# SECTION .1500 - WATER QUALITY STANDARDS

## .1501 PURPOSE

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1610 Eff. April 4, 1990;*
*Repealed Eff. September 1, 1990.*

## .1502 MONITORING OF CONSECUTIVE PUBLIC WATER SYSTEMS

(a) 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 Section 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.

(b) All public water systems which purchase water for resale and which do not provide any treatment except booster chlorination will be required to perform bacteriological monitoring in accordance with Rule .1534 of this Section.

(c) The Department may exempt a public water system that obtains treated water from another public water system serving more than 10,000 persons from conducting compliance monitoring for the organic chemicals under 15A NCAC 18C .1518(a), provided that the system from which the water is obtained has conducted the analyses required under 15A NCAC 18C .1518(a). Exempted public water systems which disinfect are required to monitor under 15A NCAC 18C .1516.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. June 1, 1988;*
*Transferred and Recodified from 10 NCAC 10D .1628 Eff. April 4, 1990.*

## .1503 MICROBIOLOGICAL CONTAMINANT SAMPLING AND ANALYSIS
## .1504 MAXIMUM MICROBIOLOGICAL CONTAMINANT LEVELS

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 1, 1989; December 1, 1988; March 31, 1981; December 19, 1979;*
*15A NCAC 18C .1503 was Transferred and Recodified from 10 NCAC 10D .1622*
*Eff. April 4, 1990;*
*15A NCAC 18C .1504 was Transferred and Recodified from 10 NCAC 10D .1613*
*Eff. April 4, 1990;*
*Amended Eff. September 1, 1990;*
*Repealed Eff. January 1, 1991.*

## .1505 TURBIDITY SAMPLING AND ANALYSIS

The requirements of this Rule shall apply only to public water systems that use water obtained in whole or in part from surface sources. The provisions of 40 C.F.R. 141.22 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/. Any dates set forth in the federal rule shall be applicable.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 31, 1981; December 19, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1623 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; January 1, 1991; September 1, 1990.*

## ADOPTED BY REFERENCE

### § 141.22 Turbidity sampling and analytical requirements.

**The requirements in this section apply to unfiltered systems until December 30, 1991, unless the State has determined prior to that date, in writing pursuant to section 1412(b)(7)(iii), that filtration is required. The requirements in this section apply to filtered systems until June 29, 1993. The requirements in this section apply to**

**unfiltered systems that the State has determined, in writing pursuant to section 1412(b)(7)(C)(iii), must install filtration, until June 29, 1993, or until filtration is installed, whichever is later.**

**(a) Samples shall be taken by suppliers of water for both community and non-community water systems at a representative entry point(s) to the water distribution system at least once per day, for the purposes of making turbidity measurements to determine compliance with §141.13. If the State determines that a reduced sampling frequency in a non-community will not pose a risk to public health, it can reduce the required sampling frequency. The option of reducing the turbidity frequency shall be permitted only in those public water systems that practice disinfection and which maintain an active residual disinfectant in the distribution system, and in those cases where the State has indicated in writing that no unreasonable risk to health existed under the circumstances of this option. Turbidity measurements shall be made as directed in §141.74(a)(1).**

**(b) If the result of a turbidity analysis indicates that the maximum allowable limit has been exceeded, 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 allowable limit has been exceeded, the supplier of water shall report to the State 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 allowable limit, or if the average of two samples taken on consecutive days exceeds 5 TU, the supplier of water shall report to the State and notify the public as directed in §§141.31 and subpart Q.**

**(c) Sampling for non-community water systems shall begin within two years after the effective date of this part.**

**(d) The requirements of this §141.22 shall apply only to public water systems which use water obtained in whole or in part from surface sources.**

**(e) The State has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by their sanctioned representatives and agencies.**

## .1506 MAXIMUM CONTAMINANT LEVELS FOR TURBIDITY

The requirements of this Rule shall apply to public water systems that use water obtained in whole or in part from surface water sources. The provisions of 40 C.F.R. 141.13 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/. Any dates set forth in the federal rule shall be applicable.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1614 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; January 1, 1991; September 1, 1990.*

## ADOPTED BY REFERENCE

**§ 141.13 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:**

**Editorial Note: At 54 FR 27527, June 29, 1989, §141.13 was amended by adding introductory text, effective December 31, 1990. However, introductory text already exists. The added text follows.**

**The requirements in this section apply to unfiltered systems until December 30, 1991, unless the State has determined prior to that date, in writing pursuant to §1412(b)(7)(C)(iii), that filtration is required. The requirements in this section apply to filtered systems until June 29, 1993. The requirements in this section apply to unfiltered systems that the State has determined, in writing pursuant to §1412(b)(7)(C)(iii), must install filtration, until June 29, 1993, or until filtration is installed, whichever is later.**

**(a) One turbidity unit (TU), as determined by a monthly average pursuant to §141.22, except that five or fewer turbidity units may be allowed if the supplier of water can demonstrate to the State that the higher turbidity does not do any of the following:**
  **(1) Interfere with disinfection;**
  **(2) Prevent maintenance of an effective disinfectant agent throughout the distribution system; or**
  **(3) Interfere with microbiological determinations.**

**(b) Five turbidity units based on an average for two consecutive days pursuant to §141.22.**

## .1507 CORROSION CONTROL AND LEAD AND COPPER MONITORING

(a) Control and adjustment of pH shall be provided for community water systems having water with a pH below 6.5; such control and adjustment to be approved by the Department. Most waters are corrosive in varying degrees at pH 6.5 and slightly above and such waters may have pH adjustment. *[Note: This requirement applies to all community systems regardless of whether or not installation of corrosion control treatment is required due to a lead and/or copper action level exceedance. Should installation of corrosion control treatment be required, then the pH values in 141.82(f)(2) apply.]*
(b) The provisions of 40 C.F.R. 141.42 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Non-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page.
(c) The provisions of 40 C.F.R. 141, Subpart I - Control of Lead and Copper are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Non-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page.
(d) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall be exempt from the provisions of this Rule.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. October 1, 1982; February 27, 1982;*
*Transferred and Recodified from 10 NCAC 10D .1621 Eff. April 4, 1990;*
*Amended Eff. July 1, 1994; October 1, 1992; December 1, 1991.*

## ADOPTED BY REFERENCE

### § 141.42 Special monitoring for corrosivity characteristics.

**(a)–(c) [Reserved]**
**(d) Community water supply systems shall identify whether the following construction materials are present in their distribution system and report to the State:**
**Lead from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing.**
**Copper from piping and alloys, service lines, and home plumbing.**
**Galvanized piping, service lines, and home plumbing.**
**Ferrous piping materials such as cast iron and steel.**
**Asbestos cement pipe.**
**In addition, States may require identification and reporting of other materials of construction present in distribution systems that may contribute contaminants to the drinking water, such as:**
**Vinyl lined asbestos cement pipe.**
**Coal tar lined pipes and tanks.**

### SUBPART I – CONTROL OF LEAD AND COPPER

### § 141.80 General requirements.

**(a)** ***Applicability and effective dates.***
**(1) The requirements of this subpart I constitute the national primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this subpart applies to community water systems and non-transient, non-community water systems (hereinafter referred to as "water systems" or "systems").**
**(2) [Reserved]**
**(b)** ***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.**
**(c)** ***Lead and copper action levels.***
**(1) The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with**

**§141.86 is greater than 0.015 mg/L ( i.e. , if the "90th percentile" lead level is greater than 0.015 mg/L).**

**(2) The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with §141.86 is greater than 1.3 mg/L ( i.e. , if the "90th percentile" copper level is greater than 1.3 mg/L).**

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

**(i) 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.**

**(ii) The number of samples taken during the monitoring period shall be multiplied by 0.9.**

**(iii) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(3)(ii) is the 90th percentile contaminant level.**

**(iv) 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.**

**(v) For a public water system that has been allowed by the State to collect fewer than five samples in accordance with §141.86(c), the sample result with the highest concentration is considered the 90th percentile value.**

**(d) *Corrosion control treatment requirements.***

**(1) All water systems shall install and operate optimal corrosion control treatment as defined in §141.2.**

**(2) Any water system that complies with the applicable corrosion control treatment requirements specified by the State under §§141.81 and 141.82 shall be deemed in compliance with the treatment requirement contained in paragraph (d)(1) of this section.**

**(e) *Source water treatment requirements*. Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the State under §141.83.**

**(f) *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 §141.84.**

**(g) *Public education requirements*. Pursuant to §141.85, all water systems must provide a consumer notice of lead tap water monitoring results to persons served at the sites (taps) that are tested. Any system exceeding the lead action level shall implement the public education requirements.**

**(h) *Monitoring and analytical requirements.* Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this subpart shall be completed in compliance with §§141.86, 141.87, 141.88, and 141.89.**

**(i) *Reporting requirements.* Systems shall report to the State any information required by the treatment provisions of this subpart and §141.90.**

**(j) *Recordkeeping requirements*. Systems shall maintain records in accordance with §141.91.**

**(k) *Violation of national primary drinking water regulations*. Failure to comply with the applicable requirements of §§141.80–141.91, including requirements established by the State pursuant to these provisions, shall constitute a violation of the national primary drinking water regulations for lead and/or copper.**

## § 141.81 Applicability of corrosion control treatment steps to small, medium-size and large water systems.

**(a) Systems shall complete the applicable corrosion control treatment requirements described in §141.82 by the deadlines established in this section.**

**(1) A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (d) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(2) or (b)(3) of this section.**

**(2) A small system (serving ≤3300 persons) and a medium-size system (serving >3,300 and ≤50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (e) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(1), (b)(2), or (b)(3) of this section.**

**(b) 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 paragraphs (b)(1) through (b)(3) of this section. Any such system deemed to have optimized corrosion control under this paragraph, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the State determines appropriate to ensure optimal corrosion control treatment is maintained.**

**(1) 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 two consecutive six-month monitoring periods conducted in accordance with §141.86.**

**(2) Any water system may be deemed by the State to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the State that it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the State 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 §141.82(f). Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the State-designated optimal water quality control parameters in accordance with §141.82(g) and continue to conduct lead and copper tap and water quality parameter sampling in accordance with §141.86(d)(3) and §141.87(d), respectively. A system shall provide the State with the following information in order to support a determination under this paragraph:**

- **(i) The results of all test samples collected for each of the water quality parameters in §141.82(c)(3).**
- **(ii) A report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in §141.82(c)(1), the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment;**
- **(iii) 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**
- **(iv) The results of tap water samples collected in accordance with §141.86 at least once every six months for one year after corrosion control has been installed.**

**(3) Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with §141.86 and source water monitoring conducted in accordance with §141.88 that demonstrates for two consecutive 6-month monitoring periods that the difference between the 90th percentile tap water lead level computed under §141.80(c)(3), and the highest source water lead concentration is less than the Practical Quantitation Level for lead specified in §141.89(a)(1)(ii).**

- **(i) Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under this paragraph if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive 6-month monitoring periods.**
- **(ii) Any water system deemed to have optimized corrosion control in accordance with this paragraph shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in §141.86(c) and collecting the samples at times and locations specified in §141.86(d)(4)(iv). Any such system that has not conducted a round of monitoring pursuant to §141.86(d) since September 30, 1997, shall complete a round of monitoring pursuant to this paragraph no later than September 30, 2000.**
- **(iii) Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the State in writing pursuant to §141.90(a)(3) of any upcoming long-term change in treatment or addition of a new source as described in that section. The State must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The State may require any such system to conduct additional monitoring or to take other action the State deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.**
- **(iv) As of July 12, 2001, a system is not deemed to have optimized corrosion control under this paragraph, and shall implement corrosion control treatment pursuant to paragraph (b)(3)(v) of this section unless it meets the copper action level.**
- **(v) Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in paragraph (e) of this section. Any such 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 paragraph.**

**(c) Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to §141.86 and submits the results to the State. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system (or the State, as the case may be) shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The**

**State may require a system to repeat treatment steps previously completed by the system where the State determines that this is necessary to implement properly the treatment requirements of this section. The State shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small- or medium-size system to implement corrosion control treatment steps in accordance with paragraph (e) of this section (including systems deemed to have optimized corrosion control under paragraph (b)(1) of this section) is triggered whenever any small- or medium-size system exceeds the lead or copper action level.**

**(d) *Treatment steps and deadlines for large systems.* Except as provided in paragraph (b) (2) and (3) of this section, large systems shall complete the following corrosion control treatment steps (described in the referenced portions of §§141.82, 141.86, and 141.87) by the indicated dates.**

- **(1) *Step 1*: The system shall conduct initial monitoring (§141.86(d)(1) and §141.87(b)) during two consecutive six-month monitoring periods by January 1, 1993.**
- **(2) *Step 2*: The system shall complete corrosion control studies (§141.82(c)) by July 1, 1994.**
- **(3) *Step 3*: The State shall designate optimal corrosion control treatment (§141.82(d)) by January 1, 1995.**
- **(4) *Step 4*: The system shall install optimal corrosion control treatment (§141.82(e)) by January 1, 1997.**
- **(5) *Step 5*: The system shall complete follow-up sampling (§141.86(d)(2) and §141.87(c)) by January 1, 1998.**
- **(6) *Step 6*: The State shall review installation of treatment and designate optimal water quality control parameters (§141.82(f)) by July 1, 1998.**
- **(7) *Step 7*: The system shall operate in compliance with the State-specified optimal water quality control parameters (§141.82(g)) and continue to conduct tap sampling (§141.86(d)(3) and §141.87(d)).**

**(e) *Treatment Steps and deadlines for small and medium-size systems*. Except as provided in paragraph (b) of this section, small and medium-size systems shall complete the following corrosion control treatment steps (described in the referenced portions of §§141.82, 141.86 and 141.87) by the indicated time periods.**

- **(1) *Step 1*: The system shall conduct initial tap sampling (§141.86(d)(1) and §141.87(b)) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under §141.86(d)(4). A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment (§141.82(a)) within six months after the end of the monitoring period during which it exceeds one of the action levels.**
- **(2) *Step 2*: Within 12 months after the end of the monitoring period during which a system exceeds the lead or copper action level, the State may require the system to perform corrosion control studies (§141.82(b)). If the State does not require the system to perform such studies, the State shall specify optimal corrosion control treatment (§141.82(d)) within the following timeframes:**
  - **(i) For medium-size systems, within 18 months after the end of the monitoring period during which such system exceeds the lead or copper action level.**
  - **(ii) For small systems, within 24 months after the end of the monitoring period during which such system exceeds the lead or copper action level.**
- **(3) *Step 3*: If the State requires a system to perform corrosion control studies under step 2, the system shall complete the studies (§141.82(c)) within 18 months after the State requires that such studies be conducted.**
- **(4) *Step 4*: If the system has performed corrosion control studies under step 2, the State shall designate optimal corrosion control treatment (§141.82(d)) within 6 months after completion of step 3.**
- **(5) *Step 5*: The system shall install optimal corrosion control treatment (§141.82(e)) within 24 months after the State designates such treatment.**
- **(6) *Step 6*: The system shall complete follow-up sampling (§141.86(d)(2) and §141.87(c)) within 36 months after the State designates optimal corrosion control treatment.**
- **(7) *Step 7*: The State shall review the system's installation of treatment and designate optimal water quality control parameters (§141.82(f)) within 6 months after completion of step 6.**
- **(8) *Step 8:* The system shall operate in compliance with the State-designated optimal water quality control parameters (§141.82(g)) and continue to conduct tap sampling (§141.86(d)(3) and §141.87(d)).**

### § 141.82 Description of corrosion control treatment requirements.

**Each system shall complete the corrosion control treatment requirements described below which are applicable to such system under §141.81.**

**(a) *System recommendation regarding corrosion control treatment.* Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, 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 paragraph (c)(1) of this section which the system believes constitutes optimal corrosion control for that system. The State may require the system to**

**conduct additional water quality parameter monitoring in accordance with §141.87(b) to assist the State in reviewing the system's recommendation.**

**(b) *State decision to require studies of corrosion control treatment (applicable to small and medium-size systems).* The State may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under paragraph (c) of this section to identify optimal corrosion control treatment for the system.**

**(c) *Performance of corrosion control studies*.**

**(1) Any public water system 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:**

**(i) Alkalinity and pH adjustment;**
**(ii) Calcium hardness adjustment; and**
**(iii) 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.**

**(2) The water system shall evaluate each of the corrosion control treatments 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.**

**(3) The water system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments listed above:**

**(i) Lead;**
**(ii) Copper;**
**(iii) pH;**
**(iv) Alkalinity;**
**(v) Calcium;**
**(vi) Conductivity;**
**(vii) Orthophosphate (when an inhibitor containing a phosphate compound is used);**
**(viii) Silicate (when an inhibitor containing a silicate compound is used);**
**(ix) Water temperature.**

**(4) The water system 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:**

**(i) 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; and/or**
**(ii) Data and documentation demonstrating that the water system 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.**

**(5) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.**

**(6) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the State in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in paragraphs (c) (1) through (5) of this section.**

**(d) *State designation of optimal corrosion control treatment*.**

**(1) Based upon consideration of available information including, where applicable, studies performed under paragraph (c) of this section and a system's recommended treatment alternative, the State shall either approve the corrosion control treatment option recommended by the system, or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(1) of this section. When designating optimal treatment the State shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.**

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

**(e) *Installation of optimal corrosion control*. Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the State under paragraph (d) of this section.**

**(f) *State review of treatment and specification of optimal water quality control parameters*. The State shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the State in paragraph (d) of this section. Upon reviewing the results of tap water and water quality parameter monitoring by the**

**system, both before and after the system installs optimal corrosion control treatment, the State shall designate:**

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

**(2) A minimum pH value, measured in all tap samples. Such value shall be equal to or greater than 7.0, unless the State determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;**

