MCLs, MRDL or treatment techniques and the report shall contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system shall use the relevant language of Appendix A to this subchapter.

(f) For detected unregulated contaminants for which monitoring is required, except *Cryptosporidium*, the tables shall contain the average and range at which the contaminant was detected. The report may include a brief explanation of the reasons for monitoring for unregulated contaminants.

**(4)** INFORMATION ON CRYPTOSPORIDIUM, RADON AND OTHER CONTAMINANTS. (a) If the system has performed any monitoring for *Cryptosporidium*, including monitoring performed to satisfy the requirements of 40 CFR sub. D, part 141, s. 141.143 (information collection rule), which indicates that *Cryptosporidium* may be present in the source water or the finished water, the report shall include all of the following:

1. A summary of the results of the monitoring.

2. An explanation of the significance of the results.

(b) If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report shall include all of the following:

1. The results of the monitoring.

2. An explanation of the significance of the results.

(c) If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, the report shall include all of the following:

1. The results of the monitoring.

2. An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

**Note:** To determine the significance of the results it is recommended that systems call the Safe Drinking Water Hotline (800–426–4791).

**(5)** COMPLIANCE WITH ALL DRINKING WATER REGULATIONS. In addition to the requirements of sub. (3) (f), the report shall note any violation that occurred during the year covered by the report of a requirement listed in this subsection. The report also shall include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation. All of the following violations shall be included:

(a) Failure to comply with requirements for monitoring and reporting of compliance data.

(b) For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of the equipment or processes which constitutes a violation, the report shall include the following language as part of the explanation of potential adverse health effects. Inadequately treated water may contain disease–causing organisms. These organisms include bacteria, viruses and parasites, which can cause symptoms such as nausea, cramps, diarrhea and associated headaches.

(c) *Lead and copper control requirements prescribed by subch. II.* For systems that fail to take one or more actions prescribed by s. NR 809.541 (4), 809.542, 809.543, 809.544 or 809.545, the report shall include the applicable language of Appendix A to this subchapter for lead, copper or both.

(d) *Treatment techniques for Acrylamide and Epichlorohydrin prescribed by subch. I.* For systems that violate the requirements of s. NR 809.26 (4), the report shall include the relevant language from Appendix A to this subchapter.

(e) Failure to comply with required recordkeeping of compliance data.

(f) Failure to comply with special monitoring requirements prescribed by ss. NR 809.13 and 809.26.

(g) Violation of the terms of a variance, an exemption or an administrative or judicial order.

**(6)** EXEMPTIONS. If a system is operating under the terms of a conditional waiver or variance issued under subch. VIII, the report shall contain all of the following:

(a) An explanation of the reasons for the conditional waiver or variance.

(b) The date on which the conditional waiver or variance was issued.

(c) A brief status report on the steps the system is taking to install treatment, find alternative sources of water or otherwise comply with the terms and schedules of the conditional waiver or variance.

(d) A notice of any opportunity for public input in the review, or renewal, of the conditional waiver or variance.

**(7)** ADDITIONAL INFORMATION. (a) The report shall contain a brief explanation regarding contaminants, which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of subds. 1. through 3. or systems may use their own comparable language. The report also shall include the language of subd. 4.

1. "The sources of drinking water, both tap water and bottled water, include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some

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cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity."

2. "Contaminants that may be present in source water include:"

a. "Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife."

b. "Inorganic contaminants, such as salts and metals, which can be naturally−occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming."

c. "Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses."

d. "Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by−products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems."

e. "Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities."

3. "In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water, which shall provide the same protection for public health."

4. "Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the environmental protection agency's safe drinking water hotline (800−426−4791)."

(b) The report shall include the telephone number of the owner, operator or designee of the community water system as a source of additional information concerning the report.

(c) In communities where non−English speaking residents comprise a significant portion of the population served, the report should contain information in the appropriate language or languages regarding the importance of the report, or contain a telephone number or address where the residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language. In communities where a specific non−English speaking group comprises at least 5% of the population of the community served, the report shall be translated into that language.

(d) The report shall include information, e.g., time and place of regularly scheduled board meetings, about opportunities for public participation in decisions that may affect the quality of the water.

(e) The systems may include additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (2) (c) (intro.), (3) (intro.), (c) 9. and (e), (5) (c) and (d), cr. (2) (c) 3. and 4. Register November 2002 No. 563, eff. 12−1−02; CR 02−147: am. (3 (c) 5. b. and c. Register October 2003 No. 574, eff. 11−1−03; CR 03−067: am. (3) (c) 9., (e), (5) (c) and (d) Register March 2004 No. 579, eff. 4−1−04; **CR 07−025: am. (3) (b) 2., (e), (6) (a) to (d) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.835 Required additional health information.** **(1)** All reports shall prominently display the following language: "Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno−compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium and other microbial contaminants are available from the environmental protection agency's safe drinking water hotline (800−426−4791)."*

**(2)** Beginning July 1, 2002 a system that detects arsenic above 0.005 mg/L and up to and including 0.010 mg/L:

(a) Shall include in its report a short information statement about arsenic, using language such as: While your drinking water meets EPA's standard for arsenic, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the costs of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

(b) May write its own educational statement, but only in consultation with the department.

**(3)** Beginning July 1, 2002 and ending January 22, 2006 a community water system that detects arsenic above 0.010 mg/L and up to and including 0.05 mg/L shall include health effects language for arsenic prescribed by Appendix A to this subchapter.

**(4)** Systems which detect lead above the action level in more than 5%, but fewer that 10%, of homes sampled:

(a) Shall include a short informational statement about the special impact of lead on children using language such as: "Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the environmental protection agency's safe drinking water hotline (800−426−4791)."

(b) May write its own educational statement, but only in consultation with the department.

**(5)** Community water systems that detect total trihalomethanes above 0.080 mg/l, but below the MCL in s. NR 809.22, as an annual average, monitored and calculated under the provisions of s. NR 809.23, shall include health effects language for total trihalomethanes prescribed by Appendix A to this subchapter.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: cr. (5) Register November 2002 No. 563, eff. 12−1−02; CR 03−067: r. and recr. (2) and (3), am. (5) Register March 2004 No. 579, eff. 4−1−04; **CR 07−025: am. (2) (intro.) and (3) Register January 2008 No. 625, eff. 2−1−08.**

**NR 809.837 Report delivery and recordkeeping.** **(1)** Except as provided in sub. (7), each community water system shall mail or otherwise directly deliver one copy of the report to each customer.

**(2)** The system shall make a good faith effort to reach consumers who do not get water bills, using means recommended by the department. EPA expects that an adequate good faith effort will be tailored to the consumers who are served by the system but are not bill−paying customers, such as renters or workers. A good faith effort to reach consumers would include a mix of methods appropriate to the particular system such as: Posting the reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the report in the news media; publication in a local newspaper; posting in public places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single−biller customers such as apartment buildings or large private employers; delivery to community organizations.

**(3)** No later than the date the system is required to distribute the report to its customers, each community water system shall mail a copy of the report to the department, followed within 3 months by a certification that the report has been distributed to customers, and that the information is correct and consistent with

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the compliance monitoring data previously submitted to the department.

**(4)** No later than the date the system is required to distribute the report to its customers, each community water system shall deliver the report to any other agency or clearinghouse identified by the department.

**(5)** Each community water system shall make its reports available to the public upon request.

**(6)** Each community water system serving 100,000 or more persons shall post its current year's report to a publicly accessible site on the Internet.

**(7)** The governor of Wisconsin or the governor's designee may waive the requirement of sub. (1) for community water systems serving fewer than 10,000 persons.

(a) A system that has received a waiver under this subsection shall do all of the following:

1. Publish the reports in one or more local newspapers serving the area in which the system is located.

2. Inform the customers that the reports will not be mailed, either in the newspapers in which the reports are published or by other means approved by the department.

3. Make the reports available to the public upon request.

(b) A system serving 500 or fewer persons that has received a waiver under this subsection may forego the requirements of par. (a) 1. and 2. if they provide notice at least once per year to their customers by mail, door−to−door delivery or by posting in an appropriate location that the report is available upon request.

**(8)** Any systems subject to this subchapter shall retain copies of its consumer confidence report for no less than 3 years.

**Note:** Appendices A through C of subch. VI are found at the end of this chapter.

**History:** Cr. Register, December, 2000, No. 540, eff. 1−1−01; CR 00−162: am. (8) Register November 2002 No. 563, eff. 12−1−02; **CR 07−025: am. (7) (intro.) Register January 2008 No. 625, eff. 2−1−08.**

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## Appendix A to Subchapter VII

| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| **Microbiological contaminants:** | | | | | | |
| Total Coliform Bacteria | MCL: (systems that collect ≥40 samples/ month) 5% of monthly samples are positive; (systems that collect ≤40 samples/month) 1 positive monthly sample. | N/A | MCL: (systems that collect ≥40 samples/ month) 5% of monthly samples are positive; (systems that collect ≤40 samples/ month) 1 positive monthly sample. | 0 | Naturally present in the environment. | Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially−harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. |
| Fecal coliform and E. coli | 0 | N/A | 0 | 0 | Human and animal fecal waste. | Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short−term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. |
| Total organic carbon (ppm) | TT | N/A | TT | N/A | Naturally present in the environment. | Total organic carbon has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. Their byproducts include trihalomethanes and haloacetic acids. Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer. |
| Turbidity (NTU) | TT | N/A | TT | N/A | Soil runoff. | Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease−causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches. |
| **Radioactive contaminants:** | | | | | | |
| Beta/photon emitters (mrem/yr) | 4 mrem/yr | N/A | 4 | N/A | Decay of natural and man−made deposits. | Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer. |
| Alpha emitters (pCi/l) | 15 pCi/l | N/A | 15 | N/A | Erosion of natural deposits. | Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer. |
| Combined radium (pCi/l) | 5 pCi/l | N/A | 5 | N/A | Erosion of natural deposits. | Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| Uranium (ug/1) | 30 ug/1 | N/A | 30 | 0 | Erosion of natural deposits. | Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer or kidney toxicity. |
| **Inorganic contaminants:** | | | | | | |
| Antimony (ppb) | .006 | 1000 | 6 | 6 | Discharge from petroleum refineries, fire retardants, ceramics, electronics, solder. | Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar. |
| Arsenic (ppb) | 0.010[1] | 1000 | 10[1] | 0[1] | Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes. | Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. |
| Asbestos (MFL) | 7 MFL | N/A | 7 | 7 | Decay of asbestos cement water; Erosion of natural deposits. | Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps. |
| Barium (ppm) | 2 | N/A | 2 | 2 | Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits. | Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure. |
| Beryllium (ppb) | .004 | 1000 | 4 | 4 | Discharge from metal refineries and coal−burning factories; Discharge from electrical, aerospace, and defense industries. | Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions. |
| Bromate (ppb) | .010 | 1000 | 10 | 0 | By−product of drinking water disinfection. | Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer. |
| Cadmium (ppb) | .005 | 1000 | 5 | 5 | Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints. | Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage. |
| Chloramines (ppm) | MRDL = 4 | N/A | MRDL = 4 | MRDLG = 4 | Water additive used to control microbes. | Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia. |
| Chlorine (ppm) | MRDL = 4 | N/A | MRDL = 4 | MRDLG = 4 | Water additive used to control microbes. | Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort or anemia. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| Chlorine dioxide (ppb) | MRDL = .8 | 1000 | MRDL = 800 | MRDLG = 800 | Water additive used to control microbes. | Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. |
| Chlorite (ppm) | 1 | N/A | 1 | 0.8 | By−product of drinking water disinfection. | Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia. |
| Chromium (ppb) | .1 | 1000 | 100 | 100 | Discharge from steel and pulp mills; Erosion of natural deposits. | Some people who drink water containing chromium well in excess of the MCL over many years could experience allergic dermatitis. |
| Copper (ppm) | AL = 1.3 | N/A | AL = 1.3 | 1.3 | Corrosion of household plumbing systems; Erosion of natural deposits. | Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor. |
| Cyanide (ppb) | .2 | 1000 | 200 | 200 | Discharge from steel/metal factories; Discharge from plastic and fertilizer factories. | Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid. |
| Fluoride (ppm) | 4 | N/A | 4 | 4 | Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories. | Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than 9 years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums. |
| Lead (ppb) | AL = .015 | 1000 | AL = 15 | 0 | Corrosion of household plumbing system; Erosion of natural deposits. | Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attentions span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| Mercury [inorganic] (ppb) | .002 | 1000 | 2 | 2 | Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland. | Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage. |
| Nitrate (ppm) | 10 | N/A | 10 | 10 | Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits. | Infants below the age of 6 months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |
| Nitrite (ppm) | 1 | N/A | 1 | 1 | Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits. | Infants below the age of 6 months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |
| Selenium (ppb) | .05 | 1000 | 50 | 50 | Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines. | Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail loss, numbness in fingers or toes, or problems with their circulation. |
| Thallium (ppb) | .002 | 1000 | 2 | 0.5 | Leaching from ore−processing sites; Discharge from electronic, glass, and drug factories. | Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver. |
| **Synthetic organic contaminants including pesticides and herbicides:** | | | | | | |
| 2,4−D (ppb) | .07 | 1000 | 70 | 70 | Runoff from herbicide used on row crops. | Some people who drink water containing the weed killer 2,4−D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands. |
| 2,4,5−TP [Silvex] (ppb) | .05 | 1000 | 50 | 50 | Residue of banned herbicide. | Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems. |
| Acrylamide | TT | N/A | TT | 0 | Added to water during sewage/wastewater treatment. | Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer. |
| Alachlor (ppb) | .002 | 1000 | 2 | 0 | Runoff from herbicide used on row crops. | Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer. |
| Atrazine (ppb) | .003 | 1000 | 3 | 3 | Runoff from herbicide used on row crops. | Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties. |
| Benzo(a)pyrene [PAH] (nanograms/l) | .0002 | 1,000,000 | 200 | 0 | Leaching from lining of water storage tanks and distribution lines. | Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| Carbofuran (ppb) | .04 | 1000 | 40 | 40 | Leaching of soil fumigant used on rice and alfalfa. | Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems. |
| Chlordane (ppb) | .002 | 1000 | 2 | 0 | Residue of banned termiticide. | Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer. |
| Dalapon (ppb) | .2 | 1000 | 200 | 200 | Runoff from herbicide used on rights of way. | Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes. |
| Di(2−ethylhexyl) adipate (ppb) | .4 | 1000 | 400 | 400 | Discharge from chemical factories. | Some people who drink water containing di (2−ethylhexyl) adipate well in excess of the MCL over many years could experience toxic effects such as weight loss, liver enlargement or possible reproductive difficulties. |
| Di(2−ethylhexyl) phthalate (ppb) | .006 | 1000 | 6 | 0 | Discharge from rubber and chemical factories. | Some people who drink water containing di (2−ethylhexyl) phthalate well in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer. |
| Dibromochloropropane (ppt) | .0002 | 1,000,000 | 200 | 0 | Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards. | Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive problems and may have an increased risk of getting cancer. |
| Dinoseb (ppb) | .007 | 1000 | 7 | 7 | Runoff from herbicide used on soybeans and vegetables. | Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties. |
| Diquat (ppb) | .02 | 1000 | 20 | 20 | Runoff from herbicide use. | Some people who drink water containing diquat in excess of the MCL over many years could get cataracts. |
| Dioxin [2,3,7,8−TCDD] (ppq) | .00000003 | 1,000,000,000 | 30 | 0 | Emissions from waste incineration and other combustion; Discharge from chemical factories. | Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer. |
| Endothall (ppb) | .1 | 1000 | 100 | 100 | Runoff from herbicide use. | Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines. |
| Endrin (ppb) | .002 | 1000 | 2 | 2 | Residue of banned insecticide. | Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems. |
| Epichlorohydrin | TT | N/A | TT | 0 | Discharge from industrial chemical factories; An impurity of some water treatment chemicals. | Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| Ethylene dibromide (ppt) | .00005 | 1,000,000 | 50 | 0 | Discharge from petroleum refineries. | Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive systems, or kidneys, and may have an increased risk of getting cancer. |
| Glyphosate (ppb) | .7 | 1000 | 700 | 700 | Runoff from herbicide use. | Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties. |
| Heptachlor (ppt) | .0004 | 1,000,000 | 400 | 0 | Residue of banned pesticide. | Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer. |
| Heptachlor epoxide (ppt) | .0002 | 1,000,000 | 200 | 0 | Breakdown of heptachlor. | Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer. |
| Hexachlorobenzene (ppb) | .001 | 1000 | 1 | 0 | Discharge from metal refineries and agricultural chemical factories. | Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer. |
| Hexachlorocyclopentadiene (ppb) | .05 | 1000 | 50 | 50 | Discharge from chemical factories. | Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach. |
| Lindane (ppt) | .0002 | 1,000,000 | 200 | 200 | Runoff/leaching from insecticide used on cattle, lumber and gardens. | Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver. |
| Methoxychlor (ppb) | .04 | 1000 | 40 | 40 | Runoff/leaching from insecticide used on fruits, vegetables, alfalfa and livestock. | Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties. |
| Oxamyl [Vydate] (ppb) | .2 | 1000 | 200 | 200 | Runoff/leaching from insecticide used on apples, potatoes and tomatoes. | Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects. |
| PCBs [Polychlorinatedbiphenyls] (ppt) | .0005 | 1,000,000 | 500 | 0 | Runoff from landfills; Discharge of waste chemicals. | Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer. |
| Pentachlorophenol (ppb) | .001 | 1000 | 1 | 0 | Discharge from wood preserving factories. | Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| Picloram (ppb) | .5 | 1000 | 500 | 500 | Herbicide runoff. | Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver. |
| Simazine (ppb) | .004 | 1000 | 4 | 4 | Herbicide runoff. | Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood. |
| Toxaphene (ppb) | .003 | 1000 | 3 | 0 | Runoff/leaching from insecticide used on cotton and cattle. | Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer. |
| **Volatile organic contaminants:** | | | | | | |
| Benzene (ppb) | .005 | 1000 | 5 | 0 | Discharge from factories; Leaching from gas storage tanks and landfills. | Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer. |
| Carbon tetrachloride (ppb) | .005 | 1000 | 5 | 0 | Discharge from chemical plants and other industrial activities. | Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer. |
| Chlorobenzene (ppb) | .1 | 1000 | 100 | 100 | Discharge from chemical and agricultural chemical factories. | Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys. |
| o−Dichlorobenzene (ppb) | .6 | 1000 | 600 | 600 | Discharge from industrial chemical factories. | Some people who drink water containing o−dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems. |
| p−Dichlorobenzene (ppb) | .075 | 1000 | 75 | 75 | Discharge from industrial chemical factories. | Some people who drink water containing p−dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood. |
| 1,2−Dichloroethane (ppb) | .005 | 1000 | 5 | 0 | Discharge from industrial chemical factories. | Some people who drink water containing 1,2−dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer. |
| 1,1−Dichloroethylene (ppb) | .007 | 1000 | 7 | 7 | Discharge from industrial chemical factories. | Some people who drink water containing 1,1−dichloroethylene in excess of the MCL over many years could experience problems with their liver. |
| cis−1,2−dichloroethylene (ppb) | .07 | 1000 | 70 | 70 | Discharge from industrial chemical factories. | Some people who drink water containing cis−1,2−dichloroethylene in excess of the MCL over many years could experience problems with their liver. |
| Trans−1,2−Dichloroethylene (ppb) | .1 | 1000 | 100 | 100 | Discharge from industrial chemical factories. | Some people who drink water containing trans−1,2−dichloroethylene well in excess of the MCL over many years could experience problems with their liver. |
| Dichloromethane (ppb) | .005 | 1000 | 5 | 0 | Discharge from pharmaceutical and chemical factories. | Some people who drink water containing dichlorormethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer. |

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| Contaminant (units) | Traditional MCL in mg/L | To convert for CCR; multiply by | MCL in CCR units | MCLG | Major sources in drinking water | Health effects language |
|---|---|---|---|---|---|---|
| 1,2−dichloropropane (ppb) | .005 | 1000 | 5 | 0 | Discharge from industrial chemical factories. | Some people who drink water containing 1,2−dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer. |
| Ethylbenzene (ppb) | .7 | 1000 | 700 | 700 | Discharge from petroleum refineries. | Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys. |
| Haloacetic Acids (pbb) | .060 | 1000 | 60 | N/A | By−product of drinking water disinfection. | Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer. |
| Styrene (ppb) | .1 | 1000 | 100 | 100 | Discharge from rubber and plastic factories; Leaching from landfills. | Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system. |
| Tetrachloroethylene (ppb) | .005 | 1000 | 5 | 0 | Discharge from factories and dry cleaners. | Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer. |
| 1,2,4−Trichlorobenzene (ppb) | .07 | 1000 | 70 | 70 | Discharge from textile−finishing factories. | Some people who drink water containing 1,2,4−trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands. |
| 1,1,1−Trichloroethane (ppb) | .2 | 1000 | 200 | 200 | Discharge from metal degreasing sites and other factories. | Some people who drink water containing 1,1,1−trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system. |
| 1,1,2−Trichloroethane (ppb) | .005 | 1000 | 5 | 3 | Discharge from industrial chemical factories. | Some people who drink water containing 1,1,2−trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems. |
| Trichloroethylene (ppb) | .005 | 1000 | 5 | 0 | Discharge from metal degreasing sites and other factories. | Some people who drink water containing trichoroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer. |
| TTHMs [Total trihalomethanes] (ppb) | 0.10/0.80 | 1000 | 100/80 | N/A | By−product of drinking water disinfection. | Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer. |
| Toluene (ppm) | 1 | N/A | 1 | 1 | Discharge from petroleum factories. | Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver. |
| Vinyl Chloride (ppb) | .002 | 1000 | 2 | 0 | Leaching from PVC piping; Discharge from plastics factories. | Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer. |
| Xylenes (ppm) | 10 | N/A | 10 | 10 | Discharge from petroleum factories; Discharge from chemical factories. | Some people who drink water containing xylenes in excess of the MCL over many years could experience damages to their nervous system. |

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**Key:**

| | |
|---|---|
| AL = | Action Level |
| MCL = | Maximum Contaminant Level |
| MCLG = | Maximum Contaminant Level Goal |
| MFL = | million fibers per liter |
| MRDL = | Maximum Residual Disinfectant Level |
| MRDLG = | Maximum Residual Disinfectant Level Goal |
| mrem/year = | millirems per year (a measure of radiation absorbed by the body) |
| N/A = | Not Applicable |
| NTU = | Nephelometric Turbidity Units (a measure of water clarity) |
| pCi/l = | picocuries per liter (a measure of radioactivity) |
| ppm = | parts per million, or milligrams per liter (mg/l) |
| ppb = | parts per billion, or micrograms per liter (µg/l) |
| ppt = | parts per trillion, or nanograms per liter |
| ppq = | parts per quadrillion, or picograms per liter |
| TT = | Treatment Technique |

## Subchapter VIII — Conditional Waivers and Variances

**NR 809.90 Conditional waivers. (1)** A public system may apply to the department for a conditional waiver respecting compliance with a maximum contaminant level or treatment technique requirement for a period up to 3 years if all of the following apply:

(a) One of the following situations exists:

1. Because of the characteristics of the raw water sources which are reasonably available, the public water system cannot comply with a maximum contaminant level despite application of best technology, treatment techniques or other means generally available, taking costs into consideration.

