Chapter NR 109

SAFE DRINKING WATER

NR 109.01 Purpose. The purpose of this chapter is to establish minimum standards and procedures for the protection of the public health, safety and welfare in the obtaining of safe drinking water. This chapter is adopted under the authority granted in chs. 144 and 162, Stats.

Note: See chs. NR 108, 111, 112 and 114 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.

NR 109.02 Severability. Should any section, paragraph, phrase, sentence, clause or word of this chapter be declared invalid or unconstitutional for any reason, the reminder of this chapter shall not be affected thereby.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.03 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.

NR 109.04 Definitions. (1) "Community water system" 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.

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

(3) "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 (ICRU).

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

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

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

(7) "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.

(8) "Maximum contaminant level" means the maximum permissible level of a contaminant in water which is delivered to the consumer service outlet of the ultimate user of a public water system, except in the case of turbidity where the maximum permissible level is measured at the point of entry to the distribution system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition.

(9) "Non-community water system" means a public water system that is not a community water system. A non-community water system

typically serves a transient population rather than permanent year-round residents.

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

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

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

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

(14) "Public water system" means a system for the provision to the public of piped water for human consumption, if such 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". Such system includes:

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

(b) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system.

(15) "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.

(16) "Sanitary survey" means an onsite 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.

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

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

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.

NR 109.05 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 and 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.

PART I — MAXIMUM CONTAMINANT LEVELS, MONITORING AND ANALYTICAL REQUIREMENTS

NR 109.11 Maximum contaminant levels for inorganic chemicals. (1) The maximum contaminant level for nitrate is applicable to both community water systems and non-community water systems, except as provided in sub. (3). The levels for the other inorganic chemicals apply only to community water systems. Compliance with maximum contaminant levels for inorganic chemicals is calculated under s. NR 109.12.

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

Contaminant	Level, milligrams per liter (micrograms per liter in parentheses)
Arsenic	0.05 (50 ug/1)
Barium	1. (1000 ug/1)
Cadmium	0.010 (10 ug/1)
Chromium	0.05 (50 ug/1)
Fluoride	2.2
Lead	0.05 (50 ug/1)
Mercury	0.002 (2 ug/1)
Nitrate (as N)	10.
Selenium	0.01 (10 ug/1)
Silver	0.05 (50 ug/1)

(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) There will be 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.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.12 Inorganic chemical sampling and analytical requirements. (1) Samples collected for the purpose of determining compliance with s. NR 109.11 shall be collected at a point on the distribution system representative of water quality at the customer tap.

(2) Analyses for the purpose of determining compliance with s. NR 109.11 are required as follows:

(a) Analyses for all community water systems utilizing surface water sources shall be completed before system operation begins. These analyses shall be repeated at intervals determined by the department, but not less than once per year.

(b) Analyses for all community water systems utilizing only groundwater sources shall be completed within 90 days after system operation begins. These analyses shall be repeated at intervals determined by the department, but not less than 3-year intervals.

(c) For non-community water systems, analysis for nitrate concentration shall be completed within 90 days after system operation begins. These analyses shall be repeated at intervals determined by the department.

(3) If the result of an analysis made under sub. (1) indicates that the level of any contaminant listed in s. NR 109.11 exceeds the maximum contaminant level, the supplier of water shall report to the department within 7 days and initiate 3 additional analyses at the same sampling point within one month.

(4) When the average of 4 analyses made under sub. (3), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall notify the department under s. NR 109.80 and give notice to the public under s. NR 109.81. Monitoring after the maximum contaminant level is exceeded shall be at a frequency designated by the department and shall continue until the maximum contaminant level has not been exceeded in 2 successive samples (special monitoring thereafter shall be at a frequency designated by the department) or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(5) The provisions of subs. (3) and (4) notwithstanding, compliance with the maximum contaminant level for nitrate as nitrogen shall be determined on the basis of the mean of 2 analyses. When a level exceeding the maximum contaminant level for nitrate as nitrogen is found, a second analysis shall be initiated within 24 hours, and if the average of the 2 analyses exceeds the maximum contaminant level the supplier of water shall report findings to the department under s. NR 109.80 and shall notify the public under s. NR 109.81.

(6) Analyses conducted to determine compliance with s. NR 109.11 shall be made in accordance with methods approved by the U.S. environmental protection agency. The department shall maintain a current list of approved methods.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. Register, April, 1982, No. 316, eff. 5-1-82.

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

NR 109.13 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 a representative point on 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 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 by the flame photometric method in accordance with the procedures described in "Standard Methods for the Examination of Water and Wastewater," 14th Edition, pp. 250-253; or by Method 273.1, Atomic Absorption-Direct Aspiration or Method 273.2, Atomic Absorption-Graphite Furnace in "Methods for Chemical Analysis of Water and Waste," EMSL, Cincinnati, EPA, 1979; or by Method D1428-64 (a) in Annual Book of ASTM Standards, part 31, Water. Copies of these publications are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the U.S. Environmental Protection Agency, Washington, DC 20460.

History: Cr. Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.14 Special monitoring for corrosivity 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 approved by the U.S. environmental protection agency. The department shall maintain a current list of approved methods.