**(3) 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 State determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;**

**(4) 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;**

**(5) 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.**

**The values for the applicable water quality control parameters listed above shall be those that the State determines to reflect optimal corrosion control treatment for the system. The State may designate values for additional water quality control parameters determined by the State to reflect optimal corrosion control for the system. The State shall notify the system in writing of these determinations and explain the basis for its decisions.**

**(g) *Continued operation and monitoring*. All systems 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 State under paragraph (f) of this section, in accordance with this paragraph for all samples collected under §141.87(d) through (f). Compliance with the requirements of this paragraph shall be determined every six months, as specified under §141.87(d). A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any State-specified parameter on more than nine 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 State. Daily values are calculated as follows. States have discretion to delete results of obvious sampling errors from this calculation.**

**(1) 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 §142.16 of this chapter in the State's application for a program revision submitted pursuant to §142.12 of this chapter, the State'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.**

**(2) 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.**

**(3) 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.**

**(h) *Modification of State treatment decisions*. Upon its own initiative or in response to a request by a water system or other interested party, a State may modify its determination of the optimal corrosion control treatment under paragraph (d) of this section or optimal water quality control parameters under paragraph (f) of this section. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The State may modify its determination where it concludes that such change is necessary to ensure that the system 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 State's decision, and provide an implementation schedule for completing the treatment modifications.**

**(i) *Treatment decisions by EPA in lieu of the State*. Pursuant to the procedures in §142.19, the EPA Regional Administrator may review treatment determinations made by a State under paragraphs (d), (f), or (h) of this section and issue federal treatment determinations consistent with the requirements of those paragraphs where the Regional Administrator finds that:**

**(1) A State has failed to issue a treatment determination by the applicable deadlines contained in §141.81,**

**(2) A State has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or**

**(3) The technical aspects of a State's determination would be indefensible in an expected Federal enforcement action taken against a system.**

## § 141.83 Source water treatment requirements.

**Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of paragraph (b) of this section, and in §§141.86, and 141.88) by the following deadlines.**

**(a)** ***Deadlines for completing source water treatment steps*—**

**(1)** ***Step 1*: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (§141.88(b)) and make a treatment recommendation to the State (§141.83(b)(1)) no later than 180 days after the end of the monitoring period during which the lead or copper action level was exceeded.**

**(2)** ***Step 2*: The State shall make a determination regarding source water treatment (§141.83(b)(2)) within 6 months after submission of monitoring results under step 1.**

**(3)** ***Step 3*: If the State requires installation of source water treatment, the system shall install the treatment (§141.83(b)(3)) within 24 months after completion of step 2.**

**(4)** ***Step 4*: The system shall complete follow-up tap water monitoring (§141.86(d)(2) and source water monitoring (§141.88(c)) within 36 months after completion of step 2.**

**(5)** ***Step 5*: The State shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels (§141.83(b)(4)) within 6 months after completion of step 4.**

**(6)** ***Step 6*: The system shall operate in compliance with the State-specified maximum permissible lead and copper source water levels (§141.83(b)(4)) and continue source water monitoring (§141.88(d)).**

**(b)** ***Description of source water treatment requirements* —**

**(1)** ***System treatment recommendation*. Any system which exceeds the lead or copper action level shall recommend in writing to the State the installation and operation of one of the source water treatments listed in paragraph (b)(2) of this section. A system 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.**

**(2)** ***State determination regarding source water treatment*. The State shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the State determines that treatment is needed, the State shall either require installation and operation of the source water treatment recommended by the system (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 State requests additional information to aid in its review, the water system shall provide the information by the date specified by the State in its request. The State shall notify the system in writing of its determination and set forth the basis for its decision.**

**(3)** ***Installation of source water treatment*. Each system shall properly install and operate the source water treatment designated by the State under paragraph (b)(2) of this section.**

**(4)** ***State review of source water treatment and specification of maximum permissible source water levels.* The State shall review the source water samples taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the State. Based upon its review, the State shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The State shall notify the system in writing and explain the basis for its decision.**

**(5)** ***Continued operation and maintenance*. Each water system shall maintain lead and copper levels below the maximum permissible concentrations designated by the State at each sampling point monitored in accordance with §141.88. 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 designated by the State.**

**(6)** ***Modification of State treatment decisions*. Upon its own initiative or in response to a request by a water system or other interested party, a State may modify its determination of the source water treatment under paragraph (b)(2) of this section, or maximum permissible lead and copper concentrations for finished water entering the distribution system under paragraph (b)(4) of this section. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The State may modify its determination where it concludes that such change is necessary to ensure that the system 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 State's decision, and provide an implementation schedule for completing the treatment modifications.**

**(7) *Treatment decisions by EPA in lieu of the State*. Pursuant to the procedures in §142.19, the EPA Regional Administrator may review treatment determinations made by a State under paragraphs (b) (2), (4), or (6) of this section and issue Federal treatment determinations consistent with the requirements of those paragraphs where the Administrator finds that:**

- **(i) A State has failed to issue a treatment determination by the applicable deadlines contained in §141.83(a),**
- **(ii) A state has abused its discretion in a substantial number of cases or in cases affecting a substantial population, or**
- **(iii) The technical aspects of a State's determination would be indefensible in an expected Federal enforcement action taken against a system.**

**§ 141.84 Lead service line replacement requirements.**

**(a) Systems that fail to meet the lead action level in tap samples taken pursuant to §141.86(d)(2), after installing corrosion control and/or source water treatment (whichever sampling occurs later), shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of §141.81 or §141.83 for failure to install source water or corrosion control treatment, the State may require the system to commence lead service line replacement under this section after the date by which the system was required to conduct monitoring under §141.86(d)(2) has passed.**

**(b)**

**(1) A water system shall replace annually at least 7 percent 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 shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based on a materials evaluation, including the evaluation required under §141.86(a) and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the first day following the end of the monitoring period in which the action level was exceeded under paragraph (a) of this section. If monitoring is required annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs. If the State has established an alternate monitoring period, then the end of the monitoring period will be the last day of that period.**

**(2) Any water system resuming a lead service line replacement program after the cessation of its lead service line replacement program as allowed by paragraph (f) of this section shall update its inventory of lead service lines to include those sites that were previously determined not to require replacement through the sampling provision under paragraph (c) of this section. The system will then divide the updated number of remaining lead service lines by the number of remaining years in the program to determine the number of lines that must be replaced per year (7 percent lead service line replacement is based on a 15-year replacement program, so, for example, systems resuming lead service line replacement after previously conducting two years of replacement would divide the updated inventory by 13). For those systems that have completed a 15-year lead service line replacement program, the State will determine a schedule for replacing or retesting lines that were previously tested out under the replacement program when the system re-exceeds the action level.**

**(c) A system 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 §141.86(b)(3), is less than or equal to 0.015 mg/L.**

**(d) A water system shall replace that portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A system is not required to bear the cost of replacing the privately-owned portion of the line, nor is it 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 portion would be precluded by State, local or common law. A water system that does not replace the entire length of the service line also shall complete the following tasks.**

**(1) At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) 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 State may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) 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 §141.86(b)(3), within 72 hours after the completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered "on time."**

**(2) The water system shall provide the information required by paragraph (d)(1) of this section to the residents of individual dwellings by mail or by other methods approved by the State. In instances where multi-family dwellings are served by the line, the water system shall have the option to post the information at a conspicuous location.**

**(e) The State shall require a system 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 State shall make this determination in writing and notify the system of its finding within 6 months after the system is triggered into lead service line replacement based on monitoring referenced in paragraph (a) of this section.**

**(f) Any system may cease replacing lead service lines whenever first draw samples collected pursuant to §141.86(b)(2) meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the State. If first draw tap samples collected in any such system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines pursuant to paragraph (b)(2) of this section.**

**(g) To demonstrate compliance with paragraphs (a) through (d) of this section, a system shall report to the State the information specified in §141.90(e).**

**§ 141.85 Public education and supplemental monitoring requirements.**

**All water systems must deliver a consumer notice of lead tap water monitoring results to persons served by the water system at sites that are tested, as specified in paragraph (d) of this section. A water system that exceeds the lead action level based on tap water samples collected in accordance with §141.86 shall deliver the public education materials contained in paragraph (a) of this section in accordance with the requirements in paragraph (b) of this section. Water systems that exceed the lead action level must sample the tap water of any customer who requests it in accordance with paragraph (c) of this section.**

**(a) *Content of written public education materials* —**

**(1) Community water systems and non-transient non-community water systems. Water systems must include the following elements in printed materials (e.g., brochures and pamphlets) in the same order as listed below. In addition, language in paragraphs (a)(1)(i) through (ii) and (a)(1)(vi) of this section must be included in the materials, exactly as written, except for the text in brackets in these paragraphs for which the water system must include system-specific information. Any additional information presented by a water system must be consistent with the information below and be in plain language that can be understood by the general public. Water systems must submit all written public education materials to the State prior to delivery. The State may require the system to obtain approval of the content of written public materials prior to delivery.**

**(i) (i) IMPORTANT INFORMATION ABOUT LEAD IN YOUR DRINKING WATER. [INSERT NAME OF WATER SYSTEM] found elevated levels of lead in drinking water in some homes/buildings. Lead can cause serious health problems, especially for pregnant women and young children. Please read this information closely to see what you can do to reduce lead in your drinking water.**

**(ii) Health effects of lead. Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys, and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults. Lead is stored in the bones, and it can be released later in life. During pregnancy, the child receives lead from the mother's bones, which may affect brain development.**

**(iii) Sources of lead.**

**(A) Explain what lead is.**

**(B) Explain possible sources of lead in drinking water and how lead enters drinking water. Include information on home/building plumbing materials and service lines that may contain lead.**

**(C) Discuss other important sources of lead exposure in addition to drinking water (e.g., paint).**

**(iv) Discuss the steps the consumer can take to reduce their exposure to lead in drinking water.**

**(A) Encourage running the water to flush out the lead.**

**(B) Explain concerns with using hot water from the tap and specifically caution against the use of hot water for preparing baby formula.**

**(C) Explain that boiling water does not reduce lead levels.**

**(D) Discuss other options consumers can take to reduce exposure to lead in drinking water, such as alternative sources or treatment of water.**

**(E) Suggest that parents have their child's blood tested for lead.**

**(v) Explain why there are elevated levels of lead in the system's drinking water (if known) and what the water system is doing to reduce the lead levels in homes/buildings in this area.**

**(vi) For more information, call us at [INSERT YOUR NUMBER] [(IF APPLICABLE), or visit our Web site at [INSERT YOUR WEB SITE HERE]]. For more information on reducing lead exposure around your home/building and the health effects of lead, visit EPA's Web site at http://www.epa.gov/lead or contact your health care provider.**

**(2) Community water systems. In addition to including the elements specified in paragraph (a)(1) of this section, community water systems must:**

**(i) Tell consumers how to get their water tested.**

**(ii) Discuss lead in plumbing components and the difference between low lead and lead free.**

**(b) *Delivery of public education materials.***

**(1) For public water systems serving a large proportion of non-English speaking consumers, as determined by the State, the public education materials must contain information in the appropriate language(s) 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 public education materials or to request assistance in the appropriate language.**

**(2) A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with §141.86, and that is not already conducting public education tasks under this section, must conduct the public education tasks under this section within 60 days after the end of the monitoring period in which the exceedance occurred:**

**(i) Deliver printed materials meeting the content requirements of paragraph (a) of this section to all bill paying customers.**

**(ii)**

**(A) Contact customers who are most at risk by delivering education materials that meet the content requirements of paragraph (a) of this section to local public health agencies even if they are not located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users. The water system must contact the local public health agencies directly by phone or in person. The local public health agencies may provide a specific list of additional community based organizations serving target populations, which may include organizations outside the service area of the water system. If such lists are provided, systems must deliver education materials that meet the content requirements of paragraph (a) of this section to all organizations on the provided lists.**

**(B) Contact customers who are most at risk by delivering materials that meet the content requirements of paragraph (a) of this section to the following organizations listed in 1 through 6 that are located within the water system's service area, along with an informational notice that encourages distribution to all the organization's potentially affected customers or community water system's users:**

*( 1 )* **Public and private schools or school boards.**
*( 2 )* **Women, Infants and Children (WIC) and Head Start programs.**
*( 3 )* **Public and private hospitals and medical clinics.**
*( 4 )* **Pediatricians.**
*( 5 )* **Family planning clinics.**
*( 6 )* **Local welfare agencies.**

**(C) Make a good faith effort to locate the following organizations within the service area and deliver materials that meet the content requirements of paragraph (a) of this section to them, along with an informational notice that encourages distribution to all potentially affected customers or users. The good faith effort to contact at-risk customers may include requesting a specific contact list of these organizations from the local public health agencies, even if the agencies are not located within the water system's service area:**

*( 1 )* **Licensed childcare centers**

*( 2 )* **Public and private preschools.**
*( 3 )* **Obstetricians-Gynecologists and Midwives.**

**(iii) No less often than quarterly, provide information on or in each water bill as long as the system exceeds the action level for lead. The message on the water bill must include the following statement exactly as written except for the text in brackets for which the water system must include system-specific information: [INSERT NAME OF WATER SYSTEM] found high levels of lead in drinking water in some homes. Lead can cause serious health problems. For more information please call [INSERT NAME OF WATER SYSTEM] [or visit (INSERT YOUR WEB SITE HERE)]. The message or delivery mechanism can be modified in consultation with the State; specifically, the State may allow a separate mailing of public education materials to customers if the water system cannot place the information on water bills.**

**(iv) Post material meeting the content requirements of paragraph (a) of this section on the water system's Web site if the system serves a population greater than 100,000.**

**(v) Submit a press release to newspaper, television and radio stations.**

**(vi) In addition to paragraphs (b)(2)(i) through (v) of this section, systems must implement at least three activities from one or more categories listed below. The educational content and selection of these activities must be determined in consultation with the State.**

**(A) Public Service Announcements.**
**(B) Paid advertisements.**
**(C) Public Area Information Displays.**
**(D) E-mails to customers.**
**(E) Public Meetings.**
**(F) Household Deliveries.**
**(G) Targeted Individual Customer Contact.**
**(H) Direct material distribution to all multi-family homes and institutions.**
**(I) Other methods approved by the State.**

**(vii) For systems that are required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or, if the State has established an alternate monitoring period, the last day of that period.**

**(3) As long as a community water system exceeds the action level, it must repeat the activities pursuant to paragraph (b)(2) of this section as described in paragraphs (b)(3)(i) through (iv) of this section.**

**(i) A community water system shall repeat the tasks contained in paragraphs (b)(2)(i), (ii) and (vi) of this section every 12 months.**

**(ii) A community water system shall repeat tasks contained in paragraph (b)(2)(iii) of this section with each billing cycle.**

**(iii) A community water system serving a population greater than 100,000 shall post and retain material on a publicly accessible Web site pursuant to paragraph (b)(2)(iv) of this section.**

**(iv) The community water system shall repeat the task in paragraph (b)(2)(v) of this section twice every 12 months on a schedule agreed upon with the State. The State can allow activities in paragraph (b)(2) of this section to extend beyond the 60-day requirement if needed for implementation purposes on a case-by-case basis; however, this extension must be approved in writing by the State in advance of the 60-day deadline.**

**(4) Within 60 days after the end of the monitoring period in which the exceedance occurred (unless it already is repeating public education tasks pursuant to paragraph (b)(5) of this section), a non-transient non-community water system shall deliver the public education materials specified by paragraph (a) of this section as follows:**

**(i) 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**

**(ii) Distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The State 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.**

**(iii) For systems that are required to conduct monitoring annually or less frequently, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or, if the State has established an alternate monitoring period, the last day of that period.**

**(5) A non-transient non-community water system shall repeat the tasks contained in paragraph (b)(4) of this section at least once during each calendar year in which the system exceeds the lead action level. The State can allow activities in (b)(4) of this section to extend beyond the 60-day requirement if needed for implementation purposes on a**

**case-by-case basis; however, this extension must be approved in writing by the State in advance of the 60-day deadline.**

**(6) A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to §141.86. Such a system shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.**

**(7) A community water system may apply to the State, in writing (unless the State has waived the requirement for prior State approval), to use only the text specified in paragraph (a)(1) of this section in lieu of the text in paragraphs (a)(1) and (a)(2) of this section and to perform the tasks listed in paragraphs (b)(4) and (b)(5) of this section in lieu of the tasks in paragraphs (b)(2) and (b)(3) of this section if:**

**(i) 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; and**

**(ii) The system provides water as part of the cost of services provided and does not separately charge for water consumption.**

**(8) A community water system serving 3,300 or fewer people may limit certain aspects of their public education programs as follows:**

**(i) With respect to the requirements of paragraph (b)(2)(vi) of this section, a system serving 3,300 or fewer must implement at least one of the activities listed in that paragraph.**

**(ii) With respect to the requirements of paragraph (b)(2)(ii) of this section, a system serving 3,300 or fewer people may limit the distribution of the public education materials required under that paragraph to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.**

**(iii) With respect to the requirements of paragraph (b)(2)(v) of this section, the State may waive this requirement for systems serving 3,300 or fewer persons as long as system distributes notices to every household served by the system.**

**(c) *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 §141.86 shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.**

**(d) *Notification of results —***

**(1) Reporting requirement. All water systems must provide a notice of the individual tap results from lead tap water monitoring carried out under the requirements of §141.86 to the persons served by the water system at the specific sampling site from which the sample was taken (e.g., the occupants of the residence where the tap was tested).**