2. Compelling factors, which may include economic factors, indicate that the public water system cannot comply with a maximum contaminant level or treatment technique requirement for a limited period of time.

(b) The public water system was in operation on the effective date of the maximum contaminant level or treatment technique requirement.

(c) Granting of a conditional waiver will not result in an unreasonable risk to public health.

**(2)** Small systems serving less than 3,300 persons, may apply for a conditional waiver only for nonmicrobial contaminants and only when all of the following conditions are met:

(a) The contaminant or treatment technique to be waived has a maximum contaminant level or treatment technique requirement established in national primary drinking water regulations promulgated on or after January 1, 1986.

(b) The technology used to comply with the maximum contaminant level or treatment technique is approved by the department.

(c) Compliance with maximum contaminant levels or treatment techniques is not reasonably affordable through restructuring or consolidation changes, including ownership change or physical consolidation or both with another public water system, or obtaining financial assistance through the Wisconsin drinking water state revolving loan fund (DWSRF).

(d) The small system is financially and technically capable of installing, operating and maintaining the applicable small system technology under par. (b).

(e) Granting of a conditional waiver will not result in an unreasonable risk to public health.

**(3)** The department may grant a conditional waiver if the supplier of water has established that the criteria of sub. (1) or (2) have been met. Any conditional waiver granted shall require all of the following:

(a) Compliance, including increments of progress, by the supplier of water with each maximum contaminant level or treatment technique requirement within the time frame specified by the department in the compliance schedule.

(b) Implementation by the water supplier of control measures the department deems necessary until compliance with the maximum contaminant level or treatment technique requirement is achieved.

**(4)** Public water systems that use bottled water as a requirement for receiving a conditional waiver shall meet all the of following requirements:

(a) The department shall require and approve a monitoring program for bottled water. The public water system owner or operator shall develop and put in place a monitoring program that provides reasonable assurances that the bottled water meets all MCLs. The public water system owner or operator shall monitor a representative sample of the bottled water for all contaminants regulated under ss. NR 809.24 (1), (2) and 809.11 during the first 3−month period that it supplies the bottled water to the public, and annually thereafter. Results of the monitoring program shall be provided to the department annually.

(b) The public water system owner or operator shall obtain a written certification from the bottled water company that the bottled water supplied meets all requirements of ch. ATCP 70. The public water system owner or operator shall provide the certification to the department the first quarter after it supplies bottled water and annually thereafter.

(c) The public water system shall be fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system via door−to−door bottled water delivery.

**(5)** If the department approves the use of a point−of−entry device as a requisite for granting a conditional waiver, the water supplier shall provide documentation that the device will not cause increased corrosion of plumbing materials which could increase contaminant levels at the consumer's tap.

**(6)** Additional requirements for conditional waivers shall include all of the following:

(a) Proof of proper and effective installation, operation and maintenance of any applicable treatment technologies.

(b) Department specified monitoring requirements for the contaminant for which the conditional waiver is sought.

(c) Other terms or conditions specified by the department to ensure adequate public health protection, including but not limited to all of the following:

1. Public education requirements.

2. Source water protection requirements.

3. Quarterly conditional waiver compliance reports to the department.

**(7)** Before the department may grant a conditional waiver under this section, a class 1 public notice under ch. 985, Stats., and opportunity for a public hearing on the proposed conditional waiver shall be provided by the department. A hearing held pursuant to a request under this subsection is a class 1 hearing and shall be conducted in accordance with ch. 227, Stats.

**(8)** The department may extend a compliance deadline not to exceed 3 years or 2 years for a small system conditional waiver under sub. (2), beyond the expiration date of the original conditional waiver if the supplier of water establishes all of the following:

(a) The public water system cannot meet the maximum contaminant level or treatment technique requirement without capital

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improvements which cannot be completed within the period of the conditional waiver.

(b) The supplier of water has entered into an enforceable agreement to become part of a regional public water system or, if the supplier of water needs financial assistance for the necessary capital improvements, the supplier of water has entered into an agreement to obtain the financial assistance.

(c) The supplier of water is taking all practicable steps to meet the standard.

**(9)** The department may renew an extension granted under sub. (8) if the supplier of water establishes all of the following:

(a) The public water system does not serve more than 500 service connections.

(b) The public water system cannot meet a maximum contaminant level or treatment technique requirement without financial assistance for the necessary capital improvements.

(c) The public water system is taking all practicable steps to achieve compliance with a maximum contaminant level or treatment technique requirement.

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.90, cr. (2) (c) and (d), Register, July, 1993, No. 451, eff. 8−1−93; r. and recr., Register, December, 2000, No. 540, eff. 1−1−01; **CR 07−025: am. (4) (b) Register January 2008 No. 625, eff. 2−1−08**.

**NR 809.905 Conditional waivers from the maximum contaminant levels for radionuclides. (1)** The department shall consider conditional waivers from the maximum contaminant levels for combined radium−226 and radium−228, uranium, gross alpha particle activity, excluding radon and uranium, and beta particle and photon radioactivity as follows:

(a) The department has identified the following as the best available technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for the radionuclides listed in ss. NR 809.50 (1) and 809.51, for the purposes of issuing variances and exemptions, as shown in s. NR 809.50 (3), Table B.

(b) In addition, the department identifies the following as the best available technology, treatment techniques or other means available for achieving compliance with the maximum contaminant levels for the radionuclides listed in ss. NR 809.50 (1) and 809.51 for the purposes of issuing conditional waivers to small drinking water systems, defined as those serving 10,000 persons or fewer, as shown in s. NR 809.50 (4), Table D.

**(2)** The department shall require community water systems to install or use or both any treatment technology identified in s. NR 809.50 (3), Table B, or in the case of community water systems that serve 10,000 persons or fewer, s. NR 809.50 (3), Table C and table D, as a condition for granting a variance except as provided in sub. (3). If, after the system's installation of the treatment technology, the system cannot meet the MCL, the system shall be eligible for a variance under s. NR 809.90.

**(3)** If a community water system can demonstrate through comprehensive engineering assessments, which may include pilot plant studies, that the treatment technologies identified in this section would only achieve a de minimus reduction in the contaminant level, the department may issue a schedule for compliance that requires the system being granted the variance to examine other treatment technologies as a condition of obtaining the variance.

**(4)** If the department determines that a treatment technology identified under sub. (3) is technically feasible, the department may require the system to install or use or both that treatment technology in connection with a compliance schedule issued under s. NR 809.90. The department's determination shall be based upon studies by the system and other relevant information.

**(5)** The department may require a community water system to use bottled water, point−of−use devices, point−of−entry devices or other means as a condition of granting a variance or an exemption from the requirements of s. NR 809.50 or 809.51 to avoid an unreasonable risk to health.

**(6)** Community water systems that use bottled water as a condition for receiving a variance or an exemption from s. NR 809.50 or 809.51 shall meet the requirements in either s. NR 809.90 (4) (a) or (b) and (c).

**(7)** Community water systems that use point−of−use or point−of−entry devices as a condition for obtaining a variance or an exemption from the radionuclides MCLs shall meet the conditions in s. NR 809.90 (3).

**History:** CR 01−067: cr. Register March 2002 No. 555, eff. 4−1−02.

**NR 809.91 Nitrate variances. (1)** A non−community water system is eligible for a variance from the nitrate as nitrogen maximum contaminant level if:

(a) The department determines that because of the characteristics of the raw water sources which are reasonably available, the non−community water system cannot comply with the maximum contaminant level for nitrate as nitrogen; and

(b) The non−community water system has not had a nitrate as nitrogen sample which exceeds 20 mg/l, confirmed by a check sample; and

(c) The supplier of water continuously posts a department approved notice at all water taps supplied with water by the non−community water system. The notice shall state that the nitrate as nitrogen level exceeds 10 mg/l and describe the potential health effects of exposure; and

(d) The supplier of water ensures that water from its system will not be available to children under 6 months of age and provides bottled water which complies with all maximum contaminant levels for such children; and

(e) No adverse health effects will result.

**(2)** A community water system serving a nursing home, prison or mental health care facility, is eligible for a variance from the nitrate as nitrogen maximum contaminant level if:

(a) The institution does not permit infants under 6 months of age as residents; and

(b) The community water system has not had a nitrate as nitrogen sample which exceeds 20 mg/l, confirmed by a check sample; and

(c) The institution continuously posts a department approved notice at all water taps supplied with water by the community water system. The notice shall state that the nitrate as nitrogen level exceeds 10 mg/l and describe the potential health effects of exposure; and

(d) The institution ensures that water from its system will not be available to children under 6 months of age and provides bottled water which complies with all maximum contaminant levels for such children; and

(e) No adverse health effects will result.

**(3)** The department may condition the issuance of a variance under this section on compliance with such control measures as it deems necessary. Failure to comply with any term or condition of a variance granted by the department under this section voids the variance.

**History:** Cr. Register, August, 1989, No. 404, eff. 9−1−89; renum. from NR 109.91, Register, July, 1993, No. 451, eff. 8−1−93.

## Subchapter IX — Water System Capacity

**NR 809.931 System capacity.** All new community and non−transient non−community water systems constructed after September 1, 1999, shall develop and maintain adequate financial, managerial and technical capacity to meet the requirements of this chapter and 42 USC 300f to 300j−26.

**Note:** 42 USC 300f to 300j−26 is entitled the federal safe drinking water act

**History:** Cr., Register, May, 1999, No. 521, eff. 6−1−99.

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**NR 809.932 New system capacity evaluation.** **(1)** No new community or non−transient non−community water system may be constructed after September 1, 1999, unless the owner of the proposed water system first demonstrates to the satisfaction of the department that the water system shall have and shall maintain adequate financial, managerial and technical capacity to meet the requirements of this chapter and the requirements of 42 USC 300f to 300j−26. Additions to water systems constructed prior to September 1, 1999, are exempt from this requirement.

**Note:** 42 USC 300f to 300j−26 is entitled the federal safe drinking water act

**(2)** To demonstrate its financial, managerial and technical capacity to the department, before beginning construction of a water system, the owner of a proposed community or non−transient non−community water system shall submit to the department a system capacity evaluation that includes all of the following:

(a) A written description of the water system design that includes all of the following:

1. For groundwater systems, the proposed well construction and the name of the water bearing formation.

2. For surface water systems, the name of the source water body and the intake length and intake location.

3. The proposed pumping capacity.

4. The proposed water treatment.

5. The proposed water storage volume.

6. The proposed length and diameter of water mains.

7. The proposed pressure range within the water system.

8. The proposed location of any pressure reducing valves or pressure booster stations.

9. A map or plat showing the proposed water system.

(b) An evaluation of the potential for the water quality to exceed any of the primary or secondary standards of this chapter. For groundwater systems, this evaluation shall be based on a review of water quality information available from nearby existing wells or on the results of water quality monitoring from a test well. For surface water systems, this evaluation shall be based on water quality monitoring from the surface water.

(c) The anticipated average and maximum daily water use for the proposed water system.

(d) For groundwater systems, a site assessment that includes all of the following:

1. The separation distances between the well and potential sources of contamination within the proposed wellhead protection area.

2. Any violation of the applicable separation distances contained in chs. NR 811 and 812.

3. The proximity of the well to any wetlands.

4. The location of the well in relation to the 100 year flood elevation.

(e) For surface water systems, a source water assessment that includes the identification of potential sources of contamination in relation to the intake and the susceptibility of the water system to contamination.

(f) The anticipated number of industrial, commercial and residential water services.

(g) The initial and projected customer population and service area.

(h) Information for the identification, location and contact of the water system designer including the name, address, and telephone number of the system designer and designer's firm.

(i) The status of all department permits and approvals related to the construction of the water system.

(j) Information for the identification, location and contact of the water system owner including the name, address and telephone number of the water system owner and the extent of the owner's responsibility for the water system.