(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.

NR 109.20 Maximum contaminant levels for organic chemicals. The following are the maximum contaminant levels for organic chemicals. They apply only to community water systems. Compliance with maximum contaminant levels for organic chemicals is calculated pursuant to NR 109.21.

	Level, milligrams per liter
(1) Chlorinated hydrocarbons:	
Endrin (1,2,3,4,10, 10-hexachloro- 6,7-expoxy- 1,4, 4a,5,6,7,8,8a-octahydro-1,4-endo, endo-5,8 - dimethano naphthalene).	0.0002
Lindane (1,2,3,4,5,6-hexachloro-cyclohexane, gamma isomer).	0.004
Methoxychlor (1,1,1-Trichloro- 2, 2 - bis (p-methoxyphenyl) ethane).	0.1
Toxaphene ($C_{10}H_{10}Cl_8$-Technical chlorinated camphene, 67-69 percent chlorine).	0.005
(2) Chlorophenoxys:	
2,4 - D (2,4-Dichlorophenoxyacetic acid).	0.1
2,4,5 - TP Silvex (2,4,5-Trichlorophenoxypropionic acid).	0.01
(3) Total trihalomethanes [the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform), and trichloromethane (chlorform)].	0.10

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; cr. (3), Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.21 Organic chemicals other than total trihalomethanes—sampling and analytical requirements. (1) An analysis of substances for the purpose of determining compliance with s. NR 109.20 (1) and (2) shall be made as follows:

(a) For all community water systems utilizing surface water sources, analyses shall be completed before system operation begins. Subsequent analyses shall be repeated at intervals specified by the department, but not less than at 3-year intervals. Samples analyzed shall be collected

during the period of the year designated by the department as the period when contamination by pesticides is most likely to occur.

(b) For community water systems utilizing only ground water sources, analyses shall be completed for those systems specified by the department.

(2) If the result of an analysis made under sub. (1) indicates that the level of any contaminant listed in s. NR 109.20 exceeds the maximum contaminant level, the supplier of water shall report to the department within 7 days and initiate 3 additional analyses within one month.

(3) When the average of 4 analyses made under sub. (2), rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall report to the department under s. NR 109.80 and give notice to the public under sub. to NR 109.81. Monitoring after the maximum contaminant level is exceeded shall be at a frequency designated by the department and shall continue until the maximum contaminant level has not been exceeded in 2 successive samples (special monitoring thereafter shall be at a frequency designated by the department) or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(4) Analysis made to determine compliance with s. NR 109.20 (1) shall be conducted in accordance with "Methods for Organochlorine Pesticides and Chlorophenoxy Acid Herbicides in Drinking Water and Raw Source Water," available from ORD Publications, CERI, EPA, Cincinnati, Ohio 45268; or Organochlorine Pesticides in Water," 1977 Annual Book of ASTM Standards, part 31, Water, Method D3088; or Method 509-A, pp. 555-565; or Gas Chromatographic Methods for Analysis of Organic Substances in Water, USGS, Book 5, Chapter A-5, pp. 24-39.

(5) Analysis made to determine compliance with s. NR 109.20 (2) shall be conducted in accordance with "Methods for Organochlorine Pesticides and Chlorophenoxy Acid Herbicides in Drinking Water and Raw Source Material," available from ORD Publications, CERI, EPA, Cincinnati, Ohio 46268; or "Chlorinated Phenoxy Acid Herbicides in Water," 1977 Annual Book of ASTM Standards, part 31, Method D3478; or Method 509-B, pp. 555-5692; or Gas Chromatographic Methods for Analysis of Organic Substances in Water, USGS, Book 5, Chapter A-5, pp. 24-39. Copies of these publications are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the U.S. Environmental Protection Agency, Washington, DC 20460.

(6) Other analytical methods, if any, approved by the U.S. environmental protection agency are acceptable. The department shall maintain a list of approved methods.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am., Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.22 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 systems serving 75,000 or more individuals, sampling and analyses shall begin not later than March 31, 1981. For systems serving 10,000 to 74,999 individuals, sampling and analyses shall begin not later than March 31, 1983. 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/1 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 ony 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/1 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/1 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 109.20 (3) 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 109.80 and notify the public under s. NR 109.81. Monitoring after the maximum contaminant level is exceeded shall be at a frequency designated by the department and shall continue until a monitoring schedule as a condition to a variance, exemption or enforcement action becomes effective.

(5) (a) Sampling and analyses made under this section shall be conducted by one of the following EPA approved methods:

1. "The Analysis of Trihalomethanes in Drinking Waters by the Purge and Trap Method," Method 501.1, EMSL, EPA, Cincinnati, Ohio.

2. "The Analysis of Trihalomethanes in Drinking Water by Liquid/Liquid Extraction," Method 501.2, EMSL, EPA, Cincinnati, Ohio.

Copies of these publications are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the U.S. Environmental Protection Agency, Washington, DC 20460.

(b) Samples for TTHM analysis shall be dechlorinated upon collection to prevent further production of trihalomethanes, according to the procedures described in par. (a) 1. and 2. Samples for maximum TTHM potential should not be declorinated, and should be held for 7 days at 25°C (or above) prior to analysis according to the procedures described in par. (a) 1. and 2.