**(2) Timing of notification. A water system must provide the consumer notice as soon as practical, but no later than 30 days after the system learns of the tap monitoring results.**

**(3) Content. The consumer notice must include the results of lead tap water monitoring for the tap that was tested, an explanation of the health effects of lead, list steps consumers can take to reduce exposure to lead in drinking water and contact information for the water utility. The notice must also provide the maximum contaminant level goal and the action level for lead and the definitions for these two terms from §141.153(c).**

**(4) Delivery. The consumer notice must be provided to persons served at the tap that was tested, either by mail or by another method approved by the State. For example, upon approval by the State, a non-transient non-community water system could post the results on a bulletin board in the facility to allow users to review the information. The system must provide the notice to customers at sample taps tested, including consumers who do not receive water bills.**

## <u>§ 141.86 Monitoring requirements for lead and copper in tap water.</u>

**(a) *Sample site location*.**

**(1) By the applicable date for commencement of monitoring under paragraph (d)(1) of this section, each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in paragraph (c) of this section. 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.**

**(2) A water system shall use the information on lead, copper, and galvanized steel that it is required to collect under §141.42(d) of this part [special monitoring for corrosivity characteristics] when conducting a materials evaluation. When an evaluation of the information collected pursuant to §141.42(d) is insufficient to locate the requisite number**

**of lead and copper sampling sites that meet the targeting criteria in paragraph (a) of this section, the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system 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):**

- **(i) All plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;**
- **(ii) 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**
- **(iii) 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.**

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

- **(i) Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or**
- **(ii) Are served by a lead service line. When multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures in its sampling pool.**

**(4) 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:**

- **(i) Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or**
- **(ii) Are served by a lead service line.**

**(5) 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 paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.**

**(6) The sampling sites selected for a non-transient noncommunity water system ("tier I sampling sites") shall consist of buildings that:**

- **(i) Contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or**
- **(ii) Are served by a lead service line.**

**(7) A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in paragraph (a)(6) of this section 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 in which the plumbing materials used at that site would be commonly found at other sites served by the water system.**

**(8) Any water system whose distribution system contains lead service lines shall draw 50 percent of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50 percent of the samples from sites served by a lead service line. A water system that 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.**

**(b) *Sample collection methods*.**

**(1) All tap samples for lead and copper collected in accordance with this subpart, with the exception of lead service line samples collected under §141.84(c) and samples collected under paragraph (b)(5) of this section, shall be first-draw samples.**

**(2) 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 six 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 one liter in volume and 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 paragraph (b)(5) of this section 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 must 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.**

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

- **(i) 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;**
- **(ii) Tapping directly into the lead service line; or**
- **(iii) 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.**

**(4) A water system 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 cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system 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.**

**(5) A non-transient non-community water system, or a community water system that meets the criteria of §141.85(b)(7), that does not have enough taps that can supply first-draw samples, as defined in §141.2, may apply to the State in writing to substitute non-first-draw samples. Such systems must 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 State has the discretion to waive the requirement for prior State approval of non-first-draw sample sites selected by the system, either through State regulation or written notification to the system.**

**(c) *Number of samples*. Water systems shall collect at least one sample during each monitoring period specified in paragraph (d) of this section from the number of sites listed in the first column (“standard monitoring”) of the table in this paragraph. A system conducting reduced monitoring under paragraph (d)(4) of this section shall collect at least one sample from the number of sites specified in the second column (“reduced monitoring”) of the table in this paragraph during each monitoring period specified in paragraph (d)(4) of this section. Such reduced monitoring sites shall be representative of the sites required for standard monitoring. A public water system that has fewer than five drinking water taps, that can be used for human consumption meeting the sample site criteria of paragraph (a) of this section to reach the required number of sample sites listed in paragraph (c) of this section, must collect at least one sample from each tap and then must collect additional samples from those taps on different days during the monitoring period to meet the required number of sites. Alternatively the State may allow these public water systems to collect a number of samples less than the number of sites specified in paragraph (c) of this section, provided that 100 percent of all taps that can be used for human consumption are sampled. The State must approve this reduction of the minimum number of samples in writing based on a request from the system or onsite verification by the State. States may specify sampling locations when a system is conducting reduced monitoring. The table is as follows:**

| System size (number of people served) | Number of sites (standard monitoring) | Number of sites (reduced monitoring) |
|---|---|---|
| >100,000 | 100 | 50 |
| 10,001 to 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 |

**(d) *Timing of monitoring—***

**(1) Initial tap sampling.**

**The first six-month monitoring period for small, medium-size and large systems shall begin on the following dates:**

| System size (No. 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. |

**(i) All large systems shall monitor during two consecutive six-month periods.**

**(ii) All small and medium-size systems shall monitor during each six-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 §141.81, in which case the system shall continue monitoring in accordance with paragraph (d)(2) of this section, or**

**(B) The system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with paragraph (d)(4) of this section.**

**(2) Monitoring after installation of corrosion control and source water treatment.**

**(i) Any large system which installs optimal corrosion control treatment pursuant to §141.81(d)(4) shall monitor during two consecutive six-month monitoring periods by the date specified in §141.81(d)(5).**

**(ii) Any small or medium-size system which installs optimal corrosion control treatment pursuant to §141.81(e)(5) shall monitor during two consecutive six-month monitoring periods by the date specified in §141.81(e)(6).**

**(iii) Any system which installs source water treatment pursuant to §141.83(a)(3) shall monitor during two consecutive six-month monitoring periods by the date specified in §141.83(a)(4).**

**(3) Monitoring after State specifies water quality parameter values for optimal corrosion control. After the State specifies the values for water quality control parameters under §141.82(f), the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the State specifies the optimal values under §141.82(f).**

**(4) Reduced monitoring.**

**(i) A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with paragraph (c) of this section, and reduce the frequency of sampling to once per year. A small or medium water system collecting fewer than five samples as specified in paragraph (c) of this section, that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the frequency of sampling to once per year. In no case can the system reduce the number of samples required below the minimum of one sample per available tap. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.**

**(ii) Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and reduce the number of lead and copper samples in accordance with paragraph (c) of this section if it receives written approval from the State. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period. The State shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with §141.90, and shall notify the system in writing when it determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The State shall review, and where appropriate, revise its determination when the system submits new monitoring**

**or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.**

**(iii) A small or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that meets the lead action level and maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f) during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the State. Samples collected once every three years shall be collected no later than every third calendar year. The State shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with §141.90, and shall notify the system in writing when it determines the system is eligible to reduce the frequency of monitoring to once every three years. The State shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.**

**(iv) A water system 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 paragraph (a) of this section. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August, or September unless the State has approved a different sampling period in accordance with paragraph (d)(4)(iv)(A) of this section.**

**(A) The State, at its discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and must 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 State shall designate a period that represents a time of normal operation for the system. This sampling shall begin during the period approved or designated by the State in the calendar year immediately following the end of the second consecutive six-month monitoring period for systems initiating annual monitoring and during the three-year period following the end of the third consecutive calendar year of annual monitoring for systems initiating triennial monitoring.**

**(B) Systems monitoring annually, that have been collecting samples during the months of June through September and that receive State approval to alter their sample collection period under paragraph (d)(4)(iv)(A) of this section, must 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 State approval to alter the sampling collection period as per paragraph (d)(4)(iv)(A) of this section, must 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 must be collected annually or triennially, as required by this section. Small systems with waivers, granted pursuant to paragraph (g) of this section, that have been collecting samples during the months of June through September and receive State approval to alter their sample collection period under paragraph (d)(4)(iv)(A) of this section must collect their next round of samples before the end of the 9-year period.**

**(v) Any water system that demonstrates for two consecutive 6-month monitoring periods that the tap water lead level computed under §141.80(c)(3) is less than or equal to 0.005 mg/L and the tap water copper level computed under §141.80(c)(3) is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with paragraph (c) of this section and reduce the frequency of sampling to once every three calendar years.**

**(vi)**

**(A) A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with paragraph (d)(3) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section. Such a system shall also conduct water quality parameter monitoring in accordance with §141.87(b), (c) or (d) (as appropriate) during the monitoring period in**

which it exceeded the action level. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of paragraph (d)(4)(i) of this section and/or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section.

(B) Any water system subject to the reduced monitoring frequency that fails to meet the lead action level during any four-month monitoring period or that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the State under §141.82(f) for more than nine days in any six-month period specified in §141.87(d) shall conduct tap water sampling for lead and copper at the frequency specified in paragraph (d)(3) of this section, collect the number of samples specified for standard monitoring under paragraph (c) of this section, and shall resume monitoring for water quality parameters within the distribution system in accordance with §141.87(d). This standard tap water sampling shall begin no later than the six-month period beginning January 1 of the calendar year following the lead action level exceedance or water quality parameter excursion. Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

*( 1 )* The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent six-month rounds of monitoring that meet the criteria of paragraph (d)(4)(ii) of this section and the system has received written approval from the State that it is appropriate to resume reduced monitoring on an annual frequency. This sampling shall begin during the calendar year immediately following the end of the second consecutive six-month monitoring period.

*( 2 )* 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 paragraph (d)(4)(iii) or (d)(4)(v) of this section and the system has received written approval from the State that it is appropriate to resume triennial monitoring.

*( 3 )* The system may reduce the number of water quality parameter tap water samples required in accordance with §141.87(e)(1) and the frequency with which it collects such samples in accordance with §141.87(e)(2). Such a system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of §141.87(e)(2), that it has re-qualified for triennial monitoring.

(vii) Any water system subject to a reduced monitoring frequency under paragraph (d)(4) of this section shall notify the State in writing in accordance with §141.90(a)(3) of any upcoming long-term change in treatment or addition of a new source as described in that section. The State must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The State may require the system to resume sampling in accordance with paragraph (d)(3) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section 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.

(e) *Additional monitoring by systems*. The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the State in making any determinations ( i.e. , calculating the 90th percentile lead or copper level) under this subpart.

(f) *Invalidation of lead or copper tap water samples*. A sample invalidated under this paragraph does not count toward determining lead or copper 90th percentile levels under §141.80(c)(3) or toward meeting the minimum monitoring requirements of paragraph (c) of this section.

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

(i) The laboratory establishes that improper sample analysis caused erroneous results.

(ii) The State determines that the sample was taken from a site that did not meet the site selection criteria of this section.

**(iii) The sample container was damaged in transit.**

**(iv) There is substantial reason to believe that the sample was subject to tampering.**

**(2) The system must report the results of all samples to the State and all supporting documentation for samples the system believes should be invalidated.**

**(3) To invalidate a sample under paragraph (f)(1) of this section, the decision and the rationale for the decision must be documented in writing. States 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.**

**(4) The water system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of paragraph (c) of this section. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the State 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 shall 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.**

**(g) *Monitoring waivers for small systems.* Any small system that meets the criteria of this paragraph may apply to the State to reduce the frequency of monitoring for lead and copper under this section to once every nine years ( i.e., a “full waiver”) if it meets all of the materials criteria specified in paragraph (g)(1) of this section and all of the monitoring criteria specified in paragraph (g)(2) of this section. If State regulations permit, any small system that meets the criteria in paragraphs (g)(1) and (2) of this section only for lead, or only for copper, may apply to the State for a waiver to reduce the frequency of tap water monitoring to once every nine years for that contaminant only ( i.e., a “partial waiver”).**

**(1) Materials criteria. The system must 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 and/or copper-containing materials, as those terms are defined in this paragraph, as follows:**

**(i) Lead. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for lead ( i.e., a “lead waiver”), the water system must provide certification and supporting documentation to the State 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 such fittings and fixtures meet the specifications of any standard established pursuant to 42 U.S.C. 300g–6(e) (SDWA section 1417(e)).**

**(ii) Copper. To qualify for a full waiver, or a waiver of the tap water monitoring requirements for copper ( i.e., a “copper waiver”), the water system must provide certification and supporting documentation to the State that the system contains no copper pipes or copper service lines.**

**(2) Monitoring criteria for waiver issuance. The system must have completed at least one 6-month round of standard tap water monitoring for lead and copper at sites approved by the State and from the number of sites required by paragraph (c) of this section 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/or copper-containing materials, as appropriate, meet the following criteria.**

**(i) Lead levels. To qualify for a full waiver, or a lead waiver, the system must demonstrate that the 90th percentile lead level does not exceed 0.005 mg/L.**

**(ii) Copper levels. To qualify for a full waiver, or a copper waiver, the system must demonstrate that the 90th percentile copper level does not exceed 0.65 mg/L.**

**(3) State approval of waiver application. The State shall notify the system 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 State may require the system to perform specific activities (e.g., 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 system must continue monitoring for lead and copper at the tap as required by paragraphs (d)(1) through (d)(4) of this section, as appropriate, until it receives written notification from the State that the waiver has been approved.**

**(4) Monitoring frequency for systems with waivers.**

**(i) A system with a full waiver must conduct tap water monitoring for lead and copper in accordance with paragraph (d)(4)(iv) of this section at the reduced number of sampling sites identified in paragraph (c) of this section at least once every nine years and provide the materials certification specified in paragraph (g)(1) of this section for both lead and copper to the State along with the monitoring results. Samples collected every nine years shall be collected no later than every ninth calendar year.**

**(ii) A system with a partial waiver must conduct tap water monitoring for the waived contaminant in accordance with paragraph (d)(4)(iv) of this section at the reduced number of sampling sites specified in paragraph (c) of this section at least once every nine years and provide the materials certification specified in paragraph (g)(1) of this section pertaining to the waived contaminant along with the monitoring results. Such a system also must continue to monitor for the non-waived contaminant in accordance with requirements of paragraph (d)(1) through (d)(4) of this section, as appropriate.**

**(iii) Any water system with a full or partial waiver shall notify the State in writing in accordance with §141.90(a)(3) of any upcoming long-term change in treatment or addition of a new source, as described in that section. The State must review and approve the addition of a new source or long-term change in water treatment before it is implemented by the water system. The State has the authority to require the system to add or modify waiver conditions (e.g., require recertification that the system is free of lead-containing and/or copper-containing materials, require additional round(s) of monitoring), if it deems such modifications are necessary to address treatment or source water changes at the system.**

**(iv) 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 appropriate, (e.g., as a result of new construction or repairs), the system shall notify the State in writing no later than 60 days after becoming aware of such a change.**

**(5) Continued eligibility. If the system continues to satisfy the requirements of paragraph (g)(4) of this section, the waiver will be renewed automatically, unless any of the conditions listed in paragraph (g)(5)(i) through (g)(5)(iii) of this section occurs. A system whose waiver has been revoked may re-apply for a waiver at such time as it again meets the appropriate materials and monitoring criteria of paragraphs (g)(1) and (g)(2) of this section.**

**(i) A system with a full waiver or a lead waiver no longer satisfies the materials criteria of paragraph (g)(1)(i) of this section or has a 90th percentile lead level greater than 0.005 mg/L.**

**(ii) A system with a full waiver or a copper waiver no longer satisfies the materials criteria of paragraph (g)(1)(ii) of this section or has a 90th percentile copper level greater than 0.65 mg/L.**

**(iii) The State notifies the system, in writing, that the waiver has been revoked, setting forth the basis of its decision.**

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

**(i) If the system exceeds the lead and/or copper action level, the system must implement corrosion control treatment in accordance with the deadlines specified in §141.81(e), and any other applicable requirements of this subpart.**

**(ii) If the system meets both the lead and the copper action level, the system must monitor for lead and copper at the tap no less frequently than once every three years using the reduced number of sample sites specified in paragraph (c) of this section.**

**(7) Pre-existing waivers. Small system waivers approved by the State in writing prior to April 11, 2000 shall remain in effect under the following conditions:**

**(i) If the system has demonstrated that it is both free of lead-containing and copper-containing materials, as required by paragraph (g)(1) of this section and that its 90th percentile lead levels and 90th percentile copper levels meet the criteria of paragraph (g)(2) of this section, the waiver remains in effect so long as the system continues to meet the waiver eligibility criteria of paragraph (g)(5) of this section. The first round of tap water monitoring conducted pursuant to paragraph (g)(4) of this section shall be completed no later than nine years after the last time the system has monitored for lead and copper at the tap.**

**(ii) If the system has met the materials criteria of paragraph (g)(1) of this section but has not met the monitoring criteria of paragraph (g)(2) of this section, the system shall conduct a round of monitoring for lead and copper at the tap demonstrating that it meets the criteria of paragraph (g)(2) of this section no later than September 30, 2000. Thereafter, the waiver shall remain in effect as long as the system meets the continued eligibility criteria of paragraph (g)(5) of this section. The first round of tap water**

monitoring conducted pursuant to paragraph (g)(4) of this section shall be completed no later than nine years after the round of monitoring conducted pursuant to paragraph (g)(2) of this section.

**§ 141.87 Monitoring requirements for water quality parameters.**

**All large water systems and 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.**

(a) *General requirements* —

(1) Sample collection methods.

(i) 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, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under §141.86(a). [Note: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling under 40 CFR 141.21.]

(ii) Samples collected at the entry point(s) 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 must 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).

(2) Number of samples.

(i) Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under paragraphs (b) through (e) of this section from the following number of sites.

| System size (No. people served) | No. 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 |

(ii) Except as provided in paragraph (c)(3) of this section, systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in paragraph (b) of this section. During each monitoring period specified in paragraphs (c)–(e) of this section, systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

(b) *Initial sampling*. 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 six-month monitoring period specified in §141.86(d)(1). All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in §141.86(d)(1) during which the system exceeds the lead or copper action level.

(1) At taps:

(i) pH;
(ii) Alkalinity;
(iii) Orthophosphate, when an inhibitor containing a phosphate compound is used;
(iv) Silica, when an inhibitor containing a silicate compound is used;
(v) Calcium;
(vi) Conductivity; and
(vii) Water temperature.