(k) Information for the identification, location and contact of the water system manager including the name, address and telephone number of the system manager.

(L) Information for the identification, location and contact of the water system operator including the name, address and telephone number of the designated or certified water system operator. If an operator has not been selected prior to submitting the capacity evaluation, a timetable for hiring an operator shall be included as part of the capacity evaluation in lieu of the information for the identification, location and contact of the water system operator. The water system may not be placed into operation until the department is provided with the information for the identification, location and contact of the water system operator required in this paragraph.

(m) A proposed water quality monitoring plan that includes monitoring for all of the following:

1. Total coliform bacteria.

2. Corrosion products, including lead and copper and associated water quality parameters.

3. Chemicals to be added to the water.

4. Other water quality monitoring required by the department as part of the construction plan approval.

(n) A description of the operational procedures required by chs. NR 809 and 811 and PSC 185 related to wellhead protection, well abandonment, cross−connection control, operational reporting, meter testing, hydrant and valve exercising and operator certification.

(o) A description of the rate or fee mechanism for other−than−municipal water systems. Other−than−municipal water system has the meaning contained in s. NR 811.02 (19).

**Note:** Sec. NR 811.02 (19) states that "Other−than−municipal water system" means a community water system that is not a municipal water system.

(p) A copy of the public service commission certificate authorizing the construction and operation, and estimating rates, for municipal water systems regulated by the public service commission. Municipal water system has the meaning contained in s. NR 811.02 (16).

**Note:** Sec. NR 811.02 (16) states that "Municipal water system" means a community water system owned by a city, village, county, town, town sanitary district, utility district, public inland lake and rehabilitation district, municipal water district, or a federal, state, county, or municipal owned institution for congregate care or correction, or a privately owned water utility serving the foregoing.

(q) A description of the method of payment for the construction and operation of the water system for non−transient non−community water systems.

(r) A statement from the water system owner on the financial capacity of the water system to meet the requirements of this chapter.

**(3)** The capacity evaluation shall be submitted on a form provided by the department or in a format approved by the department.

**Note:** Capacity evaluation forms may be obtained from the department bureau of drinking water and groundwater at no charge by writing to Bureau of Drinking Water and Groundwater, Box 7921, Madison, WI, 53707, or by calling (608) 266−6699.

**(4)** The information in sub. (2) (a) to (e) shall be prepared by a professional engineer for municipal water systems and by a professional engineer or licensed well driller for other−than−municipal or non−transient non−community water systems.

**(5)** The department may waive the requirement for the owner to supply information on well construction, well location, water quality monitoring, and operational procedures listed in sub. (2) (a) to (n) for non−community water systems provided that the owner acknowledges conformance to the requirements for well

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construction, well location, water quality monitoring, and water system operation contained in this chapter and ch. NR 812.

**(6)** A single engineering or design report may be submitted to satisfy the requirements of s. NR 811.13 (3) and (4) and the capacity evaluation required by sub. (2).

**History:** Cr., Register, May, 1999, No. 521, eff. 6−1−99; correction in (6) made under s. 13.93 (2m) (b) 7., Stats., Register November 2002 No. 563, eff. 12−1−02.

**NR 809.933 Department approval of system capacity. (1)** The construction of any new non−transient non−community or community water system may not commence without department approval of the system capacity evaluation demonstrating technical, financial and managerial capacity required in s. NR 809.932.

**(2)** The department may deny approval of the system capacity evaluation for any of the following reasons:

(a) The water system design does not conform to the applicable design and location standards, or approved variances to the standards, contained in chs. NR 811 and 812 and Comm 82.

(b) The water system operational procedures do not meet the applicable requirements of ch. PSC 185 or of this chapter and ch. NR 811 related to wellhead protection, well abandonment, cross−connection control, operational reporting, meter testing, hydrant and valve exercising and operator certification.

(c) The water system monitoring plan does not conform to the applicable monitoring requirements of this chapter, approved variances to the requirements of this chapter, or to monitoring requirements established as part of the department construction approval under chs. NR 811 and 812.

(d) The system capacity evaluation is incomplete.

(e) The information provided does not demonstrate adequate financial capacity to meet the requirements of this chapter.

**History:** Cr., Register, May, 1999, No. 521, eff. 6−1−99.

## Subchapter X — Public Notification of Drinking Water Violations

**NR 809.950 General public notification requirements. (1)** DATE OF COMPLIANCE. Public water systems shall comply with the requirements in this subchapter no later than May 6, 2002 or on December 1, 2002, whichever comes first. Prior to these dates, public water systems shall continue to comply with the public notice requirements in s. NR 809.81.

**Note:** NR 809.81 was repealed eff. 11−1−02.

**(2)** WHO SHALL GIVE PUBLIC NOTICE. (a) *Public owner or operator.* Each owner or operator of a public water system including, community water systems, non−transient non−community water systems, and transient non−community water systems, shall give notice for all violations of national primary drinking water regulations (NPDWR) and for other situations, as listed in par. (b). The term "NPDWR violations" is used in this subchapter to include violations of the maximum contaminant level, maximum residual disinfection level, treatment technique, monitoring requirements, and testing procedures in this chapter. Appendix A to this subchapter identifies the tier assignment for each specific violation or situation requiring a public notice.

(b) *Violation categories and other situations requiring a public notice.* 1. NPDWR violations include all of the following:

a. Failure to comply with an applicable maximum contaminant level or maximum residual disinfectant level.

b. Failure to comply with a treatment technique prescribed by this chapter.

c. Failure to perform water quality monitoring, as required by the drinking water regulations.

d. Failure to comply with testing procedures as prescribed in this chapter or by a drinking water regulation.

2. Variance and exemptions under subch. VIII include all of the following:

a. Operation under a variance or an exemption.

b. Failure to comply with the requirements of any schedule that has been set under a variance or exemption.

3. Special public notices include all of the following:

a. Occurrence of a waterborne disease outbreak or other waterborne emergency.

b. Exceedance of the nitrate MCL by non−community water systems, where granted permission by the department under s. NR 809.11 (3).

c. Exceedance of the secondary maximum contaminant level for fluoride.

d. Availability of unregulated contaminant monitoring data.

e. Other violations and situations determined by the department to require a public notice under this subchapter, not listed in Appendix A.

**(3)** TYPE OF PUBLIC NOTICE IS REQUIRED FOR EACH VIOLATION OR SITUATION. (a) *Public notice tiers.* Public notice requirements are divided into 3 tiers, to take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. The public notice requirements for each violation or situation listed in sub. (2) (b) are determined by the tier to which it is assigned. The definition of each tier is provided in sub. (3) (b). Appendix A identifies the tier assignment for each specific violation or situation.

(b) *Definition of public notice tiers.* 1. Tier 1 public notice is required for NPDWR violations and situations with significant potential to have serious adverse effects on human health as a result of short−term exposure.

2. Tier 2 public notice is required for NPDWR violations and situations with potential to have serious adverse effects on human health.

3. Tier 3 public notice is required for NPDWR violations or situations not included in Tier 1 and Tier 2.

**(4)** WHO SHALL BE NOTIFIED. (a) Each public water system shall provide public notice to persons served by the water system, in accordance with this subchapter. Public water systems that sell or otherwise provide drinking water to consecutive systems are required to give public notice to the owner or operator of the consecutive system. The consecutive system is responsible for providing public notice to the persons it serves.

(b) If a public water system has a violation in a portion of the distribution system that is physically or hydraulically isolated from other parts of the distribution system, the department may allow the system to limit distribution of the public notice to only persons served by that portion of the system which is out of compliance. Permission by the department for limiting distribution of the notice shall be granted in writing.

(c) A copy of the notice shall also be sent to the department, in accordance with the requirements under s. NR 809.80 (5).

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.951 Tier 1 public notice−−form, manner, and frequency of notice. (1)** VIOLATIONS OR SITUATIONS WHICH REQUIRE A TIER 1 PUBLIC NOTICE. (a) Paragraph (b) lists the violation categories and other situations requiring a Tier 1 public notice. Appendix A identifies the tier assignment for each specific violation or situation.

(b) Violation categories and other situations requiring a Tier 1 public notice include all of the following:

1. Violation of the MCL for total coliforms when fecal coliform or E. coli is present in the water distribution system, as specified in s. NR 809.30 (2), or when the water system fails to test for fecal coliforms or E. coli when any repeat sample tests positive for coliform, as specified in s. NR 809.31 (4).

2. Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in s. NR 809.11, or when the water system fails to take a confirmation sample within 24 hours of the system's

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receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in s. NR 809.12 (6) (b).

3. Exceedance of the nitrate MCL by non−community water systems, where permitted to exceed the MCL by the department under s. NR 809.11 (3), as required under s. NR 809.958.

4. Violation of the MRDL for chlorine dioxide, as defined in s. NR 809.561 (2), when one or more samples taken in the distribution system the day following an exceedance of the MRDL at the entrance of the distribution system exceed the MRDL, or when the water system does not take the required samples in the distribution system, as specified in s. NR 809.566 (3) (b) 1.

5. Violation of the turbidity MCL under s. NR 809.76, where the department determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation.

6. Violation of the surface water treatment rule (SWTR) or interim enhanced surface water treatment rule (IESWTR) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit as identified in Appendix A, where the department determines after consultation that a Tier 1 notice is required or where consultation does not take place within 24 hours after the system learns of the violation.

7. Occurrence of a waterborne disease outbreak, as defined in s. NR 809.04 (79), or other waterborne emergency, such as a failure or significant interruption in key water treatment processes, a natural disaster that disrupts the water supply or distribution system, or a chemical spill or unexpected loading of possible pathogens into the source water that significantly increases the potential for drinking water contamination.

8. Other violations or situations with significant potential to have serious adverse effects on human health as a result of short−term exposure, as determined by the department either in its regulations or on a case−by−case basis.

**(2)** WHEN THE TIER 1 PUBLIC NOTICE IS PROVIDED AND WHAT ADDITIONAL STEPS ARE REQUIRED. Public water systems shall do all of the following if Tier 1 notice is required:

(a) Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation.

(b) Initiate consultation with the department as soon as practical, but no later than 24 hours after the public water system learns of the violation or situation, to determine additional public notice requirements.

(c) Comply with any additional public notification requirements, including any repeat notices or direction on the duration of the posted notices, that are established as a result of the consultation with the department. Requirements may include the timing, form, manner, frequency, and content of repeat notices, if any, and other actions designed to reach all persons served.

**(3)** FORM AND MANNER OF THE PUBLIC NOTICE. Public water systems shall provide the notice within 24 hours in a form and manner reasonably calculated to reach all persons served. The form and manner used by the public water system shall be designed to fit the specific situation, and to reach residential, transient and non−transient users of the water system. To reach all persons served, water systems shall use, at a minimum, one or more of the following forms of delivery:

(a) Appropriate broadcast media, such as radio and television.

(b) Posting of the notice in conspicuous locations throughout the area served by the water system.

(c) Hand delivery of the notice to persons served by the water system.

(d) Another delivery method approved in writing by the department.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.952 Tier 2 public notice−−form, manner, and frequency of notice. (1)** VIOLATIONS OR SITUATIONS WHICH REQUIRE A TIER 2 PUBLIC NOTICE. (a) Paragraph (b) lists the violation categories and other situations requiring a Tier 2 public notice. Appendix A identifies the tier assignment for each specific violation or situation.

(b) Violation categories and other situations requiring a Tier 2 public notice include all of the following:

1. All violations of the MCL, MRDL, and treatment technique requirements, except where a Tier 1 notice is required under s. NR 809.951 (1) or where the department determines that a Tier 1 notice is required.

2. Violations of the monitoring and testing procedure requirements, where the department determines that a Tier 2 rather than a Tier 3 public notice is required, taking into account potential health impacts and persistence of the violation.