(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 109.20 (3), 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) Provide baseline water quality survey data of the distribution system. 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.

NR 109.30 Maximum microbiological contaminant levels. The following are the maximum contaminant levels for coliform bacteria applicable to community water systems and non-community water systems. Compliance with maximum contaminant levels for coliform bacteria is determined pursuant to NR 109.31 (4) (b) for purposes of public

notification requirements pursuant to NR 109.81. The public notification provisions of NR 109.81 shall not apply to sub. (3) or (4).

(1) When the membrane filter technique pursuant to NR 109.31 (1) is used, the number of coliform bacteria shall be less than one per 100 milliliters in any sample collected and analyzed pursuant to NR 109.31 (2) or (3).

(2) When the fermentation tube method and 10 milliliter standard portions under s. NR 109.31 (1) are used, coliform bacteria may not be present in any portion of any sample collected and analyzed under s. NR 109.31 (2) or (3).

(3) 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 might exist in the system when monitoring pursuant to s. NR 109.31 (2), (3) or (4) shows the presence of any coliform organisms in any of the following:

(a) More than 10% of the samples in any quarter when more than 20 samples are required per quarter; or

(b) Two or more samples in any quarter when 6 to 20 samples are required per quarter; or

(c) Two or more in any year when less than 24 samples are required per year.

(4) Bacterial plate counts on water distributed to the consumer may not exceed 500 organisms per milliliter. When this value is exceeded the department shall determine if the bacterial count is of public health or nuisance significance and may require appropriate action.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (2) and (4), Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.31 Microbiological contaminant sampling and analytical requirements. (1) Suppliers of water for community water systems and non-community water systems shall analyze for coliform bacteria for the purpose of determining compliance with NR 109.30. Analyses shall be conducted in accordance with the analytical recommendations set forth in "Standard Methods for the Examination of Water and Wastewater," American Public Health Association, 14th Edition, pp. 913-937, except that a standard sample size shall be employed. Copies of this publication are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the American Public Health Association, 1015 Eighteenth St., N.W., Washington, D.C. The standard sample used in the membrane filter procedure shall be 100 milliliters. The standard sample used in the 5 tube most probable number (MPN) procedure (fermentation tube method) shall be 5 times the standard portion. The standard portion is 10 milliliters as described in NR 109.30 (2). The samples shall be taken at points which are representative of the conditions within the distribution system.

(2) (a) The supplier of water for a community water system 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. In no event shall the sampling frequency be less than 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 9,400	10
9,401 to 10,300	11
10,301 to 11,100	12
11,101 to 12,000	13
12,001 to 12,900	14
12,901 to 13,700	15
13,701 to 14,600	16
14,601 to 15,500	17
15,501 to 16,300	18
16,301 to 17,200	19
17,201 to 18,100	20
18,101 to 18,900	21
18,901 to 19,800	22
19,801 to 20,700	23
20,701 to 21,500	24
21,501 to 22,300	25
22,301 to 23,200	26
23,201 to 24,000	27
24,001 to 24,900	28
24,901 to 25,000	29
25,001 to 28,000	30
28,001 to 33,000	35
33,001 to 37,000	40
37,001 to 41,000	45
41,001 to 46,000	50
46,001 to 50,000	55
50,001 to 54,000	60
54,001 to 59,000	65
59,001 to 64,000	70
64,001 to 70,000	75
70,001 to 76,000	80
76,001 to 83,000	85
83,001 to 90,000	90
90,001 to 96,000	95
96,001 to 111,000	100
111,001 to 130,000	110
130,001 to 160,000	120
160,001 to 190,000	130

190,001 to 220,000	140
220,001 to 250,000	150
250,001 to 290,000	160
290,001 to 320,000	170
320,001 to 360,000	180
360,001 to 410,000	190
410,001 to 450,000	200
450,001 to 500,000	210
500,001 to 550,000	220
550,001 to 600,000	230
600,001 to 660,000	240
660,001 to 720,000	250
720,001 to 780,000	260
780,001 to 840,000	270
840,001 to 910,000	280
910,001 to 970,000	290
970,001 to 1,050,000	300
1,050,001 to 1,140,000	310
1,140,001 to 1,230,000	320
1,230,001 to 1,320,000	330
1,320,001 to 1,420,000	340
1,420,001 to 1,520,000	350
1,520,001 to 1,630,000	360
1,630,001 to 1,730,000	370
1,730,001 to 1,850,000	380
1,850,001 to 1,970,000	390
1,970,001 to 2,060,000	400

(b) 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 quarter.

(3) The supplier of water for a non-community school 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, determines that some other frequency is more appropriate.

(4) Based on a history of bacteriologically unsafe samples, structural deficiencies, or affected population, the department may require the supplier of water for a non-community water system to monitor for coliform bacteria at specified intervals.

(5) (a) When a sample collected under sub. (2) or (3) exceeds a maximum contaminant level set forth in s. NR 109.30 (1) or (2), the supplier of water shall collect a repeat sample which shall be considered the check sample from the same sampling point within 48 hours.