(2) At each entry point to the distribution system: all of the applicable parameters listed in paragraph (b)(1) of this section.

(c) *Monitoring after installation of corrosion control.* Any large system which installs optimal corrosion control treatment pursuant to §141.81(d)(4) shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period

**specified in §141.86(d)(2)(i). Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in §141.86(d)(2)(ii) in which the system exceeds the lead or copper action level.**

**(1) At taps, two samples for:**

**(i) pH;**

**(ii) Alkalinity;**

**(iii) Orthophosphate, when an inhibitor containing a phosphate compound is used;**

**(iv) Silica, when an inhibitor containing a silicate compound is used;**

**(v) Calcium, when calcium carbonate stabilization is used as part of corrosion control.**

**(2) Except as provided in paragraph (c)(3) of this section, at each entry point to the distribution system, at least one sample no less frequently than every two weeks (biweekly) for:**

**(i) pH;**

**(ii) 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**

**(iii) 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).**

**(3) Any ground water system can limit entry point sampling described in paragraph (c)(2) of this section 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 must 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 paragraph, the system shall provide to the State 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.**

**(d) *Monitoring after State specifies water quality parameter values for optimal corrosion control*. After the State specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under §141.82(f), all large systems shall measure the applicable water quality parameters in accordance with paragraph (c) of this section and determine compliance with the requirements of §141.82(g) every six months with the first six-month period to begin on either January 1 or July 1, whichever comes first, after the State specifies the optimal values under §141.82(f). Any small or medium-size system shall conduct such monitoring during each six-month period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to §141.86(d)(4) at the time of the action level exceedance, the start of the applicable six-month monitoring period under this paragraph shall coincide with the start of the applicable monitoring period under §141.86(d)(4). Compliance with State-designated optimal water quality parameter values shall be determined as specified under §141.82(g).**

**(e) *Reduced monitoring*.**

**(1) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under paragraph (d) of this section shall continue monitoring at the entry point(s) to the distribution system as specified in paragraph (c)(2) of this section. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.**

| System size (No. of people served) | Reduced No. 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 |

**(2)**

**(i) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f)**

during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in this paragraph (e)(1) of this section from every six months to annually. This sampling begins during the calendar year immediately following the end of the monitoring period in which the third consecutive year of six-month monitoring occurs. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f), during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in paragraph (e)(1) of this section from annually to every three years. This sampling begins no later than the third calendar year following the end of the monitoring period in which the third consecutive year of monitoring occurs.

(ii) A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in paragraph (e)(1) of this section to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the PQL for lead specified in §141.89 (a)(1)(ii), that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in §141.80(c)(2), and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under §141.82(f). Monitoring conducted every three years shall be done no later than every third calendar year.

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

(4) 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 State in §141.82(f) for more than nine days in any six-month period specified in §141.82(g) shall resume distribution system tap water sampling in accordance with the number and frequency requirements in paragraph (d) of this section. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in paragraph (e)(1) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of that paragraph and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (e)(2)(i) or (e)(2)(ii) of this section.

(f) *Additional monitoring by systems*. The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the State in making any determinations ( i.e. , determining concentrations of water quality parameters) under this section or §141.82.

**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 point(s) 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 point(s) to distribution system[6] | No less frequently than every two weeks. |
| After State 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 point(s) to distribution system[6] | No less frequently than every two weeks. |

| Monitoring period | Parameters[2] | Location | Frequency |
|---|---|---|---|
| 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 point(s) to distribution system[6] | No less frequently than every two weeks. |

[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 six 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 State under §141.82(f) as representing optimal corrosion control during two consecutive six-month monitoring periods.

## § 141.88 Monitoring requirements for lead and copper in source water.

(a) *Sample location, collection methods, and number of samples*.

(1) A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with §141.86 shall collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:

(i) 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 (hereafter called a sampling point). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(ii) 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 (hereafter called a sampling point). The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

Note to paragraph (a)(1)(ii): For the purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

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

(iv) The State may reduce the total number of samples which must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five 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, then 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.

(2) Where the results of sampling indicate an exceedance of maximum permissible source water levels established under §141.83(b)(4), the State may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to

exceed two weeks) at the same sampling point. If a State-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 State-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 the PQL shall either be considered as the measured value or be considered one-half the PQL.

(b) *Monitoring frequency after system exceeds tap water action level.* Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system no later than six months after the end of the monitoring period during which the lead or copper action level was exceeded. For monitoring periods that are annual or less frequent, the end of the monitoring period is September 30 of the calendar year in which the sampling occurs, or if the State has established an alternate monitoring period, the last day of that period.

(c) *Monitoring frequency after installation of source water treatment*. Any system which installs source water treatment pursuant to §141.83(a)(3) shall collect an additional source water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in §141.83(a)(4).

(d) *Monitoring frequency after State specifies maximum permissible source water levels or determines that source water treatment is not needed*.

(1) A system shall monitor at the frequency specified below in cases where the State specifies maximum permissible source water levels under §141.83(b)(4) or determines that the system is not required to install source water treatment under §141.83(b)(2).

(i) A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in §141.2) in effect when the applicable State determination under paragraph (d)(1) of this section is made. Such systems shall collect samples once during each subsequent compliance period. Triennial samples shall be collected every third calendar year.

(ii) A water system using surface water (or a combination of surface and ground water) shall collect samples once during each calendar year, the first annual monitoring period to begin during the year in which the applicable State determination is made under paragraph (d)(1) of this section.

(2) A system is not required to conduct source water sampling for lead and/or copper 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 paragraph (d)(1) (i) or (ii) of this section.

(e) *Reduced monitoring frequency*.

(1) A water system using only ground water may reduce the monitoring frequency for lead and copper in source water to once during each nine-year compliance cycle (as that term is defined in §141.2) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

(i) 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 State in §141.83(b)(4) during at least three consecutive compliance periods under paragraph (d)(1) of this section; or

(ii) The State has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under paragraph (d)(1) of this section, 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.

(2) A water system using surface water (or a combination of surface water and ground water) may reduce the monitoring frequency in paragraph (d)(1) of this section to once during each nine-year compliance cycle (as that term is defined in §141.2) provided that the samples are collected no later than every ninth calendar year and if the system meets one of the following criteria:

(i) 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 State in §141.83(b)(4) for at least three consecutive years; or

(ii) The State has determined that source water treatment is not needed and the system demonstrates that, during at least three 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.

(3) A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the State in §141.83(a)(5).

**<u>§ 141.89 Analytical methods.</u>**

**(a) Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica, and temperature shall be conducted with the methods in §141.23(k)(1).**

- **(1) Analyses for alkalinity, calcium, conductivity, orthophosphate, pH, silica, and temperature may be performed by any person acceptable to the State. Analyses under this section for lead and copper shall only be conducted by laboratories that have been certified by EPA or the State. To obtain certification to conduct analyses for lead and copper, laboratories must:**
  - **(i) Analyze Performance Evaluation samples, which include lead and copper, provided by or acceptable to EPA or the State at least once a year by each method for which the laboratory desires certification; and**
  - **(ii) Achieve quantitative acceptance limits as follows:**
    - **(A) For lead: ±30 percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.005 mg/L. The Practical Quantitation Level, or PQL for lead is 0.005 mg/L.**
    - **(B) For Copper: ±10 percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.050 mg/L. The Practical Quantitation Level, or PQL for copper is 0.050 mg/L.**
  - **(iii) Achieve the method detection limit for lead of 0.001 mg/L according to the procedures in appendix B of part 136 of this title. This need only be accomplished if the laboratory will be processing source water composite samples under §141.88(a)(1)(iv).**
  - **(iv) Be currently certified by EPA or the State to perform analyses to the specifications described in paragraph (a)(1) of this section.**
- **(2) States have the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected and analyzed in accordance with the requirements of this subpart.**
- **(3) All lead and copper levels measured between the PQL and MDL must be either reported as measured or they can be reported as one-half the PQL specified for lead and copper in paragraph (a)(1)(ii) of this section. All levels below the lead and copper MDLs must be reported as zero.**
- **(4) All copper levels measured between the PQL and the MDL must be either reported as measured or they can be reported as one-half the PQL (0.025 mg/L). All levels below the copper MDL must be reported as zero.**

**(b) [Reserved]**

**<u>§ 141.90 Reporting requirements.</u>**

**All water systems shall report all of the following information to the State in accordance with this section.**

**(a) *Reporting requirements for tap water monitoring for lead and copper and for water quality parameter monitoring*.**

- **(1) Except as provided in paragraph (a)(1)(viii) of this section, a water system shall report the information specified below for all tap water samples specified in §141.86 and for all water quality parameter samples specified in §141.87 within the first 10 days following the end of each applicable monitoring period specified in §141.86 and §141.87 ( i.e., every six months, annually, every 3 years, or every 9 years). For monitoring periods with a duration less than six months, the end of the monitoring period is the last date samples can be collected during that period as specified in §§141.86 and 141.87.**
  - **(i) The results of all tap samples for lead and copper including the location of each site and the criteria under §141.86(a) (3), (4), (5), (6), and/or (7) under which the site was selected for the system's sampling pool;**
  - **(ii) Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to §141.86(f)(2);**
  - **(iii) [Reserved]**
  - **(iv) 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 §141.80(c)(3)), unless the State calculates the system's 90th percentile lead and copper levels under paragraph (h) of this section;**
  - **(v) With the exception of initial tap sampling conducted pursuant to §141.86(d)(1), the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;**
  - **(vi) The results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under §141.87 (b)–(e);**
  - **(vii) The results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under §141.87 (b)–(e);**

**(viii) A water system shall report the results of all water quality parameter samples collected under §141.87(c) through (f) during each six-month monitoring period specified in §141.87(d) within the first 10 days following the end of the monitoring period unless the State has specified a more frequent reporting requirement.**

**(2) For a non-transient non-community water system, or a community water system meeting the criteria of §141.85(b)(7), that does not have enough taps that can provide first-draw samples, the system must either:**

**(i) Provide written documentation to the State identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under §141.86(b)(5) by the start of the first applicable monitoring period under §141.86(d) that commences after April 11, 2000, unless the State has waived prior State approval of non-first-draw sample sites selected by the system pursuant to §141.86(b)(5); or**

**(ii) If the State has waived prior approval of non-first-draw sample sites selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to §141.86(b)(5) and include this information with the lead and copper tap sample results required to be submitted pursuant to paragraph (a)(1)(i) of this section.**

**(3) At a time specified by the State, or if no specific time is designated by the State, then as early as possible prior to the addition of a new source or any long-term change in water treatment, a water system deemed to have optimized corrosion control under §141.81(b)(3), a water system subject to reduced monitoring pursuant to §141.86(d)(4), or a water system subject to a monitoring waiver pursuant to §141.86(g), shall submit written documentation to the State describing the change or addition. The State must review and approve the addition of a new source or long-term change in treatment before it is implemented by the water system. Examples of long-term treatment changes include the addition of a new treatment process or modification of an existing treatment process. Examples of modifications include switching secondary disinfectants, switching coagulants (e.g., alum to ferric chloride), and switching corrosion inhibitor products (e.g., orthophosphate to blended phosphate). Long-term changes can include dose changes to existing chemicals if the system is planning long-term changes to its finished water pH or residual inhibitor concentration. Long-term treatment changes would not include chemical dose fluctuations associated with daily raw water quality changes.**

**(4) Any small system applying for a monitoring waiver under §141.86(g), or subject to a waiver granted pursuant to §141.86(g)(3), shall provide the following information to the State in writing by the specified deadline:**

**(i) By the start of the first applicable monitoring period in §141.86(d), any small water system applying for a monitoring waiver shall provide the documentation required to demonstrate that it meets the waiver criteria of §§141.86(g)(1) and (2).**

**(ii) No later than nine years after the monitoring previously conducted pursuant to §141.86(g)(2) or §141.86(g)(4)(i), each small system desiring to maintain its monitoring waiver shall provide the information required by §§141.86(g)(4)(i) and (ii).**

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

**(iv) By October 10, 2000, any small system with a waiver granted prior to April 11, 2000 and that has not previously met the requirements of §141.86(g)(2) shall provide the information required by that paragraph.**

**(5) Each ground water system that limits water quality parameter monitoring to a subset of entry points under §141.87(c)(3) shall provide, by the commencement of such monitoring, written correspondence to the State 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.**

**(b) *Source water monitoring reporting requirements.***

**(1) A water system shall report the sampling results for all source water samples collected in accordance with §141.88 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 §141.88.**

**(2) With the exception of the first round of source water sampling conducted pursuant to §141.88(b), the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.**

**(c) *Corrosion control treatment reporting requirements.* By the applicable dates under §141.81, systems shall report the following information:**

**(1) For systems demonstrating that they have already optimized corrosion control, information required in §141.81(b) (2) or (3).**
**(2) For systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under §141.82(a).**
**(3) For systems required to evaluate the effectiveness of corrosion control treatments under §141.82(c), the information required by that paragraph.**
**(4) For systems required to install optimal corrosion control designated by the State under §141.82(d), a letter certifying that the system has completed installing that treatment.**

**(d) *Source water treatment reporting requirements*. By the applicable dates in §141.83, systems shall provide the following information to the State:**
**(1) If required under §141.83(b)(1), their recommendation regarding source water treatment;**
**(2) For systems required to install source water treatment under §141.83(b)(2), a letter certifying that the system has completed installing the treatment designated by the State within 24 months after the State designated the treatment.**

**(e) *Lead service line replacement reporting requirements.* Systems shall report the following information to the State to demonstrate compliance with the requirements of §141.84:**
**(1) No later than 12 months after the end of a monitoring period in which a system exceeds the lead action level in sampling referred to in §141.84(a), the system must submit written documentation to the State of the material evaluation conducted as required in §141.86(a), identify the initial number of lead service lines in its distribution system at the time the system exceeds the lead action level, and provide the system's schedule for annually replacing at least 7 percent of the initial number of lead service lines in its distribution system.**
**(2) No later than 12 months after the end of a monitoring period in which a system exceeds the lead action level in sampling referred to in §141.84(a), and every 12 months thereafter, the system shall demonstrate to the State in writing that the system has either:**
**(i) Replaced in the previous 12 months at least 7 percent of the initial lead service lines (or a greater number of lines specified by the State under §141.84(e)) in its distribution system, or**
**(ii) Conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line(s), taken pursuant to §141.86(b)(3), is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in §141.84(c) shall equal at least 7 percent of the initial number of lead lines identified under paragraph (e)(1) of this section (or the percentage specified by the State under §141.84(e)).**
**(3) The annual letter submitted to the State under paragraph (e)(2) of this section shall contain the following information:**
**(i) The number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;**
**(ii) The number and location of each lead service line replaced during the previous year of the system's replacement schedule;**
**(iii) If measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.**
**(4) Any system which collects lead service line samples following partial lead service line replacement required by §141.84 shall report the results to the State within the first ten days of the month following the month in which the system receives the laboratory results, or as specified by the State. States, at their discretion may eliminate this requirement to report these monitoring results. Systems shall also report any additional information as specified by the State, and in a time and manner prescribed by the State, to verify that all partial lead service line replacement activities have taken place.**

**(f) *Public education program reporting requirements.***
**(1) Any water system that is subject to the public education requirements in §141.85 shall, within ten days after the end of each period in which the system is required to perform public education in accordance with §141.85(b), send written documentation to the State that contains:**
**(i) A demonstration that the system has delivered the public education materials that meet the content requirements in §141.85(a) and the delivery requirements in §141.85(b); and**
**(ii) 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.**
**(2) Unless required by the State, a system that previously has submitted the information required by paragraph (f)(1)(ii) of this section need not resubmit the information required by paragraph (f)(1)(ii) of this section, 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.**

**(3) No later than 3 months following the end of the monitoring period, each system must mail a sample copy of the consumer notification of tap results to the State along with a certification that the notification has been distributed in a manner consistent with the requirements of §141.85(d).**

**(g) *Reporting of additional monitoring data*. Any system which collects sampling data in addition to that required by this subpart shall report the results to the State within the first ten days following the end of the applicable monitoring period under §§141.86, 141.87 and 141.88 during which the samples are collected.**

**(h) *Reporting of 90th percentile lead and copper concentrations where the State calculates a system's 90th percentile concentrations.* 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 paragraph (a)(1)(iv) of this section if:**

**(1) The State 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 paragraph (h)(2)(i) of this section, and has specified a date before the end of the applicable monitoring period by which the system must provide the results of lead and copper tap water samples;**

**(2) The system has provided the following information to the State by the date specified in paragraph (h)(1) of this section:**

**(i) The results of all tap samples for lead and copper including the location of each site and the criteria under §141.86(a)(3), (4), (5), (6), and/or (7) under which the site was selected for the system's sampling pool, pursuant to paragraph (a)(1)(i) of this section; and**

**(ii) 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; and**

**(3) The State 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.**

### § 141.91 Recordkeeping requirements.

**Any system subject to the requirements of this subpart shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, State determinations, and any other information required by §§141.81 through 141.88. Each water system shall retain the records required by this section for no fewer than 12 years.**

## .1508 INORGANIC CHEMICAL SAMPLING AND ANALYSIS

The provisions of 40 C.F.R. 141.23 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under “Notes” on first page of this document.]* Non-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page. In addition, two or more water systems that are adjacent and are owned or operated by the same supplier of water and that together serve 15 or more service connections or 25 or more persons shall conform to the following sampling schedule. A water supplier shall submit samples every three years from each section of the water system supplied from a separate source. Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same people more than six months per year shall monitor as specified for transient non-community water systems.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 1, 1989; February 1, 1987; October 1, 1986; April 1, 1983;*
*Transferred and Recodified from 10 NCAC 10D .1625 Eff. April 4, 1990;*
*Amended Eff. July 1, 1994; April 1, 1992; December 1, 1991.*