3. Failure to comply with the terms and conditions of any variance or exemption in place.

**(2)** WHEN TIER 2 PUBLIC NOTICE TO BE PROVIDED. (a) Public water systems shall provide the public notice as soon as practical, but no later than 30 days after the system learns of the violation. If the public notice is posted, the notice shall remain in place for as long as the violation or situation persists, but in no case for less than 7 days, even if the violation or situation is resolved. The department may, in appropriate circumstances, allow additional time for the initial notice of up to 3 months from the date the system learns of the violation. The department may not grant an extension to the 30−day deadline for any unresolved violation nor allow across−the−board extensions by rule or policy for other violations or situations requiring a Tier 2 public notice. Extensions granted by the department shall be in writing.

(b) The public water system shall repeat the notice every 3 months as long as the violation or situation persists, unless the department determines that appropriate circumstances warrant a different notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. The department may not allow across−the−board reductions in the repeat notice frequency for other ongoing violations requiring a Tier 2 repeat notice. Department determinations allowing repeat notices to be given less frequently than once every 3 months shall be in writing.

(c) For turbidity violations specified in this paragraph, public water systems shall consult with the department as soon as practical but no later than 24 hours after the public water system learns of the violation, to determine whether a Tier 1 public notice under s. NR 809.951 (1) is required to protect public health. When consultation does not take place within the 24−hour period, the water system shall distribute a Tier 1 notice of the violation, no later than 48 hours after the system learns of the violation, following the requirements under s. NR 809.951 (2) and (3). Consultation with the department is required for either of the following:

1. Violation of the turbidity MCL under s. NR 809.76.

2. Violation of the surface water treatment rule or interim enhanced surface water treatment rule treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.

**(3)** FORM AND MANNER OF THE TIER 2 PUBLIC NOTICE. Public water systems shall provide the initial public notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it shall at a minimum meet the following requirements:

(a) Unless directed otherwise by the department in writing, community water systems shall provide notice by both of the following:

1. Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system.

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2. Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subd. 1. Persons may include those who do not pay water bills or do not have service connection addresses, such as house renters, apartment dwellers, university students, nursing home patients, prison inmates. Other methods may include publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others, such as apartment building owners or large private employers; posting in public places served by the system or on the internet; or delivery to community organizations.

(b) Unless directed otherwise by the department in writing, non−community water systems shall provide notice by both of the following:

1. Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection, where known.

2. Any other method reasonably calculated to reach other persons served by the system if they would not normally be reached by the notice required in subd. 1. Other methods may include publication in a local newspaper or newsletter distributed to customers; use of E−mail to notify employees or students; or, delivery of multiple copies in central locations, such as community centers.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.953 Tier 3 public notice−−form, manner, and frequency of notice. (1)** VIOLATIONS OR SITUATIONS WHICH REQUIRE A TIER 3 PUBLIC NOTICE. (a) Paragraph (b) lists the violation categories and other situations requiring a Tier 3 public notice. Appendix A identifies the tier assignment for each specific violation or situation.

(b) Violation categories and other situations requiring a Tier 3 public notice include all of the following:

1. Monitoring violations under ch. NR 809, except where a Tier 1 notice is required under s. NR 809.951 (1) or where the department determines that a Tier 2 notice is required.

2. Failure to comply with a testing procedure established in ch. NR 809, except where a Tier 1 notice is required under s. NR 809.951 (1) or where the department determines that a Tier 2 notice is required.

3. Operation under a conditional waiver or variance, or both, under subch. VIII.

4. Availability of unregulated contaminant monitoring results, as required under s. NR 809.956.

5. Exceedance of the fluoride secondary maximum contaminant level, as required under s. NR 809.957.

**(2)** WHEN TIER 3 PUBLIC NOTICE TO BE PROVIDED. (a) Public water systems shall provide Tier 3 public notice not later than one year after the public water system learns of the violation or situation or begins operating under a variance or exemption. Following the initial notice, the public water system shall repeat the notice annually for as long as the violation, variance, exemption or other situation persists. If the public notice is posted, the notice shall remain in place for as long as the violation, variance, exemption or other situation persists, but in no case less than 7 days, even if the violation or situation is resolved.

(b) Instead of individual Tier 3 public notices, a public water system may use an annual report detailing all violations and situations that occurred during the previous 12 months, as long as the timing requirements of par. (a) are met.

**(3)** FORM AND MANNER OF THE TIER 3 PUBLIC NOTICE. Public water systems shall provide the initial notice and any repeat notices in a form and manner that is reasonably calculated to reach persons served in the required time period. The form and manner of the public notice may vary based on the specific situation and type of water system, but it shall at a minimum meet the following requirements:

(a) Unless directed otherwise by the department in writing, community water systems shall provide notice by both of the following:

1. Mail or other direct delivery to each customer receiving a bill and to other service connections to which water is delivered by the public water system.

2. Any other method reasonably calculated to reach other persons regularly served by the system, if they would not normally be reached by the notice required in subd. 1. Persons may include those who do not pay water bills or do not have service connection addresses, e.g., house renters, apartment dwellers, university students, nursing home patients, prison inmates, etc. Other methods may include publication in a local newspaper; delivery of multiple copies for distribution by customers that provide their drinking water to others, such as apartment building owners or large private employers; posting in public places or on the internet; or delivery to community organizations.

(b) Unless directed otherwise by the department in writing, non−community water systems shall provide notice by both of the following:

1. Posting the notice in conspicuous locations throughout the distribution system frequented by persons served by the system, or by mail or direct delivery to each customer and service connection, where known.

2. Any other method reasonably calculated to reach other persons served by the system, if they would not normally be reached by the notice required in subd. 1. Other methods may include publication in a local newspaper or newsletter distributed to customers; use of E−mail to notify employees or students; or delivery of multiple copies in central locations, such as community centers.

**(4)** SITUATIONS IN WHICH THE CONSUMER CONFIDENCE REPORT MAY BE USED TO MEET THE TIER 3 PUBLIC NOTICE REQUIREMENTS. For community water systems, the consumer confidence report required under this subchapter may be used as a vehicle for the initial Tier 3 public notice and all required repeat notices, as long as all of the following occur:

(a) The consumer confidence report is provided to persons served no later than 12 months after the system learns of the violation or situation as required under s. NR 809.953 (2).

(b) The Tier 3 notice contained in the consumer confidence report follows the content requirements under s. NR 809.954.

(c) The consumer confidence report is distributed following the delivery requirements under s. NR 809.953 (3).

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.954 Content of the public notice. (1)** ELEMENTS TO BE INCLUDED IN THE PUBLIC NOTICE FOR VIOLATIONS OF NATIONAL PRIMARY DRINKING WATER REGULATIONS (NPDWR) OR OTHER SITUATIONS REQUIRING A PUBLIC NOTICE. When a public water system violates a national primary drinking water regulation or has a situation requiring public notification, each public notice shall include all of the following elements:

(a) A description of the violation or situation, including the contaminants of concern, and, as applicable, the contaminant levels.

(b) When the violation or situation occurred.

(c) Any potential adverse health effects from the violation or situation, including the standard language under sub. (4) (a) or (b), whichever is applicable.

(d) The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water.

(e) Whether alternative water supplies should be used.

(f) What actions consumers should take, including when they should seek medical help, if known.

(g) What the system is doing to correct the violation or situation.

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(h) When the water system expects to return to compliance or resolve the situation.

(i) The name, business address and phone number of the water system owner, operator or designee of the public water system as a source of additional information concerning the notice.

(j) A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under sub. (4) (c), where applicable.

**(2)** ELEMENTS INCLUDED IN THE PUBLIC NOTICE FOR PUBLIC WATER SYSTEMS OPERATING UNDER A VARIANCE OR EXEMPTION. (a) If a public water system has been granted a variance or an exemption, the public notice shall contain all of the following:

1. An explanation of the reasons for the variance or exemption.

2. The date on which the variance or exemption was issued.

3. A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption.

4. A notice of any opportunity for public input in the review of the variance or exemption.

(b) If a public water system violates the conditions of a variance or exemption, the public notice shall contain the 10 elements in sub. (1).

**(3)** HOW PUBLIC NOTICE IS TO BE PRESENTED. (a) Each public notice required by this section shall meet all of the following:

1. Shall be displayed in a conspicuous way when printed or posted.

2. May not contain overly technical language or very small print.

3. May not be formatted in a way that defeats the purpose of the notice.

4. May not contain language which nullifies the purpose of the notice.

(b) Each public notice required by this section shall comply with multilingual requirements, as follows:

1. For public water systems where 5% or more of the population served consists of non−English speaking consumers, the public notice shall contain information in the appropriate languages regarding the importance of the notice or contain a telephone number or address where persons served may contact the water system to obtain a translated copy of the notice or to request assistance in the appropriate languages.

2. In cases where the public water system is unable to accurately determine whether non−English speaking consumers constitute 5% of the population served, the department may require inclusion in the public notice the same information as in subd. 1., to reach non−English speaking persons served by the water system.

**(4)** STANDARD LANGUAGE PUBLIC WATER SYSTEMS TO INCLUDE IN THEIR PUBLIC NOTICE. Public water systems are required to include the following standard language in their public notice:

(a) *Standard health effects language for MCL or MRDL violations, treatment technique violations, and violations of the condition of a variance or exemption.* Public water systems shall include in each public notice the health effects language specified in Appendix B corresponding to each MCL, MRDL and treatment technique violation listed in Appendix A, and for each violation of a condition of a variance or exemption.

(b) *Standard language for monitoring and testing procedure violations.* Public water systems shall include the following language in their notice, including the language necessary to fill in the blanks, for all monitoring and testing procedure violations listed in Appendix A: We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During [compliance period], we "did not monitor or test" or "did not complete all monitoring or testing" for [contaminant(s)], and therefore cannot be sure of the quality of your drinking water during that time.

(c) *Standard language to encourage the distribution of the public notice to all persons served.* Public water systems shall include in their notice the following language, where applicable: Please share this information with all the other people who drink this water, especially those who may not have received this notice directly, for example, people in apartments, nursing homes, schools, and businesses. You can do this by posting this notice in a public place or distributing copies by hand or mail.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.955 Notice to new billing units or new customers. (1)** REQUIREMENT FOR COMMUNITY WATER SYSTEMS. Community water systems shall give a copy of the most recent public notice for any continuing violation, the existence of a variance or exemption, or other ongoing situations requiring a public notice to all new billing units or new customers prior to or at the time service begins.

**(2)** REQUIREMENT FOR NON−COMMUNITY WATER SYSTEMS. Non−community water systems shall continuously post the public notice in conspicuous locations in order to inform new consumers of any continuing violation, variance or exemption, or other situation requiring a public notice for as long as the violation, variance, exemption, or other situation persists.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.956 Special notice of the availability of unregulated contaminant monitoring results. (1)** WHEN SPECIAL NOTICE IS TO BE GIVEN. The owner or operator of a community water system or non−transient non−community water system required to monitor under s. NR 809.26 shall notify persons served by the system of the availability of the results of such sampling no later than 12 months after the monitoring results are known.

**(2)** FORM AND MANNER OF THE SPECIAL NOTICE. The form and manner of the public notice shall follow the requirements for a Tier 3 public notice prescribed in s. NR 809.953 (3), (4) (a) and (c). The notice shall also identify a person and provide the telephone number to contact for information on the monitoring results.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.957 Special notice for exceedance of the secondary maximum contaminant level for fluoride. (1)** WHEN SPECIAL NOTICE IS TO BE GIVEN. Community water systems that exceed the fluoride secondary maximum contaminant level of 2.0 mg/l as specified in s. NR 809.60, determined by the last single sample taken in accordance with s. NR 809.12, but do not exceed the maximum contaminant level (MCL) of 4.0 mg/l for fluoride, as specified in s. NR 809.11, shall provide the public notice in sub. (3) to persons served. Public notice shall be provided as soon as practical but no later than 12 months from the day the water system learns of the exceedance. A copy of the notice shall also be sent to all new billing units and new customers at the time service begins and to the state public health officer. The public water system shall repeat the notice at least annually for as long as the secondary maximum contaminant level is exceeded. If the public notice is posted, the notice shall remain in place for as long as the secondary maximum contaminant level is exceeded, but in no case less than 7 days, even if the exceedance is eliminated. On a case−by−case basis, the department may require an initial notice sooner than 12 months and repeat notices more frequently than annually.