(b) When the examination of the check sample required in par. (a) shows the presence of coliform organisms, the supplier of water shall:

1. Report to the department within 48 hours; and

2. Initiate an investigation, including the collection within 48 hours and examination of additional samples from the same point and other sampling points in the area, to define the extent of the problem; and

3. Notify the public in the area affected by the indicated contamination as prescribed in s. NR 109.81 unless the department determines that no health hazard has actually existed.

(c) The department, at its discretion, may require that additional check samples be collected at a specified frequency from the same sampling point and other sampling points in the area and examined to identify and eliminate suspected health hazards when a sample exceeds a maximum contaminant level under s. NR 109.30(1) or (2), even if the check sample required in par. (a) does not indicate the presence of coliform bacteria.

(d) When the cause of the indicated contamination has been determined and corrected, additional samples shall be collected at a frequency directed by the department.

(e) The location at which the sample was taken under par. (a) may not be eliminated from future sampling without approval of the department.

(6) The department may determine that unreliable examination results for a sample collected in a monitoring period under sub. (2) were caused by factors beyond the control of the water supplier. Such factors could be excessive transit time between collection and examination of the sample, samples being broken in transit, or interference in test results when the membrane filter technique is used. If this is the case, another sample collected immediately upon learning of these results may be used in determining compliance with sampling requirements in sub. (2) or (3). However, a single sample may not be attributed to more than one monitoring period.

(7) Samples, samples with unreliable examination results, and special purpose samples, such as those taken to determine whether disinfection practices following water main placement, replacement, or repair have been sufficient, may not be used to determine compliance with sub. (2) or (3).

(8) In addition to sampling from the distribution system, each supplier of water for a system providing chlorination 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 must 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 bacteriological 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 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 plate counts pursuant to an established schedule. Analyses shall be conducted in accordance with the analytical recommendations set forth in "Standard Methods for the Examination of Water and Wastewater", American Public Health Association, 14th Edition, pp. 908-913. Copies of this publication are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from the American Public Health Association, 1015 Eighteenth St., N.W., Washington, D.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.

NR 109.40 Maximum contaminant levels for turbidity. The maximum contaminant levels for turbidity are applicable to both community water systems and non-community water systems using surface water sources in whole or in part. The maximum contaminant levels for turbidity in drinking water, measured at a representative entry point(s) to the distribution system, are:

Note: Water systems governed by chapter NR 112 may not utilize surface water sources.

(1) One nephelometric turbidity unit (NTU), as determined by a monthly average under s. NR 109.41, except that 5 or fewer turbidity units may be allowed if the supplier of water can demonstrate to the department that the higher turbidity does not do any of the following:

(a) Interfere with disinfection;

(b) Prevent maintenance of an effective disinfectant agent throughout the distribution system; or

(c) Interfere with microbiological determinations.

(2) Five nephelometric turbidity units (NTU) based on an average for 2 consecutive days pursuant to NR 109.41.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (1) (intro.), Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.41 Turbidity sampling and analytical requirements. (1) The requirements of this section shall apply only to public water systems which use water in whole or in part from surface water sources.

(2) Samples shall be taken by suppliers of water for both community water systems and non-community water systems at a representative entry points to the water distribution system at least once per day, for the purpose of making turbidity measurements to determine compliance with s. NR 109.40. The measurement shall be made by the Nephelometric Method in accordance with the recommendations set forth in "Standard Methods for the Examination of Water and Wastewater", American Public Health Association, 14th Edition, pp. 132-134; or Method 180.1.1 - Nephelometric Method. Copies of these publications are available for inspection at the office of the department of natural resources, the secretary of state's office and the office of the revisor of statutes, and may be obtained for personal use from, respectively, the American Public Health Association, 1015 Eighteenth St., N.W., Wash-

ington, D.C. and the U.S. Environmental Protection Agency, Washington, D.C. 20460.

(3) If the result of a turbidity analysis exceeds the maximum contaminant level, the sampling and measurement shall be confirmed by resampling as soon as practicable and preferably within one hour. If the repeat sample confirms that the maximum contaminant level has been exceeded, the supplier of water shall report to the department within 48 hours. The repeat sample shall be the sample used for the purpose of calculating the monthly average. If the monthly average of the daily samples exceeds the maximum contaminant level, or if the average of 2 samples taken on consecutive days exceeds 5 NTU, the supplier of water shall report to the department and notify the public as directed in ss. NR 109.80 and 109.81.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (2) and (3), r. (4), Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.50 Maximum contaminant levels for radium-226, radium-228, and gross alpha particle radioactivity in community water systems. The following are the maximum contaminant levels for radium-226, radium-228, and gross alpha particle radioactivity:

(1) Combined radium-226 and radium-228 — 5 pCi/1.

(2) Gross alpha particle activity (including radium-226 but excluding radon and uranium) — 15 pCi/1.