## ADOPTED BY REFERENCE

### § 141.23 Inorganic chemical sampling and analytical requirements.

**Community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in §141.62 in accordance with this section. Non-transient, non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in §141.62 in accordance with this section. Transient, non-community water systems shall conduct monitoring to determine**

**compliance with the nitrate and nitrite maximum contaminant levels in §§141.11 and 141.62 (as appropriate) in accordance with this section.**

**(a) Monitoring shall be conducted as follows:**

**(1) 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 (hereafter called a sampling point) beginning in the initial compliance period. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.**

**(2) 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 (hereafter called a sampling point) beginning in the initial compliance period. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.**

**Note: For 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 must 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).**

**(4) The State may reduce the total number of samples which must be analyzed by allowing the use of compositing. Composite samples from a maximum of five samples are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory.**

**(i) If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample. Detection limits for each analytical method and MCLs for each inorganic contaminant are the following:**

**DETECTION LIMITS FOR INORGANIC CONTAMINANTS**

| Contaminant | MCL (mg/l) | Methodology | Detection limit (mg/l) |
|---|---|---|---|
| Antimony | 0.006 | Atomic Absorption; Furnace | 0.003 |
| | | Atomic Absorption; Platform | 0.0008[5] |
| | | ICP-Mass Spectrometry | 0.0004 |
| | | Hydride-Atomic Absorption | 0.001 |
| Arsenic | 0.010[6] | Atomic Absorption; Furnace | 0.001 |
| | | Atomic Absorption; Platform—Stabilized Temperature | 0.0005[7] |
| | | Atomic Absorption; Gaseous Hydride | 0.001 |
| | | ICP-Mass Spectrometry | 0.0014[8] |
| Asbestos | 7 MFL[1] | Transmission Electron Microscopy | 0.01 MFL |
| Barium | 2 | Atomic Absorption; furnace technique | 0.002 |
| | | Atomic Absorption; direct aspiration | 0.1 |
| | | Inductively Coupled Plasma | 0.002 (0.001) |
| Beryllium | 0.004 | Atomic Absorption; Furnace | 0.0002 |
| | | Atomic Absorption; Platform | 0.00002[5] |
| | | Inductively Coupled Plasma[2] | 0.0003 |
| | | ICP-Mass Spectrometry | 0.0003 |
| Cadmium | 0.005 | Atomic Absorption; furnace technique | 0.0001 |
| | | Inductively Coupled Plasma | 0.001 |

| Contaminant | MCL (mg/l) | Methodology | Detection limit (mg/l) |
|---|---|---|---|
| **Chromium** | **0.1** | **Atomic Absorption; furnace technique** | **0.001** |
| | | **Inductively Coupled Plasma** | **0.007 (0.001)** |
| **Cyanide** | **0.2** | **Distillation, Spectrophotometric**[3] | **0.02** |
| | | **Distillation, Automated, Spectrophotometric**[3] | **0.005** |
| | | **Distillation, Amenable, Spectrophotometric**[4] | **0.02** |
| | | **Distillation, Selective Electrode**[3, 4] | **0.05** |
| | | **UV, Distillation, Spectrophotometric**[9] | **0.0005** |
| | | **Micro Distillation, Flow Injection, Spectrophotometric**[3] | **0.0006** |
| | | **Ligand Exchange with Amperometry**[4] | **0.0005** |
| **Mercury** | **0.002** | **Manual Cold Vapor Technique** | **0.0002** |
| | | **Automated Cold Vapor Technique** | **0.0002** |
| **Nickel** | **XI** | **Atomic Absorption; Furnace** | **0.001** |
| | | **Atomic Absorption; Platform** | **0.0006**[5] |
| | | **Inductively Coupled Plasma**[2] | **0.005** |
| | | **ICP-Mass Spectrometry** | **0.0005** |
| **Nitrate** | **10 (as N)** | **Manual Cadmium Reduction** | **0.01** |
| | | **Automated Hydrazine Reduction** | **0.01** |
| | | **Automated Cadmium Reduction** | **0.05** |
| | | **Ion Selective Electrode** | **1** |
| | | **Ion Chromatography** | **0.01** |
| | | **Capillary Ion Electrophoresis** | **0.076** |
| **Nitrite** | **1 (as N)** | **Spectrophotometric** | **0.01** |
| | | **Automated Cadmium Reduction** | **0.05** |
| | | **Manual Cadmium Reduction** | **0.01** |
| | | **Ion Chromatography** | **0.004** |
| | | **Capillary Ion Electrophoresis** | **0.103** |
| **Selenium** | **0.05** | **Atomic Absorption; furnace** | **0.002** |
| | | **Atomic Absorption; gaseous hydride** | **0.002** |
| **Thallium** | **0.002** | **Atomic Absorption; Furnace** | **0.001** |
| | | **Atomic Absorption; Platform** | **0.0007**[5] |
| | | **ICP-Mass Spectrometry** | **0.0003** |

**[1] MFL = million fibers per liter >10 µm.**
**[2] Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.**
**[3] Screening method for total cyanides.**
**[4] Measures "free" cyanides when distillation, digestion, or ligand exchange is omitted.**
**[5] Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.**
**[6] The value for arsenic is effective January 23, 2006. Unit then, the MCL is 0.05 mg/L.**
**[7] The MDL reported for EPA method 200.9 (Atomic Absorption; Platform—Stablized Temperature) was determined using a 2x concentration step during sample digestion. The MDL determined for samples analyzed using direct analyses ( i.e. , no sample digestion) will be higher. Using multiple depositions, EPA 200.9 is capable of obtaining MDL of 0.0001 mg/L.**
**[8] Using selective ion monitoring, EPA Method 200.8 (ICP-MS) is capable of obtaining a MDL of 0.0001 mg/L.**
**[9] Measures total cyanides when UV-digestor is used, and "free" cyanides when UV-digestor is bypassed.**

**(ii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems**

**serving ≤3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.**

**(iii) If duplicates of the original sample taken from each sampling point used in the composite sample are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the State within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.**

**(5) The frequency of monitoring for asbestos shall be in accordance with paragraph (b) of this section: the frequency of monitoring for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with paragraph (c) of this section; the frequency of monitoring for nitrate shall be in accordance with paragraph (d) of this section; and the frequency of monitoring for nitrite shall be in accordance with paragraph (e) of this section.**

**(b) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in §141.62(b) shall be conducted as follows:**

**(1) Each community and non-transient, non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.**

**(2) If 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 State for a waiver of the monitoring requirement in paragraph (b)(1) of this section. If the State grants the waiver, the system is not required to monitor.**

**(3) The State may grant a waiver based on a consideration of the following factors:**

**(i) Potential asbestos contamination of the water source, and**

**(ii) The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.**

**(4) A waiver remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions of paragraph (b)(1) of this section.**

**(5) 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.**

**(6) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of paragraph (a) of this section.**

**(7) 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.**

**(8) A system which exceeds the maximum contaminant levels as determined in §141.23(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.**

**(9) The State may decrease the quarterly monitoring requirement to the frequency specified in paragraph (b)(1) of this section provided the State has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.**

**(10) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of §141.23(b), then the State may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.**

**(c) The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in §141.62 for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:**

**(1) Groundwater systems shall take one sample at each sampling point during each compliance period. Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point.**

**(2) The system may apply to the State for a waiver from the monitoring frequencies specified in paragraph (c)(1) of this section. States may grant a public water system a waiver for monitoring of cyanide, provided that the State determines that the system is not vulnerable due to lack of any industrial source of cyanide.**

**(3) A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle ( i.e. , nine years).**

**(4) The State may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample 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 three rounds of monitoring from the new source have been completed.**

**(5) In determining the appropriate reduced monitoring frequency, the State shall consider:**
  **(i) Reported concentrations from all previous monitoring;**
  **(ii) The degree of variation in reported concentrations; and**
  **(iii) 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.**

**(6) A decision by the State to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the State or upon an application by the public water system. The public water system shall specify the basis for its request. The State shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available.**

**(7) Systems which exceed the maximum contaminant levels as calculated in §141.23(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.**

**(8) The State may decrease the quarterly monitoring requirement to the frequencies specified in paragraphs (c)(1) and (c)(2) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.**

**(9) All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the State. The system must also comply with the initial sampling frequencies specified by the State to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.**

**(d) All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in §141.62.**

**(1) Community and non-transient, non-community water systems served by groundwater systems shall monitor annually beginning January 1, 1993; systems served by surface water shall monitor quarterly beginning January 1, 1993.**

**(2) 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 ≥50 percent of the MCL. The State may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.**

**(3) For community and non-transient, non-community water systems, the State may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are <50 percent of the MCL. A surface water system shall return to quarterly monitoring if any one sample is ≥50 percent of the MCL.**

**(4) Each transient non-community water system shall monitor annually beginning January 1, 1993.**

**(5) After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.**

**(e) All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in §141.62(b).**

**(1) All public water systems shall take one sample at each sampling point in the compliance period beginning January 1, 1993 and ending December 31, 1995.**

**(2) After the initial sample, systems where an analytical result for nitrite is <50 percent of the MCL shall monitor at the frequency specified by the State.**

**(3) For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is ≥50 percent of the MCL. The State may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.**

**(4) Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.**

**(f) Confirmation samples:**

**(1) Where the results of sampling for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium indicate an exceedance of the maximum contaminant level, the State may require that one additional**

**sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.**

**(2) Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, 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 must immediately notify persons served by the public water system in accordance with §141.202 and meet other Tier 1 public notification requirements under Subpart Q of this part. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.**

**(3) If a State-required confirmation sample is taken for any contaminant, then the results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with paragraph (i) of this section. States have the discretion to delete results of obvious sampling errors.**

**(g) The State may require more frequent monitoring than specified in paragraphs (b), (c), (d) and (e) of this section or may require confirmation samples for positive and negative results at its discretion.**

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

**(i) Compliance with §§141.11 or 141.62(b) (as appropriate) shall be determined based on the analytical result(s) obtained at each sampling point.**

**(1) For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average at any sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the 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 (average concentration) will be based on the total number of samples collected.**

**(2) For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium if the level of a contaminant is greater than the MCL. If confirmation samples are required by the State, the determination of compliance will be based on the annual average of the initial MCL exceedance and any State-required confirmation samples. If a system fails to collect the required number of samples, compliance (average concentration) will be based on the total number of samples collected.**

**(3) Compliance with the maximum contaminant levels for nitrate and nitrate is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (f)(2) of this section, and compliance shall be determined based on the average of the initial and confirmation samples.**

**(4) Arsenic sampling results will be reported to the nearest 0.001 mg/L.**

**(j) Each public water system shall monitor at the time designated by the State during each compliance period.**

**(k) Inorganic analysis:**

**(1) Analysis for the following contaminants shall be conducted in accordance with the methods in the following table, or the alternative methods listed in appendix A to subpart C of this part, or their equivalent as determined by EPA. Criteria for analyzing arsenic, barium, beryllium, cadmium, calcium, chromium, copper, lead, nickel, selenium, sodium, and thallium with digestion or directly without digestion, and other analytical test procedures are contained in Technical Notes on Drinking Water Methods, EPA–600/R–94–173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242–0419 or http://www.epa.gov/nscep/.**

| Contaminant | Methodology[13] | EPA | ASTM[3] | SM[4](18th, 19th ed.) | SM[4] (20th ed.) | SM Online[22] | Other |
|---|---|---|---|---|---|---|---|
| 1. Alkalinity | Titrimetric | | D1067–92, 02 B | 2320 B | 2320 B | 2320 B–97 | |
| | Electrometric titration | | | | | I–1030–85[5] | |

| Contaminant | Methodology[13] | EPA | ASTM[3] | SM[4](18th, 19th ed.) | SM[4] (20th ed.) | SM Online[22] | Other |
|---|---|---|---|---|---|---|---|
| 2. Antimony | Inductively Coupled Plasma (ICP)—Mass Spectrometry | 200.8[2] | | | | | |
| | Hydride-Atomic Absorption | | D3697–92, 02 | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Furnace | | | 3113 B | | 3113 B–99 | |
| 3. Arsenic[14] | ICP-Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Furnace | | D2972–97, 03 C | 3113 B | | 3113 B–99 | |
| | Hydride Atomic Absorption | | D1972–97, 03 B | 3114 B | | 3114 B–97 | |
| 4. Asbestos | Transmission Electron Microscopy | 100.1[9] | | | | | |
| | Transmission Electron Microscopy | 100.2[10] | | | | | |
| 5. Barium | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | ICP-Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Direct | | | 3111D | | 3111 D–99 | |
| | Atomic Absorption; Furnace | | | 3113 B | | 3113 B–99 | |
| 6. Beryllium | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | ICP-Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Furnace | | D3645–97, 03 B | 3113 B | | 3113 B–99 | |
| 7. Cadmium | Inductively Coupled Plasma | 200.7[2] | | | | | |
| | ICP-Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Furnace | | | 3113 B | | 3113 B–99 | |
| 8. Calcium | EDTA titrimetric | | D511–93, 03 A | 3500–Ca D | 3500–Ca B | 3500–Ca B–97 | |
| | Atomic Absorption; Direct Aspiration | | D511–93, 03 B | 3111 B | | 3111 B–99 | |
| | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | Ion Chromatography | | D6919–03 | | | | |
| 9. Chromium | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | ICP-Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Furnace | | | 3113 B | | 3113 B–99 | |

| Contaminant | Methodology[13] | EPA | ASTM[3] | SM[4](18th, 19th ed.) | SM[4] (20th ed.) | SM Online[22] | Other |
|---|---|---|---|---|---|---|---|
| 10. Copper | Atomic Absorption; Furnace | | D1688–95, 02 C | 3113 B | | 3113 B–99 | |
| | Atomic Absorption; Direct Aspiration | | D1688–95, 02 A | 3111 B | | 3111 B–99 | |
| | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | ICP-Mass spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| 11. Conductivity | Conductance | | D1125–95 (Reapproved 1999) A | 2510 B | 2510 B | 2510 B–97 | |
| 12. Cyanide | Manual Distillation followed by | | D2036–98 A | 4500–$CN^-$C | 4500–$CN^-$C | | |
| | Spectrophotometric, Amenable | | D2036–98 B | 4500–$CN^-$G | 4500–$CN^-$G | 4500–$CN^-$G–99 | |
| | Spectro-photometric Manual | | D2036–98 A | 4500–$CN^-$E | 4500–$CN^-$E | 4500–$CN^-$E–99 | I–3300–85[5] |
| | Spectro-photometric Semi-automated | 335.4[6] | | | | | |
| | Selective Electrode | | | 4500–$CN^-$F | 4500–$CN^-$F | 4500–$CN^-$F–99 | |
| | UV, Distillation, Spectrophotometric | | | | | | Kelada–01[17] |
| | Micro Distillation, Flow Injection, Spectrophotometric | | | | | | QuikChem 10–204–00–1–X[18] |
| | Ligand Exchange and Amperometry[21] | | D6888–04 | | | | OIA–1677, DW[20] |
| 13. Fluoride | Ion Chromatography | 300.0[6], 300.1[19] | D4327–97, 03 | 4110 B | 4110 B | 4110 B–00 | |
| | Manual Distill.; Color. SPADNS | | | 4500–$F^-$B, D | 4500–$F^-$B, D | 4500–$F^-$B, D–97 | |
| | Manual Electrode | | D1179–93, 99 B | 4500–$F^-$C | 4500–$F^-$C | 4500–$F^-$C–97 | |
| | Automated Electrode | | | | | | 380–75WE[11] |
| | Automated Alizarin | | | 4500–$F^-$E | 4500–$F^-$E | 4500–$F^-$E–97 | 129–71W[11] |
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[23] |
| 14. Lead | Atomic Absorption; Furnace | | D3559–96, 03 D | 3113 B | | 3113 B–99 | |
| | ICP–Mass spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Differential Pulse Anodic Stripping Voltametry | | | | | | Method 1001[16] |