**(2)** FORM AND MANNER OF THE SPECIAL NOTICE. The form and manner of the public notice, including repeat notices, shall follow

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the requirements for a Tier 3 public notice in s. NR 809.953 (3) and (4) (a) and (c).

**(3)** MANDATORY LANGUAGE TO BE CONTAINED IN THE SPECIAL NOTICE. The notice shall contain the following language, including the language necessary to fill in the blanks: This is an alert about your drinking water and a cosmetic dental problem that might affect children under 9 years of age. At low levels, fluoride can help prevent cavities, but children drinking water containing more than 2 milligrams per liter (mg/l) of fluoride may develop cosmetic discoloration of their permanent teeth known as dental fluorosis. The drinking water provided by your community water system [name] has a fluoride concentration of [insert value] mg/l. Dental fluorosis, in its moderate or severe forms, may result in a brown staining and/or pitting of the permanent teeth. This problem occurs only in developing teeth, before they erupt from the gums. Children under 9 should be provided with alternative sources of drinking water or water that has been treated to remove the fluoride to avoid the possibility of staining and pitting of their permanent teeth. You may also want to contact your dentist about proper use by young children of fluoride−containing products. Older children and adults may safely drink the water. Drinking water containing more than 4 mg/L of fluoride, the U.S. Environmental Protection Agency's drinking water standard, can increase your risk of developing bone disease. Your drinking water does not contain more than 4 mg/l of fluoride, but we're required to notify you when we discover that the fluoride levels in your drinking water exceed 2 mg/l because of this cosmetic dental problem. For more information, please call [name of water system contact] of [name of community water system] at [phone number]. Some home water treatment units are also available to remove fluoride from drinking water. To learn more about available home water treatment units, you may call NSF International at 1−877−8−NSF−HELP.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02; **CR 07−025: am. (1) Register January 2008 No. 625, eff. 2−1−08.**

**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). (1)** WHEN SPECIAL NOTICE TO BE GIVEN. The owner or operator of a non−community water system granted permission by the department under s. NR 809.11 (3) to exceed the nitrate MCL shall provide notice to persons served according to the requirements for a Tier 1 notice under s. NR 809.951 (1) and (2).

**(2)** FORM AND MANNER OF THE SPECIAL NOTICE. Non−community water systems granted permission by the department to exceed the nitrate MCL under s. NR 809.11 (3) shall provide continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure, according to the requirements for Tier 1 notice delivery under s. NR 809.951 (3) and the content requirements under s. NR 809.954.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

**NR 809.959 Notice by the department on behalf of the public water system. (1)** DEPARTMENT MAY GIVE NOTICE ON BEHALF OF THE PUBLIC WATER SYSTEM. The department may give the notice required by this subchapter on behalf of the owner and operator of the public water system if the department complies with the requirements of this subchapter.

**(2)** RESPONSIBILITY OF THE PUBLIC WATER SYSTEM WHEN NOTICE IS GIVEN BY THE DEPARTMENT. The owner or operator of the public water system remains responsible for ensuring that the requirements of this subchapter are met.

**History:** CR 00−162: cr. Register November 2002 No. 563, eff. 12−1−02.

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**Appendix A to Subchapter X**
**NPDWR Violations and Other Situations Requiring Public Notice[1]**

| Contaminant | MCL/MRDL/TT violations[2] | | Monitoring & testing procedure violations | |
|---|---|---|---|---|
| | Tier of public notice required | Citation | Tier of public notice required | Citation |
| **I. Violations of National Primary Drinking Water Regulations:[3]** | | | | |
| A. Microbiological Contaminants | | | | |
| 1. Total coliform | 2 | 809.30(1) | 3 | 809.31(1)−(4) |
| 2. Fecal coliform/E. coli | 1 | 809.30(2) | [4]1, 3 | 809.31(4) |
| 3. Turbity MCL | 2 | 809.40(1) | 3 | 809.41 |
| 4. Turbidity MCL (average 2 days' samples >5 NTU) | [5]2,1 | 809.40(2) | 3 | 809.41 |
| 5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level) | [6]2, 1 | 809.755(1)(b), 809.755(3)(b)1., 809.76(1)(b), 809.76(3)(b), 809.76(4)(b), 809.76(5), 809.76(1)(b), 809.76(5) | 3 | 809.78(2)(a), 809.78(1)(b), 809.76 |
| 6. Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT) | 2 | 809.75 – 809.77 | 3 | 809.78 |
| 7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. turbidity level (TT) | 2 | NR 809 subch. V | 3 | 809.77, 809.76 |
| B. Inorganic Chemicals (IOCs) | | | | |
| 1. Antimony | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 2. Arsenic | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 3. Asbestos (fibers >10 ìm) | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 4. Barium | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 5. Beryllium | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 6. Cadmium | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 7. Chromium (total) | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 8. Cyanide | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 9. Fluoride | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 10. Mercury (inorganic) | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 11. Nitrate | 1 | 809.11(2) | [8]1, 3 | 809.12(intro.), 809.12(4), 809.12(6)(b) |
| 12. Nitrite | 1 | 809.11(2) | [8]1, 3 | 809.12(intro.), 809.12(5), 809.12(6)(b) |
| 13. Total Nitrate and Nitrite | 1 | 809.11(2) | 3 | 809.12(intro.) |
| 14. Selenium | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| 15. Thallium | 2 | 809.11(2) | 3 | 809.12(intro.), 809.12(3) |
| C. Lead and Copper Rule (Action Level for lead is 0.015 mg/L, copper is 1.3 mg/L) | | | | |
| 1. Lead and Copper Rule (TT) | 2 | 809.541 – 809.55 | 3 | 809.541−809.55 |

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**Appendix A to Subchapter X − Continued**
**NPDWR Violations and Other Situations Requiring Public Notice[1]**

| Contaminant | MCL/MRDL/TT violations[2] | | Monitoring & testing procedure violations | |
|---|---|---|---|---|
| | Tier of public notice required | Citation | Tier of public notice required | Citation |
| D. Synthetic Organic Chemicals (SOCs) | | | | |
| 1. 2,4−D | 2 | 809.20(1) | 3 | 809.21(1) |
| 2. 2,4,5−TP (Silvex) | 2 | 809.20(1) | 3 | 809.21(1) |
| 3. Alachlor | 2 | 809.20(1) | 3 | 809.21(1) |
| 4. Atrazine | 2 | 809.20(1) | 3 | 809.21(1) |
| 5. Benzo(a)pyrene (PAHs) | 2 | 809.20(1) | 3 | 809.21(1) |
| 6. Carbofuran | 2 | 809.20(1) | 3 | 809.21(1) |
| 7. Chlordane | 2 | 809.20(1) | 3 | 809.21(1) |
| 8. Dalapon | 2 | 809.20(1) | 3 | 809.21(1) |
| 9. Di (2−ethylhexyl) adipate | 2 | 809.20(1) | 3 | 809.21(1) |
| 10. Di (2−ethylhexyl) phthalate | 2 | 809.20(1) | 3 | 809.21(1) |
| 11. Dibromochloropropane | 2 | 809.20(1) | 3 | 809.21(1) |
| 12. Dinoseb | 2 | 809.20(1) | 3 | 809.21(1) |
| 13. Dioxin (2, 3, 7, 8−TCDD) | 2 | 809.20(1) | 3 | 809.21(1) |
| 14. Diquat | 2 | 809.20(1) | 3 | 809.21(1) |
| 15. Endothall | 2 | 809.20(1) | 3 | 809.21(1) |
| 16. Endrin | 2 | 809.20(1) | 3 | 809.21(1) |
| 17. Ethylene dibromide | 2 | 809.20(1) | 3 | 809.21(1) |
| 18. Glyphosate | 2 | 809.20(1) | 3 | 809.21(1) |
| 19. Heptachlor | 2 | 809.20(1) | 3 | 809.21(1) |
| 20. Heptachlor epoxide | 2 | 809.20(1) | 3 | 809.21(1) |
| 21. Hexachlorobenzene | 2 | 809.20(1) | 3 | 809.21(1) |
| 22. Hexachlorocyclo−pentadiene | 2 | 809.20(1) | 3 | 809.21(1) |
| 23. Lindane | 2 | 809.20(1) | 3 | 809.21(1) |
| 24. Methoxychlor | 2 | 809.20(1) | 3 | 809.21(1) |
| 25. Oxamyl (Vydate) | 2 | 809.20(1) | 3 | 809.21(1) |
| 26. Pentachlorophenol | 2 | 809.20(1) | 3 | 809.21(1) |
| 27. Picloram | 2 | 809.20(1) | 3 | 809.21(1) |
| 28. Polychlorinated biphenyls | 2 | 809.20(1) | 3 | 809.21(1) |
| 29. Simazine | 2 | 809.20(1) | 3 | 809.21(1) |
| 30. Toxaphene | 2 | 809.20(1) | 3 | 809.21(1) |
| E. Volatile Organic Chemicals (VOCs) | | | | |
| 1. Benzene | 2 | 809.24(1) | 3 | 809.25(1) |
| 2. Carbon tetrachloride | 2 | 809.24(1) | 3 | 809.25(1) |
| 3. Chlorobenzene (monochlorobenzene) | 2 | 809.24(1) | 3 | 809.25(1) |
| 4. o−Dichlorobenzene | 2 | 809.24(1) | 3 | 809.25(1) |
| 5. p−Dichlorobenzene | 2 | 809.24(1) | 3 | 809.25(1) |
| 6. 1,2−Dichloroethane | 2 | 809.24(1) | 3 | 809.25(1) |
| 7. 1,1−Dichloroethylene | 2 | 809.24(1) | 3 | 809.25(1) |
| 8. cis−1,2−Dichloroethylene | 2 | 809.24(1) | 3 | 809.25(1) |
| 9. trans−1,2−Dichloroethylene | 2 | 809.24(1) | 3 | 809.25(1) |
| 10. Dichloromethan | 2 | 809.24(1) | 3 | 809.25(1) |
| 11. 1,2−Dichloropropane | 2 | 809.24(1) | 3 | 809.25(1) |
| 12. Ethylbenzene | 2 | 809.24(1) | 3 | 809.25(1) |
| 13. Styrene | 2 | 809.24(1) | 3 | 809.25(1) |
| 14. Tetrachloroethylene | 2 | 809.24(1) | 3 | 809.25(1) |
| 15. Toluene | 2 | 809.24(1) | 3 | 809.25(1) |
| 16. 1,2,4−Trichlorobenzene | 2 | 809.24(1) | 3 | 809.25(1) |
| 17. 1,1,1−Trichloroethane | 2 | 809.24(1) | 3 | 809.25(1) |
| 18. 1,1,2−Trichloroethane | 2 | 809.24(1) | 3 | 809.25(1) |
| 19. Trichloroethylene | 2 | 809.24(1) | 3 | 809.25(1) |
| 20. Vinyl chloride | 2 | 809.24(1) | 3 | 809.25(1) |
| 21. Xylenes (total) | 2 | 809.24(1) | 3 | 809.25(1) |
| F. Radioactive Contaminants | | | | |
| 1. Beta/photon emitters | 2 | 809.51 | 3 | 809.52(1), 809.53(2) |
| 2. Alpha emitters | 2 | 809.50(2) | 3 | 809.52(1), 809.53(1) |
| 3. Combined radium (226 & 228) | 2 | 809.50(1) | 3 | 809.52(1), 809.53(1) |
| G. Disinfection Byproducts (DBPs), Byproduct Precursors, Disinfectant Residuals. Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts. EPA sets standards for controlling the levels of disinfectants and disinfection byproducts in drinking water, including trihalomethanes and haloacetic acids. [9] | | | | |
| 1. Total trihalomethanes | 2 | 809.22, 809.561(1) | 3 | 809.25, 809.565(1)−(4) |
| 2. Haloacetic Acids | 2 | 809.561(1) | 3 | 809.565(1)−(4) |