Note: Sections NR 109.50 through NR 109.52 are identical to the radioactivity standards of the Department of Health and Social Services in chapter H 57, Wis. Adm. Code, and to the National Interim Primary Drinking Water Regulations, 40 Code of Federal Regulations 141. These sections are adopted pursuant to s. 140.56 (2), Stats.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.51 Maximum contaminant levels for beta particle and photon radioactivity from man-made radionuclides in community water systems. (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 revisor of statutes, 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 shall 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 109.50 through 109.52 are identical to the radioactivity standards of the department of health and social services in ch. H 57, Wis. Adm. Code, and to the National Interim Primary Drinking Water Regulations, 40 Code of Federal Regulations 141. These sections are adopted pursuant to s. 140.56(2), Stats.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.52 Analytical methods for radioactivity. (1) Analyses conducted to determine compliance with NR 109.50 and 109.51 shall be made in accordance with approved methods outlined in 40 Code of Federal Regulations (CFR) 141.25 or other methods approved by the U.S. environmental protection agency. 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 revisor of statutes, and may be obtained for personal use from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(2) The department shall maintain a current list of approved analytical methods.

Note: Sections NR 109.50 through 109.52 are identical to the radioactivity standards of the department of health and social services in ch. H 57, Wis. Adm. Code, and to the National Interim Primary Drinking Water Regulations, 40 Code of Federal Regulations 141. These sections are adopted pursuant to s. 140.56(2), Stats.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.53 Monitoring frequency for radioactivity in community water systems. (1) MONITORING REQUIREMENTS FOR GROSS ALPHA PARTICLE ACTIVITY, RADIUM-226 AND RADIUM-228. (a) Initial sampling to determine compliance with s. NR 109.50 shall begin within 90 days after system operation begins. Compliance shall be based on the analysis of an annual composite of 4 consecutive quarterly samples or the average of the analyses of 4 samples obtained at quarterly intervals.

1. A gross alpha particle activity measurement may be substituted for the required radium-226 and radium-228 analysis, provided that the measured gross alpha particle activity does not exceed 5 pCi/1 at a confidence level of 95% (1.65σ where σ is the standard deviation of the net counting rate of the sample). In localities where radium-228 may be present in drinking water, the department may require radium-226 and/or radium-228 analyses when the gross alpha particle activity exceeds 2 pCi/1.

2. When the gross alpha particle activity exceeds 5 pCi/1, the same or an equivalent sample shall be analyzed for radium-226. If the concentration of radium-226 exceeds 3 pCi/1 the same or an equivalent sample shall be analyzed for radium-228.

(b). Suppliers of water shall monitor at least once every 4 years following the procedure required by sub. (1) (a). At the discretion of the department, when an annual record taken in conformance with sub. (1) (a) has established that the average annual concentration is less than half the maximum contaminant levels established by NR 109.50, analysis of a single sample may be substituted for the quarterly sampling procedure required by sub. (1) (a).

1. More frequent monitoring shall be conducted when ordered by the department in the vicinity of mining or other operation which may contribute alpha particle radioactivity to either surface or ground water sources of drinking water.

2. A supplier of water shall monitor in conformance with sub. (1) (a) within one year of the introduction of new water source for a community water system. More frequent monitoring shall be conducted when ordered by the department in the event of possible contamination or when changes in the distribution system or treatment processing occur which may increase the concentration of radioactivity in finished water.

3. A community water system using 2 or more sources having different concentrations of radioactivity shall monitor source water, in addition to water from the consumer service outlet, when required by the department.

4. Monitoring for compliance with NR 109.50 after the initial period need not include radium-228 except when required by the department, provided, that the average annual concentration of radium-228 has been assayed at least once using the quarterly sampling procedure required by sub. (1) (a).

5. Suppliers of water shall conduct annual monitoring of any community water system in which the radium-226 concentration exceeds 3 pCi/1, when required by the department.

(c) If the average annual maximum contaminant level for gross alpha particle activity or total radium as set forth in NR 109.50 is exceeded, the supplier of a community water system shall give notice to the department pursuant to NR 109.80 and notify the public as required by NR 109.81. Monitoring at quarterly intervals shall be continued until the annual average concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(2) MONITORING REQUIREMENTS FOR MAN-MADE RADIOACTIVITY IN COMMUNITY WATER SYSTEMS. (a) Systems using surface water sources and serving more than 100,000 persons and such other community water systems as are designated by the department shall be monitored for initial compliance with s. NR 109.51 by analysis of a composite of 4 consecutive quarterly samples or analysis of 4 quarterly samples. Compliance with s. NR 109.51 may be assumed without further analysis if the average annual concentration of gross beta particle activity is less than 50 pCi/1 and if the average annual concentrations of tritium and strontium-90 are less than those listed in Table A, provided that, if both radionuclides are present, the sum of their annual dose equivalents to bone marrow may not exceed 4 millirem/year.

1. If the gross beta particle activity exceeds 50 pCi/1, an analysis of the sample must be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with NR 109.51.

2. Suppliers of water shall conduct additional monitoring, as required by the department to determine the concentration of man-made radioactivity in principal watersheds designated by the department.

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

(b) After the initial analysis required by par. (a) suppliers of water shall monitor at least every 4 years following the procedure given in par. (a).

(c) The supplier of any community water system designated by the department as utilizing waters subject to contamination by effluents from nuclear facilities shall initiate quarterly monitoring for gross beta particle and iodine-131 radioactivity and annual monitoring for strontium-90 and tritium.