| Contaminant | Methodology[13] | EPA | ASTM[3] | SM[4](18th, 19th ed.) | SM[4] (20th ed.) | SM Online[22] | Other |
|---|---|---|---|---|---|---|---|
| 15. Magnesium | Atomic Absorption | | D511–93, 03 B | 3111 B | | 3111 B–99 | |
| | ICP | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | Complexation Titrimetric Methods | | D511–93, 03 A | 3500–Mg E | 3500–Mg B | 3500–Mg B–97 | |
| | Ion Chromatography | | D6919–03 | | | | |
| 16. Mercury | Manual, Cold Vapor | 245.1[2] | D3223–97, 02 | 3112 B | | 3112 B–99 | |
| | Automated, Cold Vapor | 245.2[1] | | | | | |
| | ICP–Mass Spectrometry | 200.8[2] | | | | | |
| 17. Nickel | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| | ICP–Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Direct | | | 3111 B | | 3111 B–99 | |
| | Atomic Absorption; Furnace | | | 3113 B | | 3113 B–99 | |
| 18. Nitrate | Ion Chromatography | 300.0[6]300.1[19] | D4327–97, 03 | 4110 B | 4110 B | 4110 B–00 | B–1011[8] |
| | Automated Cadmium Reduction | 353.2[6] | D3867–90 A | 4500–NO3$^-$F | 4500–NO3$^-$F | 4500–NO3$^-$F–00 | |
| | Ion Selective Electrode | | | 4500–NO3$^-$D | 4500–NO3$^-$D | 4500–NO3$^-$D–00 | 601[7] |
| | Manual Cadmium Reduction | | D3867–90 B | 4500–NO3$^-$E | 4500–NO3$^-$E | 4500–NO3$^-$E–00 | |
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[23] |
| 19. Nitrite | Ion Chromatography | 300.0[6]300.1[19] | D4327–97, 03 | 4110 B | 4110 B | 4110 B–00 | B–1011[8] |
| | Automated Cadmium Reduction | 353.2[6] | D3867–90 A | 4500–NO3$^-$F | 4500–NO3$^-$F | 4500–NO3$^-$F–00 | |
| | Manual Cadmium Reduction | | D3867–90 B | 4500–NO3$^-$E | 4500–NO3$^-$E | 4500–NO3$^-$E–00 | |
| | Spectrophotometric | | | 4500–NO2$^-$B | 4500–NO2$^-$B | 4500–NO2$^-$B–00 | |
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[23] |
| 20. Ortho-phosphate[12] | Colorimetric, Automated, Ascorbic Acid | 365.1[6] | | 4500–P F | 4500–P F | | |
| | Colorimetric, ascorbic acid, single reagent | | D515–88 A | 4500–P E | 4500–P E | | |
| | Colorimetric Phosphomolybdate; | | | | | | I–1601–85[5] |
| | Automated-segmented flow; | | | | | | I–2601–90[5] |
| | Automated Discrete | | | | | | I–2598–85[5] |
| | Ion Chromatography | 300.0[6]<br>300.1[19] | D4327–97, 03 | 4110 B | 4110 B | 4110 B–00 | |

| Contaminant | Methodology[13] | EPA | ASTM[3] | SM[4](18th, 19th ed.) | SM[4] (20th ed.) | SM Online[22] | Other |
|---|---|---|---|---|---|---|---|
| | Capillary Ion Electrophoresis | | | | | | D6508, Rev. 2[23] |
| 21. pH | Electrometric | 150.1, 150.2[1] | D1293–95, 99 | 4500–$H^+$B | 4500–$H^+$B | 4500–$H^+$B–00 | |
| 22. Selenium | Hydride-Atomic Absorption | | D3859–98, 03 A | 3114 B | | 3114 B–97 | |
| | ICP–Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |
| | Atomic Absorption; Furnace | | D3859–98, 03 B | 3113 B | | 3113 B–99 | |
| 23. Silica | Colorimetric, Molybdate Blue | | | | | | I–1700–85[5] |
| | Automated-segmented Flow | | | | | | I–2700–85[5] |
| | Colorimetric | | D859–94, 00 | | | | |
| | Molybdosilicate | | | 4500–Si D | 4500–SiO2 C | 4500–SiO2 C–97 | |
| | Heteropoly blue | | | 4500–Si E | 4500–SiO2 D | 4500–SiO2 D–97 | |
| | Automated for Molybdate-reactive Silica | | | 4500–Si F | 4500–SiO2 E | 4500–SiO2 E–97 | |
| | Inductively Coupled Plasma | 200.7[2] | | 3120 B | 3120 B | 3120 B–99 | |
| 24. Sodium | Inductively Coupled Plasma | 200.7[2] | | | | | |
| | Atomic Absorption; Direct Aspiration | | | 3111 B | | 3111 B–99 | |
| | Ion Chromatography | | D6919–03 | | | | |
| 25. Temperature | Thermometric | | | 2550 | 2550 | 2550–00 | |
| 26. Thallium | ICP–Mass Spectrometry | 200.8[2] | | | | | |
| | Atomic Absorption; Platform | 200.9[2] | | | | | |

**The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1–11, 16–20, and 22–23 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800–426–4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., Room 3334, Washington, DC 20460 (Telephone: 202–566–2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to*: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.**

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[1] "Methods for Chemical Analysis of Water and Wastes," EPA/600/4–79/020, March 1983. Available at NTIS, PB84–128677.

[2] "Methods for the Determination of Metals in Environmental Samples—Supplement I," EPA/600/R–94/111, May 1994. Available at NTIS, PB95–125472.

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

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

**[5] 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.**

**[6] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA/600/R–93/100, August 1993. Available at NTIS, PB94–120821.**

**[7] 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. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129.**

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

**[9] Method 100.1, "Analytical Method For Determination of Asbestos Fibers in Water," EPA/600/4–83/043, EPA, September 1983. Available at NTIS, PB83–260471.**

**[10] Method 100.2, "Determination of Asbestos Structure Over 10-µm In Length In Drinking Water," EPA/600/R–94/134, June 1994. Available at NTIS, PB94–201902.**

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

**[12] Unfiltered, no digestion or hydrolysis.**

**[13] Because MDLs reported in EPA Methods 200.7 and 200.9 were determined using a 2x preconcentration step during sample digestion, MDLs determined when samples are analyzed by direct analysis ( i.e. , no sample digestion) will be higher. For direct analysis of cadmium 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.**

**[14] If ultrasonic nebulization is used in the determination of arsenic by Method 200.8, the arsenic must be in the pentavalent state to provide uniform signal response. For direct analysis of arsenic with Method 200.8 using ultrasonic nebulization, samples and standards must contain 1 mg/L of sodium hypochlorite.**

**[15] [Reserved]**

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

**[17] 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.**

**[18] 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.**

**[19] "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.**

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

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

**[22] 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.**

**[23] 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.**

**(2) Sample collection for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium, and thallium under this section shall be conducted using the sample preservation, container, and maximum holding time procedures specified in the table below:**

| Contaminant | Preservative[1] | Container[2] | Time[3] |
|---|---|---|---|
| Antimony | $HNO^3$ | P or G | 6 months |
| Arsenic | Conc $HNO_3$to pH <2 | P or G | 6 months |
| Asbestos | 4 °C | P or G | 48 hours[4] |
| Barium | $HNO^3$ | P or G | 6 months |
| Beryllium | $HNO^3$ | P or G | 6 months |
| Cadmium | $HNO^3$ | P or G | 6 months |
| Chromium | $HNO^3$ | P or G | 6 months |

| Contaminant | Preservative[1] | Container[2] | Time[3] |
|---|---|---|---|
| Cyanide | 4 °C, NaOH | P or G | 14 days |
| Fluoride | None | P or G | 1 month |
| Mercury | $HNO^3$ | P or G | 28 days |
| Nickel | $HNO^3$ | P or G | 6 months |
| Nitrate | 4 °C | P or G | 48 hours[5] |
| Nitrate-Nitrite[6] | $H^2SO^4$ | P or G | 28 days |
| Nitrite | 4°C | P or G | 48 hours |
| Selenium | $HNO^3$ | P or G | 6 months |
| Thallium | $HNO^3$ | P or G | 6 months |

[1] For cyanide determinations samples must be adjusted with sodium hydroxide to pH 12 at the time off collection. When chilling is indicated the sample must be shipped and stored at 4 °C or less. Acidification of nitrate or metals samples may be with a concentrated acid or a dilute (50% by volume) solution of the applicable concentrated acid. Acidification of samples for metals analysis is encouraged and allowed at the laboratory rather than at the time of sampling provided the shipping time and other instructions in Section 8.3 of EPA Methods 200.7 or 200.8 or 200.9 are followed.

[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. Follow additional (if any) information on preservation, containers or holding times that is specified in method.

[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 100.1.

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

[6] Nitrate-Nitrite refers to a measurement of total nitrate.

(3) Analysis under this section shall only be conducted by laboratories that have been certified by EPA or the State. Laboratories may conduct sample analysis under provisional certification until January 1, 1996. To receive certification to conduct analyses for antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite and selenium and thallium, the laboratory must:

- (i) Analyze Performance Evaluation (PE) samples provided by EPA, the State or by a third party (with the approval of the State or EPA) at least once a year.
- (ii) For each contaminant that has been included in the PE sample and for each method for which the laboratory desires certification achieve quantitative results on the analyses that are within the following acceptance limits:

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

**(l) Analyses for the purpose of determining compliance with §141.11 shall be conducted using the requirements specified in paragraphs (l) through (q) of this section.**

**(1) Analyses for all community water systems utilizing surface water sources shall be completed by June 24, 1978. These analyses shall be repeated at yearly intervals.**

**(2) Analyses for all community water systems utilizing only ground water sources shall be completed by June 24, 1979. These analyses shall be repeated at three-year intervals.**

**(3) For non-community water systems, whether supplied by surface or ground sources, analyses for nitrate shall be completed by December 24, 1980. These analyses shall be repeated at intervals determined by the State.**

**(4) The State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.**

**(m) If the result of an analysis made under paragraph (l) of this section indicates that the level of any contaminant listed in §141.11 exceeds the maximum contaminant level, the supplier of the water shall report to the State within 7 days and initiate three additional analyses at the same sampling point within one month.**

**(n) When the average of four analyses made pursuant to paragraph (m) of this section, 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 State pursuant to §141.31 and give notice to the public pursuant to subpart Q. Monitoring after public notification shall be at a frequency designated by the State and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.**

**(o) The provisions of paragraphs (m) and (n) of this section notwithstanding, compliance with the maximum contaminant level for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the maximum contaminant level for nitrate is found, a second analysis shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum contaminant level, the supplier of water shall report his findings to the State pursuant to §141.31 and shall notify the public pursuant to subpart Q.**

**(p) For the initial analyses required by paragraph (l) (1), (2) or (3) of this section, data for surface waters acquired within one year prior to the effective date and data for ground waters acquired within 3 years prior to the effective date of this part may be substituted at the discretion of the State.**

**(q) [Reserved]**

## .1509 SPECIAL MONITORING FOR SODIUM

(a) Suppliers of water for community water systems shall collect and analyze one sample per plant at the entry point of the distribution system for the determination of sodium concentration levels. Samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part, and at least every three years for systems utilizing solely ground water sources. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with Department approval, be considered one treatment 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.

(b) The supplier of water shall report to the Department the results of the analyses for sodium 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.

(c) The Department shall notify appropriate local health officials of the sodium levels found in community water systems.

(d) Analyses conducted to determine compliance with this Rule shall be made in accordance with methods adopted by the United States Environmental Protection Agency and codified as 40 C.F.R. 141.41(d) which are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Non-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page.

(e) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall be exempt from the provisions of this Rule.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. February 27, 1982;*
*Transferred and Recodified from 10 NCAC 10D .1636 Eff. April 4, 1990;*
*Amended Eff. July 1, 1994; September 1, 1990.*

### .1510 MAXIMUM CONTAMINANT LEVELS FOR INORGANIC CHEMICALS

(a) The provisions of 40 C.F.R. 141.11 are hereby incorporated by reference, including any subsequent amendments and editions, except the maximum contaminant level for arsenic shall be regulated as set forth in Paragraph (c) of this Rule. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from USEPA's homepage at http://www.epa.gov/safewater.

(b) The provisions of 40 C.F.R. 141.62 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under “Notes” on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from USEPA's homepage at http://www.epa.gov/safewater.

(c) Effective January 1, 2002, the maximum contaminant level for arsenic applies to community and non-transient non-community water systems as follows:

(1) The maximum contaminant level for arsenic is 0.010 milligrams per liter, until such time as the USEPA revises the standard to a level lower than 0.010 milligrams per liter at which time the more stringent level shall apply.

(2) Sampling, analytical requirements, and compliance calculations for arsenic shall be conducted as specified for the contaminants in 15A NCAC 18C .1508.

(3) Certified laboratories must report quantifiable results down to at least 0.005 milligrams per liter for arsenic compliance samples effective January 1, 2002.

(4) Water systems with arsenic in excess of the maximum contaminant level from the latest compliance sample must submit by January 1, 2005 a compliance schedule to the Division of Environmental Health, Public Water Supply Section stating the alternative solution that has been selected, the actions to be taken, and the deadline for those actions in order to meet the revised standard by the compliance date. The system must be in compliance with the MCL by January 23, 2006. In the interim period, the water system shall provide public notice pursuant to 15A NCAC 18C .1523. Exceedence of the maximum contaminant level shall be reported in the Consumer Confidence Report pursuant to 15A NCAC 18C .1538.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. October 1, 1986; October 1, 1982; April 1, 1982; March 31, 1981;*
*Transferred and Recodified from 10 NCAC 10D .1616 Eff. April 4, 1990;*
*Amended Eff. April 1, 1992;*
*Temporary Amendment Eff. January 1, 2002;*
*Amended Eff. April 1, 2003.*

### ADOPTED BY REFERENCE

**§ 141.11 Maximum contaminant levels for inorganic chemicals.**

**(a) The maximum contaminant level for arsenic applies only to community water systems. The analyses and determination of compliance with the 0.05 milligrams per liter maximum contaminant level for arsenic use the requirements of §141.23.**

**(b) The maximum contaminant level for arsenic is 0.05 milligrams per liter for community water systems until January 23, 2006.**

**(c) [Reserved]**

**(d) At the discretion of the State, nitrate 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 State that:**

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

(2) **The non-community water system is meeting the public notification requirements under §141.209, including continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure; and**

(3) **Local and State public health authorities will be notified annually of nitrate levels that exceed 10 mg/l; and**

(4) **No adverse health effects shall result.**

**<u>§ 141.62 Maximum contaminant levels for inorganic contaminants.</u>**

(a) **[Reserved]**

(b) **The maximum contaminant levels for inorganic contaminants specified in paragraphs (b) (2)–(6), (b)(10), and (b) (11)–(16) of this section apply to community water systems and non-transient, non-community water systems. The maximum contaminant level specified in paragraph (b)(1) of this section only applies to community water systems. The maximum contaminant levels specified in (b)(7), (b)(8), and (b)(9) of this section apply to community water systems; non-transient, non-community water systems; and transient non-community water systems.**

| Contaminant | MCL (mg/l) |
|---|---|
| (1) Fluoride | 4.0 |
| (2) Asbestos | 7 Million Fibers/liter (longer than 10 μm). |
| (3) Barium | 2 |
| (4) Cadmium | 0.005 |
| (5) Chromium | 0.1 |
| (6) Mercury | 0.002 |
| (7) Nitrate | 10 (as Nitrogen) |
| (8) Nitrite | 1 (as Nitrogen) |
| (9) Total Nitrate and Nitrite | 10 (as Nitrogen) |
| (10) Selenium | 0.05 |
| (11) Antimony | 0.006 |
| (12) Beryllium | 0.004 |
| (13) Cyanide (as free Cyanide) | 0.2 |
| (14) [Reserved] | |
| (15) Thallium | 0.002 |
| (16) Arsenic | 0.010 |

(c) **The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant levels for inorganic contaminants identified in paragraph (b) of this section, except fluoride:**

**BAT for Inorganic Compounds Listed in Section 141.62(b)**

| Chemical Name | BAT(s) |
|---|---|
| Antimony | 2,7 |

| Chemical Name | BAT(s) |
|---|---|
| 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 | 5,7,13 |
| 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 concentrations ≤10µg/1.
[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
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 = Chlorine
11 = Ultraviolet
12 = Oxidation/Filtration
13 = Alkaline Chlorination (pH ≥8.5)

(d) The Administrator, pursuant to section 1412 of the Act, hereby identifies in the following table the affordable technology, treatment technique, or other means available to systems serving 10,000 persons or fewer for achieving compliance with the maximum contaminant level for arsenic:

Small System Compliance Technologies (SSCTs)[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. |

| Small system compliance technology | Affordable for listed small system categories[3] |
|---|---|
| **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 SDWA specifies that SSCTs must be affordable and technically feasible for small systems.**
**[2] SSCTs for Arsenic V. Pre-oxidation may be required to convert Arsenic III to Arsenic V.**
**[3] The Act (ibid.) specifies three 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.**

### .1511 CONCENTRATION OF IRON

(a) The requirements of this Rule apply only to community water systems. A community water system which has an iron concentration in excess of 0.30 mg/l shall provide treatment to control the water quality. Analysis of samples shall be made on an as needed basis determined by the Department. Such need basis shall include, but not be limited to, addition of a new well or other raw water source, approval of a new community water system, approval of an existing system not previously approved, or problems and complaints of water quality normally associated with iron concentration.
(b) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall be exempt from the provisions of this Rule.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1619 Eff. April 4, 1990;*
*Amended Eff. July 1, 1994.*

### .1512 CONCENTRATION OF MANGANESE

(a) The requirements of this Rule apply only to community water systems. A community water system which has a manganese concentration in excess of 0.05 mg/l shall provide treatment to control the water quality. Analysis of samples shall be made on an as needed basis determined by the Department. Such need basis shall include, but not be limited to, addition of a new well or other raw water source, approval of a new community water system, approval of an existing system not previously approved, or problems and complaints of water quality normally associated with manganese concentration.
(b) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall be exempt from the provisions of this Rule.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. September 9, 1980;*
*Transferred and Recodified from 10 NCAC 10D .1620 Eff. April 4, 1990;*
*Amended Eff. July 1, 1994.*

### .1515 ORGANIC CHEMICALS OTHER THAN TTHM, SAMPLING AND ANALYSIS

(a) The requirements of this Rule shall apply to community and non-transient non-community water systems. The provisions of 40 C.F.R. 141.24 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See* *current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/. Any dates set forth in the federal rule shall be applicable.