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**Appendix A to Subchapter X − Continued**
**NPDWR Violations and Other Situations Requiring Public Notice[1]**

| Contaminant | MCL/MRDL/TT violations[2] | | Monitoring & testing procedure violations | |
|---|---|---|---|---|
| | Tier of public notice required | Citation | Tier of public notice required | Citation |
| 3. Bromate | 2 | 809.561(1) | 3 | 809.565(1)−(4) |
| 4. Chlorite | 2 | 809.561(1) | 3 | 809.565(1)−(4) |
| 5. Chlorine (MRDL) | 2 | 809.561(2) | 3 | 809.565(1), (5) |
| 6. Chloramine (MRDL) | 2 | 809.561(2) | 3 | 809.565(1), (5) |
| 7. Chlorine dioxide (MRDL), where any 2 consecutive daily samples at entrance to distribution system only are above MRDL | 2 | 809.561(2), 809.566(d) | 2[11], 3 | 809.565(1), (5), 809.566(3)(b) |
| 8. Chlorine dioxide (MRDL), where samples in distribution system the next day are also above MRDL | [12]1 | 809.561(2), 809.566(d) | 1 | 809.565(1), (5), 809.566(3)(b) |
| 9. Control of disinfection byproducts precursors – TOC (TT) | 2 | 809.569(1)−(2) | 3 | 809.565(1), (6) |
| 10. Bench marking and disinfection profiling | N/A | N/A | 3 | 809.77 |
| 11. Development of monitoring plan | N/A | N/A | 3 | 809.565(8) |
| H. Other Treatment Techniques | | | | |
| 1. Acrylamide (TT) | 2 | 809.26(5) | N/A | N/A |
| 2. Epichlorohydrin (TT) | 2 | 809.26(5) | N/A | N/A |
| **II. Unregulated Contaminant Monitoring:[13]** | | | | |
| A. Unregulated contaminants | N/A | N/A | 3 | 809.74 |
| B. Nickel | N/A | N/A | 3 | 809.12(4)(c), 809.735(1) Table A |
| **III. Public Notification for Conditional Waivers and Variances** | | | | |
| A. Operation under a conditional waiver or variance | 3 | 809.90, 809.91 | N/A | N/A |
| B. Violation of a conditional waiver or variance | 2 | Subchapter X | N/A | N/A |
| **IV. Other Situations Requiring Public Notification:** | | | | |
| A. Fluoride secondary maximum contaminant level exceedance | 3 | 809.60 | N/A | N/A |
| B. Exceedance of nitrate MCL for non−community systems, as allowed by the department | 1 | 809.11(3) | N/A | N/A |
| C. Availability of unregulated contaminant monitoring data | 3 | 809.26 | N/A | N/A |
| D. Waterborne disease outbreak | 1 | 809.04, 809.755(3)(b)2. | N/A | N/A |
| E. Other waterborne emergency[14] | 1 | N/A | N/A | N/A |
| F. Other situations as determined by the department | [15]1, 2, 3 | N/A | N/A | N/A |

**Appendix A Footnotes**

[1] Violations and other situations not listed in this table, e.g., reporting violations and failure to prepare Consumer Confidence Reports, do not require notice, unless otherwise determined by the department. Departments may, at their option, also require a more stringent public notice tier, e.g., Tier 1 instead of Tier 2 or Tier 2 instead of Tier 3, for specific violations and situations listed in this Appendix, as authorized under s. NR 809.951(1) and (2).

[2] MCL−−Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique.

[3] The term Violations of National Primary Drinking Water Regulations is used here to include violations of MCL, MRDL, TT, monitoring and testing procedure requirements.

[4] Failure to test for fecal coliform or E. coli is a Tier 1 violation if testing is not done after any repeat sample tests positive for coliform. All other total coliform monitoring and testing procedure violations are Tier 3.

[5] Systems that violate the turbidity MCL of 5 NTU based on an average of measurements over 2 consecutive days shall consult with the department within 24 hours after learning of the violation. Based on this consultation, the department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the department in the 24−hour period, the violation is automatically elevated to Tier 1.

[6] Systems with treatment technique violation involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule or the Interim Enhanced Surface Water Treatment Rule are required to consult with the department within 24 hours after learning of the violation. Based on this consultation, the department may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the department in the 24−hour period, the violation is automatically elevated to Tier 1.

[7] Most of the requirements of the Interim Enhanced Surface Water Treatment Rule (63 FR 69477) become effective January 1, 2002 for systems using surface water or ground water under the direct influence of surface water. However, NR 809.77 has some requirements that become effective as early as April 16, 1999. The Surface Water Treatment Rule remains in effect for systems even after 2002; the Interim Enhanced Surface Water Treatment Rule adds additional requirements and does not in many cases supersede the Surface Water Treatment Rule.

[8] Failure to take a confirmation sample within 24 hours for nitrate or nitrite after an initial sample exceeds the MCL is a Tier 1 violation. Other monitoring violations for nitrate are Tier 3.

[9] Water systems using surface water or ground water under the direct influence of surface water community and non−transient non−community systems serving greater that or equal to 10,000 must comply with the new disinfection byproducts MCLs, disinfectant MRDLs, and related monitoring requirements beginning January 1, 2002. All other community and non−transient non−community systems must meet the MCLs and MRDLs beginning January 1, 2004. Water systems using surface water or ground water under the direct influence of surface water transient non−community systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Water systems using surface water or ground water under the direct influence of surface water transient non−community systems serving fewer than 10,000 persons and using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.

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[10] NR 809.22 will no longer apply after January 1, 2004.

[11] Failure to monitor for chlorine dioxide at the entrance to the distribution system the day after exceeding the MRDL at the entrance to the distribution system is a Tier 2 violation.

[12] If any daily sample taken at the entrance to the distribution system exceeds the MRDL for chlorine dioxide and one or more samples taken in the distribution system the next day exceed the MRDL, Tier 1 notification is required. Failure to take the required samples in the distribution system after the MRDL is exceeded at the entry point also triggers Tier 1 notification.

[13] Some water systems must monitor for certain unregulated contaminants listed in s. NR 809.26.

[14] Other waterborne emergencies require a Tier 1 public notice under §141.202(a) for situations that do not meet the definition of a waterborne disease outbreak given in 40 CFR 141.2 but that still have the potential to have serious adverse effects on health as a result of short−term exposure. These could include outbreaks not related to treatment deficiencies, as well as situations that have the potential to cause outbreaks, such as failure or significant interruption in water treatment processes, natural disasters that disrupt the water supply, chemical spills, or unexpected loading of possible pathogens into the source water.

[15] The department may place other situations in any tier they believe appropriate, based on threat to public safety.