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. The former is recommended. If the gross beta particle activity in a sample exceeds 15 pCi/1, the same or an equivalent sample shall be analyzed for strontium-89 and cesium-134. If the gross beta particle activity exceeds 50 pCi/1, an analysis of the sample must be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance with NR 109.51.

2. For iodine-131, a composite of 5 consecutive daily samples shall be analyzed once each quarter. As required 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.

4. The department may allow the substitution of environmental surveillance data taken in conjunction with a nuclear facility for direct monitoring of man-made radioactivity by the supplier of water where the department determines such data is applicable to a particular community water system.

(d) If the average annual maximum contaminant level for man-made radioactivity set forth in s. NR 109.16 is exceeded, the operator of a community water system shall give notice to the department under s. NR 109.80 and to the public as required by s. NR 109.81. Monitoring at monthly intervals shall be continued until the concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

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.

PART II — SECONDARY CHEMICAL AND PHYSICAL STANDARDS AND MONITORING REQUIREMENTS

NR 109.60 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 (micrograms per liter in parenthesis) - except as noted
Chloride	250
Color	15 units
Copper	1.0 (1,000 ug/1)
Corrosivity	Noncorrosive
Foaming agents	
MBAS (Methylene-Blue Active Substances)	0.5
Hydrogen Sulfide	not detectable
Iron	0.3
Manganese	0.05 (50 ug/1)
Odor	3 (Threshold No.)
Sulfate	250
Total Residue	500
Zinc	5 (5,000 ug/1)

(3) The secondary standards contained in this section apply to all public water systems. Compliance with these standards shall be calculated in accordance with NR 109.61.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (2), Register, April, 1982, No. 316, eff. 3-1-82.

NR 109.61 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 NR 109.60.

(2) If it is determined by the department that physical or chemical substances or both in excess of those standards contained in s. NR 109.60 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.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (2), Register, April, 1982, No. 316, eff. 4-1-82.

PART III — MISCELLANEOUS CHEMICAL MONITORING REQUIREMENTS, RAW SURFACE WATER STANDARDS AND APPROVED LABORATORIES.

NR 109.70 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 and social 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 111.54 (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 (a) above 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.

Note: Chlorine residual testing is recommended when bacteriological samples are taken; results should be included on the sample slip.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (1) (b) 1., Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.71 Raw surface water standards. The intate 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.

NR 109.72 Laboratories. (1) For the purpose of compliance with this chapter, samples shall be analyzed at the state laboratory of hy-

giene, at a laboratory facility acceptable to the U.S. environmental protection agency, or, for bacteriological analysis, at a laboratory facility approved by the department of health and social services.

(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 health and social services.

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.

NR 109.73 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.

NR 109.74 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.

(2) Testing for other chemical constituents shall be performed at water systems as necessary for control of treatment processes.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

PART IV — REPORTING, PUBLIC NOTIFICATION AND RECORDKEEPING

NR 109.80 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) The supplier of water shall report to the department within 48 hours the failure to comply with any maximum contaminant level or monitoring requirement set forth in this chapter.

(3) The supplier of water is not required to report analytical results to the department in cases where the state laboratory of hygiene performs the analysis and reports the results to the department or where a labora-

tory facility approved by the department of health and social services performs a bacteriological analyses and reports the results to the department within the time required by NR 109.31 .

(4) The supplier of water, within 10 days of completion of each public notification required under s. NR 109.81, shall submit to the department 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.

(5) 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 109.82 or copies of any documents then in existence which the department is entitled to inspect under the authority of s. 144.09, Stats.

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.

NR 109.81 Public notification. (1) (a) The supplier of water of a community water system shall notify persons served by the system if the water supply system:

1. Fails to comply with an applicable maximum contaminant level established in ss. NR 109.11, 109.20, 109.30(1) or (2), 109.40, 109.50, or 109.51; or

2. Is granted a variance or an exemption from an applicable maximum contaminant level; or

3. Fails to comply with the requirements of any schedule prescribed pursuant to a variance or exemption.

(b) In all cases notice under this subsection shall be by inclusion of a notice in the first set of water bills of the system issued after the failure or grant and in any event by written notice within 3 months. In the case of a failure to comply with a maximum contaminant level such notice shall be repeated at least once every 3 months so long as the system's failure continues or the variance or exemption remains in effect. If the system issues water bills less frequently than quarterly, or does not issue water bills, the notice shall be made by or supplemented by another form of direct mail.

(2) If a non-community water system fails to comply with an applicable maximum contaminant level established in Part I of this chapter, is granted a variance or an exemption from an applicable maximum contaminant level, or fails to comply with the requirement of any schedule prescribed pursuant to a variance or exemption the supplier of water shall give notice of such failure or grant to the persons served by the system. Such notice shall be by conspicuous posting in a location where it can be seen by consumers and shall insure that the public using the system is adequately informed of the failure or grant.