(b) If the result of an analysis made pursuant to (a) of this Rule indicates that the level of any contaminant listed in 15A NCAC 18C .1517 exceeds the maximum contaminant level, the supplier of water shall report to the Department within 48 hours and initiate three additional analyses within one month.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. November 1, 1989; December 1, 1988; June 1, 1988; October 1, 1982;*
*Transferred and Recodified from 10 NCAC 10D .1624 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; April 1, 1992; December 1, 1991; September 1, 1990.*

## ADOPTED BY REFERENCE

**§ 141.24 Organic chemicals, sampling and analytical requirements.**

- **(a) [Reserved]**
- **(b) [Reserved]**
- **(c) [Reserved]**
- **(d) [Reserved]**
- **(e) Analyses for the contaminants in this section shall be conducted using the methods listed in the following table, or the alternative methods listed in appendix A to subpart C of this part, or their equivalent as determined by EPA.**
  - **(1) 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, 1301 Constitution Avenue, NW., EPA West, Room 3334, Washington, DC 20460 (Telephone: 202–566–2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. Method 508A and 515.1 are in Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4–88–039, December 1988, Revised, July 1991. Methods 547, 550 and 550.1 are in Methods for the Determination of Organic Compounds in Drinking Water—Supplement I, EPA/600–4–90–020, July 1990. Methods 548.1, 549.1, 552.1 and 555 are in Methods for the Determination of Organic Compounds in Drinking Water—Supplement II, EPA/600/R–92–129, August 1992. 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. Method 1613 is titled "Tetra–through Octa–Chlorinated Dioxins and Furans by Isotope–Dilution HRGC/HRMS," EPA/821–B–94–005, October 1994. These documents are available from the National Technical Information Service, NTIS PB91–231480, PB91–146027, PB92–207703, PB95–261616 and PB95–104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll free number is: 800–553–6847. Method 6651 shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, 18th edition (1992), 19th edition (1995), or 20th edition (1998), American Public Health Association (APHA); any of these three editions may be used. Method 6610 shall be followed in accordance with Standard Methods for the Examination of Water and Wastewater, (18th Edition Supplement) (1994), or with the 19th edition (1995) or 20th edition (1998) of Standard Methods for the Examination of Water and Wastewater; any of these publications may be used. The APHA documents are available from APHA, 1015 Fifteenth Street NW., Washington, DC 20005. Other required analytical test procedures germane to the conduct of these analyses are contained in Technical Notes on Drinking Water Methods, EPA/600/R–94–173, October 1994, NTIS PB95–104766. 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, 98 (Reapproved 2003) is available in the Annual Book of ASTM Standards, (1999), Vol. 11.02, ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428, any edition containing the cited version of the method may be used. EPA Method 515.4, "Determination of Chlorinated Acids in Drinking Water by Liquid-Liquid Microextraction, Derivatization and Fast Gas Chromatography with Electron Capture Detection," Revision 1.0, April 2000, EPA/815/B–00/001 and EPA Method 552.3, "Determination of Haloacetic Acids and Dalapon in Drinking Water by Liquid-Liquid Microextraction, Derivatization, and Gas Chromatography with Electron Capture**

**Detection," Revision 1.0, July 2003, EPA 815–B–03–002, can be accessed and downloaded directly online at http://www.epa.gov/safewater/methods/sourcalt.html. Syngenta Method AG–625, "Atrazine in Drinking Water by Immunoassay," February 2001, is available from Syngenta Crop Protection, Inc., 410 Swing Road, P.O. Box 18300, Greensboro, NC 27419. Telephone: 336–632–6000. Method 531.2 "Measurement of N-methylcarbamoyloximes and N-methylcarbamates in Water by Direct Aqueous Injection HPLC with Postcolumn Derivatization," Revision 1.0, September 2001, EPA 815–B–01–002, can be accessed and downloaded directly online at http://www.epa.gov/safewater/methods/sourcalt.html.**

| Contaminant | EPA method | Standard methods | ASTM | Other |
|---|---|---|---|---|
| 1. Benzene | 502.2, 524.2 | | | |
| 2. Carbon tetrachloride | 502.2, 524.2, 551.1 | | | |
| 3. Chlorobenzene | 502.2, 524.2 | | | |
| 4. 1,2-Dichlorobenzene | 502.2, 524.2 | | | |
| 5. 1,4-Dichlorobenzene | 502.2, 524.2 | | | |
| 6. 1,2-Dichloroethane | 502.2, 524.2 | | | |
| 7. cis-Dichloroethylene | 502.2, 524.2 | | | |
| 8. trans-Dichloroethylene | 502.2, 524.2 | | | |
| 9. Dichloromethane | 502.2, 524.2 | | | |
| 10. 1,2-Dichloropropane | 502.2, 524.2 | | | |
| 11. Ethylbenzene | 502.2, 524.2 | | | |
| 12. Styrene | 502.2, 524.2 | | | |
| 13. Tetrachloroethylene | 502.2, 524.2, 551.1 | | | |
| 14. 1,1,1-Trichloroethane | 502.2, 524.2, 551.1 | | | |
| 15. Trichloroethylene | 502.2, 524.2, 551.1 | | | |
| 16. Toluene | 502.2, 524.2 | | | |
| 17. 1,2,4-Trichlorobenzene | 502.2, 524.2 | | | |
| 18. 1,1-Dichloroethylene | 502.2, 524.2 | | | |
| 19. 1,1,2-Trichloroethane | 502.2, 524.2, 551.1 | | | |
| 20. Vinyl chloride | 502.2, 524.2 | | | |
| 21. Xylenes (total) | 502.2, 524.2 | | | |
| 22. 2,3,7,8-TCDD (dioxin) | 1613 | | | |
| 23. 2,4–D[4](as acids, salts, and esters) | 515.2, 555, 515.1, 515.3, 515.4 | | D5317–93, 98 (Reapproved 2003) | |
| 24. 2,4,5–TP[4](Silvex) | 515.2, 555, 515.1, 515.3, 515.4 | | D5317–93, 98 (Reapproved 2003) | |
| 25. Alachlor[2] | 507, 525.2, 508.1, 505, 551.1 | | | |
| 26. Atrazine[2] | 507, 525.2, 508.1, 505, 551.1 | | | Syngenta [5]AG–625 |
| 27. Benzo(a)pyrene | 525.2, 550, 550.1 | | | |
| 28. Carbofuran | 531.1, 531.2 | 6610 | | |
| 29. Chlordane | 508, 525.2, 508.1, 505 | | | |
| 30. Dalapon | 552.1 515.1, 552.2, 515.3, 515.4, 552.3 | | | |

| Contaminant | EPA method | Standard methods | ASTM | Other |
|---|---|---|---|---|
| **31. Di(2-ethylhexyl)adipate** | **506, 525.2** | | | |
| **32. Di(2-ethylhexyl)phthalate** | **506, 525.2** | | | |
| **33. Dibromochloropropane (DBCP)** | **504.1, 551.1** | | | |
| **34. Dinoseb[4]** | **515.2, 555, 515.1, 515.3, 515.4** | | | |
| **35. Diquat** | **549.2** | | | |
| **36. Endothall** | **548.1** | | | |
| **37. Endrin** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **38. Ethylene dibromide (EDB)** | **504.1, 551.1** | | | |
| **39. Glyphosate** | **547** | **6651** | | |
| **40. Heptachlor** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **41. Heptachlor Epoxide** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **42. Hexachlorobenzene** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **43. Hexachlorocyclopentadiene** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **44. Lindane** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **45. Methoxychlor** | **508, 525.2, 508.1, 505, 551.1** | | | |
| **46. Oxamyl** | **531.1, 531.2** | **6610** | | |
| **47. PCBs[3](as decachlorobiphenyl)** | **508A** | | | |
| **48. PCBs[3](as Aroclors)** | **508.1, 508, 525.2, 505** | | | |
| **49. Pentachlorophenol** | **515.2, 525.2, 555, 515.1, 515.3, 515.4** | | **D5317–93, 98 (Reapproved 2003)** | |
| **50. Picloram[4]** | **515.2, 555, 515.1, 515.3, 515.4** | | **D5317–93, 98 (Reapproved 2003)** | |
| **51. Simazine[2]** | **507, 525.2, 508.1, 505, 551.1** | | | |
| **52. Toxaphene** | **508, 508.1, 525.2, 505** | | | |
| **53. Total Trihalomethanes** | **502.2, 524.2, 551.1** | | | |

[1] **[Reserved]**

[2] 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 phosphorous detector may be used provided all regulatory requirements and quality control criteria are met.

[3] PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl. Users of Method 505 may have more difficulty in achieving the required detection limits than users of Methods 508.1, 525.2 or 508.

[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 D5317–93.

[5] 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 for atrazine generated by Method AG–625 that is greater than one-half the maximum contaminant level (MCL) (in other words, greater than 0.0015mg/L or 1.5 µg/L) must be confirmed using another approved method for this contaminant and should use additional volume of the original sample collected for compliance monitoring. In instances where a result from Method AG–625 triggers such confirmatory testing, the confirmatory result is to be used to determine compliance.

**(2) [Reserved]**

**(f) Beginning with the initial compliance period, analysis of the contaminants listed in §141.61(a) (1) through (21) for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:**

**(1) 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 (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.**

**(2) Surface water systems (or combined surface/ground) shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.**

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

**(4) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in §141.61(a) (2) through (21) during each compliance period, beginning in the initial compliance period.**

**(5) If the initial monitoring for contaminants listed in §141.61(a) (1) through (8) and the monitoring for the contaminants listed in §141.61(a) (9) through (21) as allowed in paragraph (f)(18) has been completed by December 31, 1992, and the system did not detect any contaminant listed in §141.61(a) (1) through (21), then each ground and surface water system shall take one sample annually beginning with the initial compliance period.**

**(6) After a minimum of three years of annual sampling, the State may allow groundwater systems with no previous detection of any contaiminant listed in §141.61(a) to take one sample during each compliance period.**

**(7) Each community and non-transient non-community ground water system which does not detect a contaminant listed in §141.61(a) (1) through (21) may apply to the State for a waiver from the requirements of paragraphs (f)(5) and (f)(6) of this section after completing the initial monitoring. (For purposes of this section, detection is defined as ≥0.0005 mg/l.) A waiver shall be effective for no more than six years (two compliance periods). States may also issue waivers to small systems for the initial round of monitoring for 1,2,4-trichlorobenzene.**

**(8) A State may grant a waiver after evaluating the following factor(s):**

- **(i) 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 State reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted.**
- **(ii) 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.**
  - **(A) Previous analytical results.**
  - **(B) 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.**
  - **(C) The environmental persistence and transport of the contaminants.**
  - **(D) The number of persons served by the public water system and the proximity of a smaller system to a larger system.**
  - **(E) How well the water source is protected against contamination, such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.**

**(9) As a condition of the waiver a groundwater system must take one sample at each sampling point during the time the waiver is effective ( i.e. , one sample during two compliance periods or six years) and update its vulnerability assessment considering the factors listed in paragraph (f)(8) of this section. Based on this vulnerability assessment the State must reconfirm that the system is non-vulnerable. If the State does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in paragraph (5) of this section.**

**(10) Each community and non-transient non-community surface water system which does not detect a contaminant listed in §141.61(a) (1) through (21) may apply to the State for a waiver from the requirements of (f)(5) of this section after completing the initial monitoring. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Systems meeting this criterion must be determined by the State 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 State (if any).**

**(11) If a contaminant listed in §141.61(a) (2) through (21) is detected at a level exceeding 0.0005 mg/l in any sample, then:**

- **(i) The system must monitor quarterly at each sampling point which resulted in a detection.**
- **(ii) The State may decrease the quarterly monitoring requirement specified in paragraph (f)(11)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.**
- **(iii) If the State determines that the system is reliably and consistently below the MCL, the State may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.**
- **(iv) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the State for a waiver as specified in paragraph (f)(7) of this section.**
- **(v) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the State may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride as specified by the State.**

**(12) Systems which violate the requirements of §141.61(a) (1) through (21), as determined by paragraph (f)(15) of this section, must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in paragraph (f)(15) of this section the system and the State determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and times specified in paragraph (f)(11)(iii) of this section.**

**(13) The State may require a confirmation sample for positive or negative results. If a confirmation sample is required by the State, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified by paragraph (f)(15). States have discretion to delete results of obvious sampling errors from this calculation.**

**(14) The State may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.**

- **(i) If the concentration in the composite sample is greater than or equal to 0.0005 mg/l for any contaminant listed in §141.61(a), then a follow-up sample must be taken within 14 days at each sampling point included in the composite, and be analyzed for that contaminant.**
- **(ii) If duplicates of the original sample taken from each sampling point used in the composite sample are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the State within 14 days after completing analysis of the composite sample, provided the holding time of the sample is not exceeded.**
- **(iii) If the population served by the system is > 3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems serving ≤ 3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.**
- **(iv) Compositing 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 must be made to maintain zero headspace in the syringe.**
  - **(B) The samples must 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 less than five samples are used for compositing, a proportionately small syringe may be used.**
- **(v) Compositing 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 must be 25 ml.**

**(C) Purge and desorb as described in the method.**

**(15) Compliance with §141.61(a) (1) through (21) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.**

**(i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.**

**(ii) Systems monitoring annually or less frequently whose sample result exceeds the MCL must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.**

**(iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.**

**(iv) If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.**

**(v) If a sample result is less than the detection limit, zero will be used to calculate the annual average.**

**(16) [Reserved]**

**(17) Analysis under this section shall only be conducted by laboratories that are certified by EPA or the State according to the following conditions (laboratories may conduct sample analysis under provisional certification until January 1, 1996):**

**(i) To receive certification to conduct analyses for the contaminants in §141.61(a) (2) through (21) the laboratory must:**

**(A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.**

**(B) Achieve the quantitative acceptance limits under paragraphs (f)(17)(i)(C) and (D) of this section for at least 80 percent of the regulated organic contaminants included in the PE sample.**

**(C) Achieve quantitative results on the analyses performed under paragraph (f)(17)(i)(A) of this section that are within ±20% of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/l.**

**(D) Achieve quantitative results on the analyses performed under paragraph (f)(17)(i)(A) of this section that are within ±40 percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is less than 0.010 mg/l.**

**(E) Achieve a method detection limit of 0.0005 mg/l, according to the procedures in appendix B of part 136.**

**(ii) To receive certification to conduct analyses for vinyl chloride, the laboratory must:**

**(A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.**

**(B) Achieve quantitative results on the analyses performed under paragraph (f)(17)(ii)(A) of this section that are within ±40 percent of the actual amount of vinyl chloride in the Performance Evaluation sample.**

**(C) Achieve a method detection limit of 0.0005 mg/l, according to the procedures in appendix B of part 136.**

**(D) Obtain certification for the contaminants listed in §141.61(a)(2) through (21).**

**(18) States may allow the use of monitoring data collected after January 1, 1988, required under section 1445 of the Act for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements of this section, the State may use these data ( i.e. , a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of paragraph (f)(4) of this section. Systems which use grandfathered samples and did not detect any contaminant listed §141.61(a)(2) through (21) shall begin monitoring annually in accordance with paragraph (f)(5) of this section beginning with the initial compliance period.**

**(19) States may increase required monitoring where necessary to detect variations within the system.**

**(20) Each certified laboratory must determine the method detection limit (MDL), as defined in appendix B to part 136, at which it is capable of detecting VOCs. The acceptable MDL is 0.0005 mg/l. This concentration is the detection concentration for purposes of this section.**

**(21) Each public water system shall monitor at the time designated by the State within each compliance period.**

- (22) All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the State. The system must also comply with the initial sampling frequencies specified by the State to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.