**Appendix B to Subchapter X**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| National Primary Drinking Water Regulations: | | | |
| A. Microbiological Contaminants: | | | |
| 1a. Total coliform | Zero | See footnote[3] | Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially−harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems. |
| 1b. Fecal coliform/E. coli | Zero | Zero | Fecal coliforms and E. coli are bacteria whose presence indicate that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short−term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems. |
| 2a. Turbidity (MCL)[4] | None | 1 NTU[5]/5 NTU | Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease−causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches. |
| 2b. Turbidity (SWTR TT)[6] | None | TT[7] | Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease−causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches. |
| 2c. Turbidity (IESWTR TT)[8] | None | TT | Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease−causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea and associated headaches. |
| B. Surface Water Treatment Rule and Interim Enhanced Surface Water Treatment Rule violations: | | | |
| 3. Giardia lamblia | Zero | TT[9] | Inadequately treated water may contain disease−causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. |
| 4. Viruses | | | |
| 5. Heterotrophic plate count bacteria[10] | | | |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 6. Legionella | | | |
| 7. Cryptosporidium | | | |
| C. Inorganic Chemicals: | | | |
| 8. Antimony | 0.006 | 0.006 | Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar. |
| 9. Arsenic | 0[11] | 0.010[11] | Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer. |
| 10. Asbestos (10 ìm) | 7 MFL[12] | 7 MFL | Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps. |
| 11. Barium | 2 | 2 | Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure. |
| 12. Beryllium | 0.004 | 0.004 | Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions. |
| 13. Cadmium | 0.005 | 0.005 | Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage. |
| 14. Chromium (total) | 0.1 | 0.1 | Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis. |
| 15. Cyanide | 0.2 | 0.2 | Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid. |
| 16. Fluoride | 4.0 | 4.0 | Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than 9 years old. Mottling, also known as dental fluorosis, may include brown staining and/or pitting of the teeth, and occurs only in developing teeth before they erupt from the gums. |
| 17. Mercury (inorganic) | 0.002 | 0.002 | Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage. |
| 18. Nitrate | 10 | 10 | Infants below the age of 6 months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |
| 19. Nitrite | 1 | 1 | Infants below the age of 6 months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |
| 20. Total Nitrate and Nitrite | 10 | 10 | Infants below the age of 6 months who drink water containing nitrate and nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue baby syndrome. |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 21. Selenium | 0.05 | 0.05 | Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation. |
| 22. Thallium | 0.0005 | 0.002 | Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver. |
| D. Lead and Copper Rule: | | | |
| 23. Lead | Zero | TT[13] | Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. |
| 24. Copper | 1.3 | TT[14] | Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor. |
| E. Synthetic Organic Chemicals: | | | |
| 25. 2,4−D | 0.07 | 0.07 | Some people who drink water containing the weed killer 2,4−D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands. |
| 26. 2,4,5−TP (Silvex) | 0.05 | 0.05 | Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems. |
| 27. Alachlor | Zero | 0.002 | Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer. |
| 28. Atrazine | 0.003 | 0.003 | Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties. |
| 29. Benzo(a)pyrene (PAHs) | Zero | 0.0002 | Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer. |
| 30. Carbofuran | 0.04 | 0.04 | Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems. |
| 31. Chlordane | Zero | 0.002 | Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer. |
| 32. Dalapon | 0.2 | 0.2 | Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes. |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 33. Di (2−ethylhexyl) adipate | 0.4 | 0.4 | Some people who drink water containing di (2−ethylhexyl) adipate well in excess of the MCL over many years could experience toxic effects such as weight loss, liver enlargement or possible reproductive difficulties. |
| 34. Di (2−ethylhexyl) phthalate | Zero | 0.006 | Some people who drink water containing di (2−ethylhexyl) phthalate well in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer. |
| 35. Dibromochloropropane | Zero | 0.0002 | Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer. |
| 36. Dinoseb | 0.007 | 0.007 | Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties. |
| 37. Dioxin (2,3,7,8−TCDD) | Zero | $3x10^{-8}$ | Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and many have an increased risk of getting cancer. |
| 38. Diquat | 0.02 | 0.02 | Some people who drink water containing diquat in excess of the MCL over many years could get cataracts. |
| 39. Endothall | 0.1 | 0.1 | Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestine. |
| 40. Endrin | 0.002 | 0.002 | Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems. |
| 41. Ethylene dibromide | Zero | 0.00005 | Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer. |
| 42. Glyphosate | 0.7 | 0.7 | Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties. |
| 43. Heptachlor | Zero | 0.0004 | Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer. |
| 44. Heptachlor epoxide | Zero | 0.0002 | Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer. |
| 45. Hexachlorobenzene | Zero | 0.001 | Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer. |
| 46. Hexachlorocyclo−pentadiene | 0.05 | 0.05 | Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach. |
| 47. Lindane | 0.0002 | 0.0002 | Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver. |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 48. Methoxychlor | 0.04 | 0.04 | Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties. |
| 49. Oxamyl (Vydate) | 0.2 | 0.2 | Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects. |
| 50. Pentachlorophenol | Zero | 0.001 | Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer. |
| 51. Picloram | 0.5 | 0.5 | Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver. |
| 52. Polychlorinated biphenyls | Zero | 0.0005 | Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer. |
| 53. Simazine | 0.004 | 0.004 | Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood. |
| 54. Toxaphene | Zero | 0.003 | Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer. |
| F. Volatile Organic Chemicals: | | | |
| 55. Benzene | Zero | 0.005 | Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer. |
| 56. Carbon tetrachloride | Zero | 0.005 | Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer. |
| 57. Chlorobenzene (monochlorobenzene) | 0.1 | 0.1 | Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys. |
| 58. *o*−Dichlorobenzene | 0.6 | 0.6 | Some people who drink water containing o−dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems. |
| 59. *p*−Dichlorobenzene | 0.075 | 0.075 | Some people who drink water containing p−dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood. |
| 60. 1,2−Dichloroethane | Zero | 0.005 | Some people who drink water containing 1,2−dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer. |
| 61. 1,1−Dichloroethylene | 0.007 | 0.007 | Some people who drink water containing 1,1−dichloroethylene in excess of the MCL over many years could experience problems with their liver. |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 62. *cis*−1,2−Dichloroethylene | 0.07 | 0.07 | Some people who drink water containing cis−1,2−dichloroethylene in excess of the MCL over many years could experience problems with their liver. |
| 63. *trans*−1,2−Dichloroethylene | 0.1 | 0.1 | Some people who drink water containing trans−1,2−dichloroethylene well in excess of the MCL over many years could experience problems with their liver. |
| 64. Dichloromethane | Zero | 0.005 | Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer. |
| 65. 1,2−Dichloropropane | Zero | 0.005 | Some people who drink water containing 1,2−dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer. |
| 66. Ethylbenzene | 0.7 | 0.7 | Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys. |
| 67. Styrene | 0.1 | 0.1 | Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system. |
| 68. Tetrachloroethylene | Zero | 0.005 | Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer. |
| 69. Toluene | 1 | 1 | Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver. |
| 70. 1,2,4−Trichlorobenzene | 0.07 | 0.07 | Some people who drink water containing 1,2,4−trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands. |
| 71. 1,1,1−Trichloroethane | 0.2 | 0.2 | Some people who drink water containing 1,1,1−trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system. |
| 72. 1,1,2−Trichloroethane | 0.003 | 0.005 | Some people who drink water containing 1,1,2−trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems. |
| 73. Trichloroethylene | Zero | 0.005 | Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer. |
| 74. Vinyl chloride | Zero | 0.002 | Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer. |
| 75. Xylenes (total) | 10 | 10 | Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system. |
| G. Radioactive Contaminants: | | | |
| 76. Beta/photon emitters | Zero | 4 mrem/yr[15] | Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer. |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 77. Alpha emitters | Zero | 15 pCi/L[16] | Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk getting cancer. |
| 78. Combined radium (226 & 228) | Zero | 5 pCi/L | Some people who drink water containing radium 226 and 228 in excess of the MCL over many years may have an increased risk of getting cancer. |
| H. Disinfection Byproducts, Byproduct Precursors, and Disinfectant Residuals: Where disinfection is used in the treatment of drinking water, disinfectants combine with organic and inorganic matter present in water to form chemicals called disinfection byproducts. EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes and haloacetic acids:[17] | | | |
| 79. Total trihalomethanes | N/A | 0.10/ 0.80[18, 19] | Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous system, and may have an increased risk of getting cancer. |
| 80. Haloacetic Acids | N/A | 0.060[20] | Some people who drink water containing haloacetic acids in excess of the MCL over many years may have increased risk of getting cancer. |
| 81. Bromate | Zero | 0.010 | Some people who drink water containing bromate in excess of the MCL over many years may have an increased risk of getting cancer. |
| 82. Chlorite | 0.08 | 1.0 | Some infants and young children who drink water containing chlorite in excess of the MCL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorite in excess of the MCL. Some people may experience anemia. |
| 83. Chlorine | 4 (MRDLG)[21] | 4.0 (MRDL)[22] | Some people who use water containing chlorine well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chlorine well in excess of the MRDL could experience stomach discomfort. |
| 84. Chloramines | 4 (MRDLG) | 4.0 (MRDL) | Some people who use water containing chloramines well in excess of the MRDL could experience irritating effects to their eyes and nose. Some people who drink water containing chloramines well in excess of the MRDL could experience stomach discomfort or anemia. |
| 85a. Chlorine dioxide, where any 2 consecutive daily samples taken at the entrance to the distribution system are above the MRDL. | 0.8 (MRDLG) | 0.8 (MRDL) | Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. |

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**Appendix B to Subchapter X − Continued**
**Standard Health Effects Language for Public Notification**

| Contaminant | MCGL[1] mg/L | MCL[2] mg/L | Standard health effects language for public notification |
|---|---|---|---|
| 85b. Chlorine dioxide, where one or more distribution system samples are above the MRDL. | 0.8 (MRDLG) | 0.8 (MRDL) | Some infants and young children who drink water containing chlorine dioxide in excess of the MRDL could experience nervous system effects. Similar effects may occur in fetuses of pregnant women who drink water containing chlorine dioxide in excess of the MRDL. Some people may experience anemia. *Add for public notification only:* The chlorine dioxide violations reported today include exceedances of the EPA standard within the distribution system which delivers water to consumers. Violations of the chlorine dioxide standard within the distribution system may harm human health based on short−term exposures. Certain groups, including fetuses, infants, and young children, may be especially susceptible to nervous system effects from excessive chlorine dioxide exposure. |
| 86. Control of DBP precursors (TOC) | None | TT | Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection byproducts. These byproducts include trihalomethanes and haloacetic acids. Drinking water containing these byproducts in excess of the MCL may lead to adverse health effects, liver or kidney problems, or nervous system effects, and may lead to an increased risk of getting cancer. |
| I. Other Treatment Techniques: | | | |
| 87. Acrylamide | Zero | TT | Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer. |
| 88. Epichlorohydrin | Zero | TT | Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer. |

**Appendix B Footnotes**

[1] MCLG−−Maximum contaminant level goal.

[2] MCL−−Maximum contaminant level.

[3] For water systems analyzing at least 40 samples per month, no more than 5.0 percent of the monthly samples may be positive for total coliforms. For systems analyzing fewer than 40 samples per month, no more than one sample per month may be positive for total coliforms.

[4] There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, the 1989 Surface Water Treatment Rule, and the 1998 Interim Enhanced Surface Water Treatment Rule. The MCL for the monthly turbidity average is 1 NTU; the MCL for the 2−day average is 5 NTU for systems that are required to filter but have not yet installed filtration (40 CFR 141.13).

[5] NTU−−Nephelometric turbidity unit.

[6] There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, the 1989 Surface Water Treatment Rule, and the 1998 Interim Enhanced Surface Water Treatment Rule. Systems subject to the Surface Water Treatment Rule (both filtered and unfiltered) may not exceed 5 NTU. In addition, in filtered systems, 95 percent of samples each month shall not exceed 0.5 NTU in systems using conventional or direct filtration and shall not exceed 1 NTU in systems using slow sand or diatomaceous earth filtration or other filtration technologies approved by the department.

[7] TT−−Treatment technique.

[8] There are various regulations that set turbidity standards for different types of systems, including 40 CFR 141.13, the 1989 Surface Water Treatment Rule, and the 1998 Interim Enhanced Surface Water Treatment Rule. For systems subject to the interim enhanced surface water treatment rule (systems using surface water or ground water under the direct influence of surface water), that use conventional filtration or direct filtration, after January 1, 2002, the turbidity level of a system's combined filter effluent may not exceed 0.3 NTU in at least 95 percent of monthly measurements, and the turbidity level of a system's combined filter effluent shall not exceed 1 NTU at any time. Systems subject to the interim enhanced surface water treatment rule using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration shall meet turbidity limits set by the department.

[9] Surface water treatment rule and interim enhanced surface water treatment rule treatment technique violations that involve turbidity exceedances may use the health effects language for turbidity instead.

[10] The bacteria detected by heterotrophic plate count are not necessarily harmful. HPC is simply an alternative method of determining disinfectant residual levels. The number of bacteria is an indicator of whether there is enough disinfectant in the distribution system.

[11] These arsenic values are effective January 23, 2006. Until then, the MCL is 0.05 mg/L and there is no MCLG.

[12] Million fibers per liter.

[13] Action Level = 0.015 mg/L.

[14] Action Level = 1.3 mg/L.

[15] Millirems per year.

[16] Picocuries per liter.

[17] Surface water systems and ground water systems under the direct influence of surface water are regulated under Subpart H of 40 CFR 141. Community and non−transient non−community systems using ground water under the direct influence of surface water serving 10,000 or more shall comply with DBP MCLs and disinfectant maximum residual disinfectant levels beginning January 1, 2002. All other community and non−transient non−community systems shall meet the MCLs and MRDLs beginning January 1, 2004. Transient non−community systems using ground water under the direct influence of surface water serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant shall

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comply with the chlorine dioxide MRDL beginning January 1, 2002. Transient non−community systems using ground water under the direct influence of surface water serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant shall comply with the chlorine dioxide MRDL beginning January 1, 2004.

[18] The MCL of 0.10 mg/l for total trihalomethanes is in effect until January 1, 2002 for community water systems using ground water under the direct influence of surface water serving 10,000 or more. This MCL is in effect until January 1, 2004 for community water systems with a population of 10,000 or more using only ground water not under the direct influence of surface water. After these deadlines, the MCL will be 0.080 mg/l. On January 1, 2004, all systems serving less than 10,000 will have to comply with the new MCL as well.

[19] The MCL for total trihalomethanes is the sum of the concentrations of the individual trihalomethanes.

[20] The MCL for haloacetic acids is the sum of the concentrations of the individual haloacetic acids.

[21] MRDLG−−Maximum residual disinfectant level goal.

[22] MRDL−−Maximum residual disinfectant level.

## Appendix C to Subchapter X
## List of Acronyms Used in Public Notification Regulation

| | |
|---|---|
| CCR | Consumer Confidence Report |
| CWS | Community Water System |
| DBP | Disinfection Byproduct |
| EPA | Environmental Protection Agency |
| HPC | Heterotrophic Plate Count |
| IESWTR | Interim Enhanced Surface Water Treatment Rule |
| IOC | Inorganic Chemical |
| LCR | Lead and Copper Rule |
| MCL | Maximum Contaminant Level |
| MCLG | Maximum Contaminant Level Goal |
| MRDL | Maximum Residual Disinfectant Level |
| MRDLG | Maximum Residual Disinfectant Level Goal |
| NCWS | Non−Community Water System |
| NPDWR | National Primary Drinking Water Regulation |
| NTNCWS | Non−Transient Non−Community Water System |
| NTU | Nephelometric Turbidity Unit |
| OGWDW | Office of Ground Water and Drinking Water |
| OW | Office of Water |
| PN | Public Notification |
| PWS | Public Water System |
| SDWA | Safe Drinking Water Act |
| SMCL | Secondary Maximum Contaminant Level |
| SOC | Synthetic Organic Chemical |
| SWTR | Surface Water Treatment Rule |
| TCR | Total Coliform Rule |
| TT | Treatment Technique |
| TWS | Transient Non−Community Water System |
| VOC | Volatile Organic Chemical |