(3) Notices given pursuant to this section shall be written in a manner reasonably designed to fully inform the users of the system. The notice shall be conspicuous and shall not use unduly technical language, unduly small print or other methods which would frustrate the purpose of the notice. The notice shall disclose all material facts regarding the subject including the nature of the problem and, when appropriate a clear

statement that a primary drinking water regulation has been violated and any preventive measures that should be taken by the public. Where appropriate, or where designated by the department, bilingual notice shall be given. Notices may include a balanced explanation of the significance or seriousness to the public health, a fair explanation of steps taken by the system to correct any problem and the results of any additional sampling.

(4) In the case of a failure to comply with a maximum contaminant level which is not corrected promptly after discovery, the supplier of water for a community water system shall provide public notification in addition to that required under sub. (1).

(a) Such notification shall be given as immediately after discovery of the failure to comply as practicable unless the department determines that the failure to comply with a maximum contaminant level does not create an imminent hazard to public health. In such case, the additional notification required under this subsection may be given at any time within the time period prescribed for the notice under sub. (1) (b).

(b) The notification shall be by appropriate means as may be required by the department and may include newspaper advertisement, news release to radio and television stations, and door-to-door contact.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (4) (a), Register, April, 1982, No. 316, eff. 5-1-82.

NR 109.82 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.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (intro.), Register, April, 1982, No. 316, eff. 5-1-82.

PART V — VARIANCES AND EXEMPTIONS

(Note: A supplier of water may apply for a "variance" when a maximum contaminant level cannot be met despite application of the best technology available at a reasonable cost. A supplier of water may apply for an "exemption" when a maximum contaminant level temporarily cannot be met until new facilities are constructed.)

NR 109.90 Requirements for a variance. (1) The department may grant one or more variances to any public water system from any requirement respecting a maximum contaminant level established in this chapter upon a finding that:

(a) Because of characteristics of the raw water sources which are reasonably available to the system the system cannot meet the requirements respecting a maximum contaminant level despite application of the best technology, treatment techniques, or other means, which the department finds are generally available (taking costs into consideration); and

(b) The granting of a variance will not result in an unreasonable risk to the health of persons served by the system.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.91 Variance request. A supplier of water may petition for the granting of a variance pursuant to this chapter. Suppliers of water may submit a joint request for variances when they seek similar variances under similar circumstances. Any petition for a variance shall include the following information:

(1) The nature and duration of variance requested.

(2) Relevant analytical results of water quality samples collected from the system, including results of relevant tests conducted pursuant to the requirements of the chapter.

(3) For any request made under NR 109.90(1):

(a) Explanation in full and evidence of the best available treatment technology and techniques.

(b) Economic and legal factors relevant to ability to comply.

(c) Analytical results of raw water quality relevant to the variance request.

(d) A proposed compliance schedule, including the date each step toward compliance will be achieved. Such schedule shall include as a minimum the following dates:

1. Date by which arrangement for alternative raw water source or improvement of existing raw water source will be completed.

2. Date of initiation of the connection of the alternative raw water source or improvement of existing raw water source.

3. Date by which final compliance is to be achieved.

(e) A plan for the provision of safe drinking water in the case of an excessive rise in the contaminant level for which the variance is requested.

(f) A plan for interim control measures during the effective period of variance.

(4) A statement that the system will perform monitoring and other reasonable requirements prescribed by the department as a condition to the variance.

(5) Other information, if any, believed to be pertinent by the applicant or required by the department.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.92 Consideration of a variance request. (1) The department shall provide a class 1 public notice under ch. 985, Stats, within 90 days of the receipt of a variance petition and an opportunity for hearing on any variance petition submitted pursuant to NR 109.91. Hearings under this section shall be class 1 hearings and shall be held in accordance with ch. 227, Stats.

(2) In consideration of whether the public water system is unable to comply with a contaminant level required by this chapter because of the nature of the raw water source, the department shall consider such factors as the following:

(a) The availability and effectiveness of treatment methods for the contaminant for which the variance is requested.

(b) Cost and other economic considerations such as implementing treatment, improving the quality of the source water or using an alternate source.

(3) If the department is not in opposition to a variance petition, the variance shall become effective 30 days after notice and opportunity for hearing is given pursuant to sub. (1) if no timely request for hearing is submitted.

(4) If the department is in opposition to a variance petition, the variance shall be deemed denied 30 days after notice and opportunity for hearing is given pursuant to sub. (1) if no timely request for hearing is submitted.

(5) If the department decides to deny the petition for a variance it shall notify the applicant in writing of the reasons for such denial.

(6) Any final determination of the department shall be subject to review as provided in ch. 227, Stats.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.93 Compliance schedules. (1) For any variance granted pursuant to NR 109.92, the department shall establish, either at the

time of granting a variance or within one year after the granting of a variance, a schedule for:

(a) Compliance (including increments of progress) by the public water system with each maximum contaminant level requirement covered by the variance; and,

(b) Implementation by the public water system of such control measures as the department may require for each contaminant covered by the variance.

(2) The schedule for complaince shall specify dates by which steps towards compliance are to be taken, including at the minimum, where applicable:

(a) Date by which arrangements for an alternative raw water source or improvement of existing raw water source will be completed.

(b) Date of initiation of the connection for the alternative raw water source or improvement of the existing raw water source.

(c) Date by which final compliance is to be achieved.

(3) The schedule may, if the public water system has no access to an alternative raw water source, and can effect or anticipate no adequate improvement of the existing raw water source, specify an indefinite time period for compliance until a new and effective treatment technology is developed at which time a new compliance schedule shall be prescribed by the department.

(4) The proposed schedule for implementation of interim control measures during the period of variance shall specify interim treatment techniques, methods and equipment, and dates by which steps toward meeting the interim control measures are to be met.

(5) If a schedule is established at any time other than the initial granting of a variance an opportunity for a hearing shall be given in compliance with NR 109.92.

(6) The department shall retain jurisdiction in all cases and may, upon its own motion or upon the motion of the supplier of water, modify a compliance schedule, after opportunity for hearing in compliance with NR 109.92, if changed circumstances warrant such a modification.

(7) If a public water system does not comply with a schedule established pursuant to this section the department may, after an opportunity for hearing pursuant to NR 109.92, terminate the variance.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.94 Requirements for an exemption. (1) The department may grant an exemption to any public water system from any requirement respecting a maximum contaminant level upon a finding that:

(a) Due to compelling factors (which may include economic factors), the public water system is unable to comply with such contaminant level or treatment technique requirement; and

(b) The public water system was in operation on the effective date of such contaminant level or treatment technique requirement; and

(c) The granting of the exemption will not result in an unreasonable risk to health.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.95 Exemption request. A supplier of water may petition for the granting of an exemption pursuant to this chapter. Suppliers of water may submit a joint request for exemptions when they seek similar exemptions under similar circumstances. Any petition for an exemption shall include the following information:

(1) The nature and duration of exemption requested.

(2) Relevant analytical results of water quality sampling of the system, including results of relevant tests conducted pursuant to the requirements of this chapter.

(3) Explanation of the compelling factors such as time or economic factors which prevent such system from achieving compliance.

(4) Other information if any, believed by the applicant to be pertinent to the application or such other information as the department may require.

(5) A proposed compliance schedule, including the date when each step toward compliance will be achieved.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.96 Consideration of an exemption request. (1) The department shall provide a class 1 public notice under ch. 985, Stats, within 90 days of the receipt of a variance petition and an opportunity for hearing on any exemption petition submitted pursuant to NR 109.51. Hearings under this section shall be class 1 hearings and shall be held in accordance with ch. 227, Stats.

(2) In consideration of whether the public water system is unable to comply due to compelling factors, the department shall consider factors such as the following, including:

(a) Construction, installation, or modification of treatment equipment or systems.

(b) The time needed to put into operation a new treatment facility to replace an existing system which is not in compliance.

(c) Economic feasibility of compliance.

(3) If the department is not in opposition to an exemption petition, the exemption shall become effective 30 days after notice and opportunity for hearing is given pursuant to sub. (1) if no timely request for hearing is submitted. If the department is in opposition to an exemption petition, the exemption shall be deemed denied 30 days after notice and an opportunity for hearing is given pursuant to sub. (1) if no timely request for hearing is submitted.

(4) If the department decides to deny the petition for an exemption it shall notify the applicant in writing of the reasons for such denial.

(5) Any final determination of the department shall be subject to review as provided in ch. 227, Stats.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.97 Compliance schedules. (1) For any exemption granted pursuant to NR 109.52, the department shall establish, either at the time of granting an exemption or within one year after the granting of an exemption, a schedule for:

(a) Compliance (including increments of progress) by the public water system with each maximum contaminant level requirement and treatment technique requirement covered by the exemption; and

(2) (a) Implementation by the public water system of such control measures as the department may require for each contaminant covered by the exemption.

(b) If a schedule is established at any time other than the initial granting of an exemption an opportunity for hearing shall be given in compliance with NR 109.96.

(c) The department shall retain jurisdiction in all cases and may, upon its own motion or upon the motion of the supplier of water, modify a compliance schedule, after opportunity for hearing in compliance with NR 109.96, if changed circumstances warrant such a modification.

(d) If a public water system does not comply with a schedule established pursuant to this section the department may, after an opportunity for hearing pursuant to NR 109.52, terminate the exemption.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78.

NR 109.98 Final exemption schedule. (1) Any exemption schedule established pursuant to this chapter shall require compliance by the public water system with each maximum contaminant level prescribed by:

(a) The interim national primary drinking water regulations under 40 C.F.R. s. 141 by no later than January 1, 1984; and

(b) Any maximum contaminant levels established by this chapter but not contained in the interim national primary drinking water regulations under 40 C.F.R. s. 141, by no later than 7 years after the effective date of such maximum contaminant levels.

(2) If the public water system has entered into an enforceable agreement to become a part of a regional public water system, as determined by the department, such schedule shall require compliance by the public water system with each maximum contaminant level prescribed by:

(a) The interim national drinking water regulations under 40 C.F.R. s. 141 by no later than January 1, 1983; and

(b) Any maximum contaminant levels established by this chapter but not contained in the interim national primary drinking water regulations under 40 C.F.R. s. 141, by no later than 9 years after the effective date of such maximum contaminant levels.

History: Cr. Register, February, 1978, No. 266, eff. 3-1-78; am. (1) (a), (b), (2) (a) and (b), Register, April, 1982, No. 316, eff. 5-1-82.