(g) [Reserved]

(h) Analysis of the contaminants listed in §141.61(c) for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows, with the exception that no monitoring is required for aldicarb, aldicarb sulfoxide or aldicarb sulfone:

- (1) 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 (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
- (2) Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
  - Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.
- (3) If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions ( i.e. , when water representative of all sources is being used).
- (4) Monitoring frequency:
  - (i) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in §141.61(c) during each compliance period beginning with the initial compliance period.
  - (ii) 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 two quarterly samples in one year during each repeat compliance period.
  - (iii) Systems serving less 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.
- (5) Each community and non-transient water system may apply to the State for a waiver from the requirement of paragraph (h)(4) of this section. A system must reapply for a waiver for each compliance period.
- (6) A State may grant a waiver after evaluating the following factor(s): 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 State reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted. 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.
  - (i) Previous analytical results.
  - (ii) 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.
  - (iii) The environmental persistence and transport of the pesticide or PCBs.
  - (iv) 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.
  - (v) Elevated nitrate levels at the water supply source.
  - (vi) Use of PCBs in equipment used in the production, storage, or distribution of water ( i.e. , PCBs used in pumps, transformers, etc.).
- (7) If an organic contaminant listed in §141.61(c) is detected (as defined by paragraph (h)(18) of this section) in any sample, then:
  - (i) Each system must monitor quarterly at each sampling point which resulted in a detection.
  - (ii) The State may decrease the quarterly monitoring requirement specified in paragraph (h)(7)(i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

**(iii) After the State determines the system is reliably and consistently below the maximum contaminant level the State may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.**

**(iv) Systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the State for a waiver as specified in paragraph (h)(6) of this section.**

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

**(8) Systems which violate the requirements of §141.61(c) as determined by paragraph (h)(11) of this section must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the State determines the system is reliably and consistently below the MCL, as specified in paragraph (h)(11) of this section, the system shall monitor at the frequency specified in paragraph (h)(7)(iii) of this section.**

**(9) The State may require a confirmation sample for positive or negative results. If a confirmation sample is required by the State, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by paragraph (h)(11) of this section. States have discretion to delete results of obvious sampling errors from this calculation.**

**(10) The State may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.**

**(i) If the concentration in the composite sample detects one or more contaminants listed in §141.61(c), then a follow-up sample must be taken within 14 days at each sampling point included in the composite, and be analyzed for that contaminant.**

**(ii) If duplicates of the original sample taken from each sampling point used in the composite sample are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the State within 14 days after completion of the composite analysis or before the holding time for the initial sample is exceeded whichever is sooner.**

**(iii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the State at sampling points within a single system. In systems serving ≤ 3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.**

**(11) Compliance with §141.61(c) shall be determined based on the analytical results obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.**

**(i) For systems monitoring more than once per year, compliance with the MCL is determined by a running annual average at each sampling point.**

**(ii) Systems monitoring annually or less frequently whose sample result exceeds the regulatory detection level as defined by paragraph (h)(18) of this section must begin quarterly sampling. The system will not be considered in violation of the MCL until it has completed one year of quarterly sampling.**

**(iii) If any sample result will cause the running annual average to exceed the MCL at any sampling point, the system is out of compliance with the MCL immediately.**

**(iv) If a system fails to collect the required number of samples, compliance will be based on the total number of samples collected.**

**(v) If a sample result is less than the detection limit, zero will be used to calculate the annual average.**

**(12) [Reserved]**

**(13) Analysis for PCBs shall be conducted as follows using the methods in paragraph (e) of this section:**

**(i) Each system which monitors for PCBs shall analyze each sample using either Method 508.1, 525.2, 508 or 505. Users of Method 505 may have more difficulty in achieving the required Aroclor detection limits than users of Methods 508.1, 525.2 or 508.**

**(ii) If PCBs (as one of seven Aroclors) are detected (as designated in this paragraph) in any sample analyzed using Method 505 or 508, the system shall reanalyze the sample 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 |

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

**(14) If monitoring data collected after January 1, 1990, are generally consistent with the requirements of §141.24(h), then the State may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.**

**(15) The State may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).**

**(16) The State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.**

**(17) Each public water system shall monitor at the time designated by the State within each compliance period.**

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

| Contaminant | Detection limit (mg/l) |
|---|---|
| Alachlor | .0002 |
| Aldicarb | .0005 |
| Aldicarb sulfoxide | .0005 |
| Aldicarb sulfone | .0008 |
| Atrazine | .0001 |
| Benzo[a]pyrene | .00002 |
| Carbofuran | .0009 |
| Chlordane | .0002 |
| Dalapon | .001 |
| 1,2–Dibromo–3–chloropropane (DBCP) | .00002 |
| Di (2-ethylhexyl) adipate | .0006 |
| Di (2-ethylhexyl) phthalate | .0006 |
| Dinoseb | .0002 |
| Diquat | .0004 |
| 2,4-D | .0001 |
| Endothall | .009 |
| Endrin | .00001 |
| Ethylene dibromide (EDB) | .00001 |
| Glyphosate | .006 |
| Heptachlor | .00004 |

| Contaminant | Detection limit (mg/l) |
|---|---|
| Heptachlor epoxide | .00002 |
| Hexachlorobenzene | .0001 |
| Hexachlorocyclopentadiene | .0001 |
| Lindane | .00002 |
| Methoxychlor | .0001 |
| Oxamyl | .002 |
| Picloram | .0001 |
| Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl) | .0001 |
| Pentachlorophenol | .00004 |
| Simazine | .00007 |
| Toxaphene | .001 |
| 2,3,7,8-TCDD (Dioxin) | .000000005 |
| 2,4,5-TP (Silvex) | .0002 |

**(19) Anaylsis under this section shall only be conducted by laboratories that have received certification by EPA or the State and have met the following conditions:**

- **(i) To receive certification to conduct analyses for the contaminants in §141.61(c) the laboratory must:**
  - **(A) Analyze Performance Evaluation (PE) samples provided by EPA, the State, or by a third party (with the approval of the State or EPA) at least once a year by each method for which the laboratory desires certification.**
  - **(B) For each contaminant that has been included in the PE sample achieve quantitative results on the analyses that are within the following acceptance limits:**

| Contaminant | Acceptance limits (percent) |
|---|---|
| DBCP | ±40 |
| EDB | ±40. |
| Alachlor | ±45. |
| Atrazine | ±45. |
| Benzo[a]pyrene | 2 standard deviations. |
| Carbofuran | ±45. |
| Chlordane | ±45. |
| Dalapon | 2 standard deviations. |
| Di(2-ethylhexyl)adipate | 2 standard deviations. |
| Di(2-ethylhexyl)phthalate | 2 standard deviations. |
| Dinoseb | 2 standard deviations. |
| Diquat | 2 standard deviations. |
| Endothall | 2 standard deviations. |
| Endrin | ±30. |
| Glyphosate | 2 standard deviations. |
| Heptachlor | ±45. |
| Heptachlor epoxide | ±45. |

| **Contaminant** | **Acceptance limits (percent)** |
|---|---|
| **Hexachlorobenzene** | **2 standard deviations.** |
| **Hexachloro-cyclopentadiene** | **2 standard deviations.** |
| **Lindane** | **±45.** |
| **Methoxychlor** | **±45.** |
| **Oxamyl** | **2 standard deviations.** |
| **PCBs (as Decachlorobiphenyl)** | **0–200.** |
| **Picloram** | **2 standard deviations.** |
| **Simazine** | **2 standard deviations.** |
| **Toxaphene** | **±45.** |
| **Aldicarb** | **2 standard deviations.** |
| **Aldicarb sulfoxide** | **2 standard deviations.** |
| **Aldicarb sulfone** | **2 standard deviations.** |
| **Pentachlorophenol** | **±50.** |
| **2,3,7,8-TCDD (Dioxin)** | **2 standard deviations.** |
| **2,4-D** | **±50.** |
| **2,4,5-TP (Silvex)** | **±50.** |

**(ii) [Reserved]**

**(20) All new systems or systems that use a new source of water that begin operation after January 22, 2004 must demonstrate compliance with the MCL within a period of time specified by the State. The system must also comply with the initial sampling frequencies specified by the State to ensure a system can demonstrate compliance with the MCL. Routine and increased monitoring frequencies shall be conducted in accordance with the requirements in this section.**

## .1516 SPECIAL MONITORING FOR INORGANIC AND ORGANIC CHEMICALS

*NOTE: This rule is currently being implemented directly by the US Environmental Protection Agency.*

(a) The provisions of 40 C.F.R. 141.40 are hereby incorporated by reference including any subsequent amendments and editions, except that 40 C.F.R. 141.40(n)(10) is not adopted. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Non-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page.

(b) To comply with the monitoring requirements of this Rule a community water system or non-transient, non-community water system serving fewer than 150 service connections shall take a single water sample to be analyzed for inorganic and organic chemicals.

(c) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall be exempt from the provisions of this Rule.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. June 1, 1988;*
*Amended Eff. November 1, 1989;*
*Transferred and Recodified from 10 NCAC 10D .1638 Eff. April 4, 1990;*
*Amended Eff. July 1, 1994; April 1, 1992; December 1, 1991; August 1, 1990.*

## ADOPTED BY REFERENCE

**<u>§ 141.40 Monitoring requirements for unregulated contaminants.</u>**

**(a) General applicability. This section specifies the monitoring and quality control requirements that must be followed if you own or operate a public water system (PWS) that is subject to the Unregulated Contaminant Monitoring Regulation (UCMR), as specified in paragraphs (a)(1) and (2) of this section. In addition, this section specifies the UCMR requirements for State and Tribal participation. For the purposes of this section, PWS “population served,” “State,” “ PWS Official,” “PWS Technical Contact,” and “finished water” apply as defined in §141.35(a). The determination of whether a PWS is required to monitor under this rule is based on the type of system (e.g., community water system, non-transient non-community water system, etc.); whether the system purchases all of its water, as finished water, from another system; and its population served as of June 30, 2005.**

- **(1) Applicability to transient non-community systems. If you own or operate a transient non-community water system, you do not have to monitor that system for unregulated contaminants.**
- **(2) Applicability to community water systems and non-transient non-community water systems.**
  - **(i) Large systems. If you own or operate a wholesale or retail PWS (other than a transient non-community system) that serves more than 10,000 people, and do not purchase your entire water supply as finished water from another PWS, you must monitor according to the specifications in this paragraph (a)(2)(i). If you believe that your applicability status is different than EPA has specified in the notification letter that you received, or if you are subject to UCMR requirements and you have not been notified by either EPA or your State, you must report to EPA, as specified in §141.35(b)(2) or (c)(4).**
    - **(A) Assessment Monitoring. You must monitor for the unregulated contaminants on List 1 of Table 1, UCMR Contaminant List, in paragraph (a)(3) of this section. If you serve a population of more than 10,000 people, you are required to perform this monitoring regardless of whether you have been notified by the State or EPA.**
    - **(B) Screening Survey. You must monitor for the unregulated contaminants on List 2 (Screening Survey) of Table 1, as specified in paragraph (a)(3) of this section, if your system serves 10,001 to 100,000 people and you are notified by EPA or your State that you are part of the State Monitoring Plan for Screening Survey testing. If your system serves more than 100,000 people, you are required to conduct this Screening Survey testing regardless of whether you have been notified by the State or EPA.**
    - **(C) Pre-Screen Testing. You must monitor for the unregulated contaminants on List 3 of Table 1, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the Pre-Screen Testing.**
  - **(ii) Small systems. Small PWSs, as defined in this paragraph, will not be selected to monitor for any more than one of the three monitoring lists provided in Table 1, UCMR Contaminant List, in paragraph (a)(3) of this section. EPA will provide sample containers, provide pre-paid air bills for shipping the sampling materials, conduct the laboratory analysis, and report and review monitoring results for all small systems selected to conduct monitoring under paragraphs (a)(2)(ii)(A) through (C) of this section. If you own or operate a PWS (other than a transient system) that serves 10,000 or fewer people and do not purchase your entire water supply from another PWS, you must monitor as follows:**
    - **(A) Assessment Monitoring. You must monitor for the unregulated contaminants on List 1 of Table 1, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the State Monitoring Plan for Assessment Monitoring.**
    - **(B) Screening Survey. You must monitor for the unregulated contaminants on List 2 of Table 1, in paragraph (a)(3) of this section, if notified by your State or EPA that you are part of the State Monitoring Plan for the Screening Survey.**
    - **(C) Pre-Screen Testing. You must monitor for the unregulated contaminants on List 3 of Table 1, in paragraph (a)(3) of this section, if you are notified by your State or EPA that you are part of the State Monitoring plan for Pre-Screen Testing.**
- **(3) Analytes to be monitored. Lists 1, 2, and 3 of unregulated contaminants are provided in the following table:**

**Table 1—UCMR Contaminant List**

**[List 1: Assessment Monitoring Chemical Contaminants]**

| 1—Contaminant | 2—CAS registry number | 3—Analytical methods[a] | 4—Minimum reporting level[b] | 5—Sampling location[c] | 6—Period during which monitoring to be completed |
|---|---|---|---|---|---|
| Dimethoate | 60–51–5 | EPA 527[d] | 0.7 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Terbufos sulfone | 56070–16–7 | EPA 527[d] | 0.4 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 2,2',4,4'-tetrabromodiphenyl ether (BDE–47) | 5436–43–1 | EPA 527[d] | 0.3 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 2,2',4,4',5-pentabromodiphenyl ether (BDE–99) | 60348–60–9 | EPA 527[d] | 0.9 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 2,2',4,4',5,5'-hexabromobiphenyl (HBB) | 59080–40–9 | EPA 527[d] | 0.7 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE–153) | 68631–49–2 | EPA 527[d] | 0.8 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 2,2',4,4',6-pentabromodiphenyl ether (BDE–100) | 189084–64–8 | EPA 527[d] | 0.5 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 1,3-dinitrobenzene | 99–65–0 | EPA 529[e] | 0.8 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| 2,4,6-trinitrotoluene (TNT) | 118–96–7 | EPA 529[e] | 0.8 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) | 121–82–4 | EPA 529[e] | 1 µg/L | EPTDS | 1/1/2008–12/31/2010 |

**Table 1—UCMR Contaminant List**

**[List 2: Screening Survey Chemical Contaminants]**

| 1—Contaminant | 2—CAS registry number | 3—Analytical methods[a] | 4—Minimum reporting level[b] | 5—Sampling location[c] | 6—Period during which monitoring to be completed |
|---|---|---|---|---|---|
| **Acetanilide Pesticide Degradation Products** | | | | | |
| Acetochlor ESA | 187022–11–3 | EPA 535[f] | 1 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Acetochlor OA | 184992–44–4 | EPA 535[f] | 2 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Alachlor ESA | 142363–53–9 | EPA 535[f] | 1 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Alachlor OA | 171262–17–2 | EPA 535[f] | 2 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Metolachlor ESA | 171118–09–5 | EPA 535[f] | 1 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Metolachlor OA | 152019–73–3 | EPA 535[f] | 2 µg/L | EPTDS | 1/1/2008–12/31/2010 |

| 1—Contaminant | 2—CAS registry number | 3—Analytical methods[a] | 4—Minimum reporting level[b] | 5—Sampling location[c] | 6—Period during which monitoring to be completed |
|---|---|---|---|---|---|
| **Acetanilide Pesticide Parent Compounds** | | | | | |
| Acetochlor | 34256–82–1 | EPA 525.2[g] | 2 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Alachlor | 15972–60–8 | EPA 525.2[g] | 2 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| Metolachlor | 51218–45–2 | EPA 525.2[g] | 1 µg/L | EPTDS | 1/1/2008–12/31/2010 |
| **Nitrosamines** | | | | | |
| N-nitrosodiethylamine (NDEA) | 55–18–5 | EPA 521[h] | 0.005 µg/L | DSMRT and EPTDS | 1/1/2008–12/31/2010 |
| N-nitroso-dimethylamine (NDMA) | 62–75–9 | EPA 521[h] | 0.002 µg/L | DSMRT and EPTDS | 1/1/2008–12/31/2010 |
| N-nitroso-di-n-butylamine (NDBA) | 924–16–3 | EPA 521[h] | 0.004 µg/L | DSMRT and EPTDS | 1/1/2008–12/31/2010 |
| N-nitroso-di-n-propylamine (NDPA) | 621–64–7 | EPA 521[h] | 0.007 µg/L | DSMRT and EPTDS | 1/1/2008–12/31/2010 |
| N-nitroso-methylethylamine (NMEA) | 10595–95–6 | EPA 521[h] | 0.003 µg/L | DSMRT and EPTDS | 1/1/2008–12/31/2010 |
| N-nitrosopyrrolidine (NPYR) | 930–55–2 | EPA 521[h] | 0.002 µg/L | DSMRT and EPTDS | 1/1/2008–12/31/2010 |

**Table 1—UCMR Contaminant List**

**[List 3: Pre-Screen Testing to be Sampled After Notice of Analytical Methods Availability]**

| 1—Contaminant | 2—CAS registry number | 3—Analytical methods[a] | 4—Minimum reporting level[b] | 5—Sampling location[c] | 6—Period during which monitoring to be completed |
|---|---|---|---|---|---|
| Reserved[i] | Reserved[i] | Reserved[i] | Reserved[i] | Reserved[i] | Reserved[i] |

Column headings are:

1—Contaminant: The name of the contaminant to be analyzed.
2—CAS (Chemical Abstract Service) Registry Number or Identification Number: A unique number identifying the chemical contaminants.
3—Analytical Methods: method numbers identifying the methods that must be used to test the contaminants.
4—Minimum Reporting Level: The value and unit of measure at or above which the concentration of the contaminant must be measured using the approved analytical methods.
5—Sampling Location: The locations within a PWS at which samples must be collected.
6—Period During Which Monitoring To Be Completed: The dates during which the sampling and testing are to occur for the indicated contaminant.

The analytical procedures shall be performed in accordance with the documents associated with each method (per the following footnotes). The incorporation by reference of the following documents listed in footnotes d—h was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Information on how to obtain these documents can be provided by the Safe Drinking Water Hotline at (800) 426–4791. Documents may be inspected at EPA's Drinking Water Docket, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington, DC 20460, Telephone: (202) 566–2426; or at the National Archives and Records Administration (NARA). For information on availability of this material at NARA, call 202–741–6030, or go to: http://www.archives.gov/federal-register/index.html.

[a] The version of the EPA methods which you must follow for this Regulation are listed in d—h as follows.

[b] The Minimum Reporting Level (MRL) was established by EPA by adding the mean of the Lowest Concentration Minimum Reporting Levels (LCMRL) determined according to the procedure detailed in "Statistical Protocol for the Determination of The Single-Laboratory Lowest Concentration Minimum Reporting Level (LCMRL) and Validation of the Minimum Reporting Level (MRL)" by the primary and secondary laboratories conducting the development and validation of the analytical method to three times the difference of the LCMRLs. If LCMRL data from three or more laboratories were available, the MRL was established by EPA by adding three times the standard deviation of the LCMRLs to the mean of the LCMRLs. Note that EPA Method 525.2 was developed prior to UCMR 2, hence the LCMRLs were not determined for analytes determined by this method.

[c] Sampling must occur at entry points to the distribution system (EPTDSs) after treatment is applied that represent each non-emergency water source in routine use over the 12-month period of monitoring. See 40 CFR 141.35(c)(3) for an explanation of the requirements related to use of representative EPTDSs. Sampling for nitrosamines on List 2 must also occur at the disinfection byproduct distribution system maximum residence time (DSMRT) sampling locations as defined in 40 CFR 141.132(b)(1)(i) and at EPTDS sampling locations. If a treatment plant/water source is not subject to the sampling required in 40 CFR 141.132(b)(1), then the samples for nitrosamines must be collected only at the EPTDS location(s).

[d] EPA Method 527 "Determination of Selected Pesticides and Flame Retardants in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS)," Revision 1.0, April 2005 is available at *http://www.epa.gov/safewater/methods/sourcalt.html*.

[e] EPA Method 529 "Determination of Explosives and Related Compounds in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography/Mass Spectrometry (GC/MS)," Revision 1.0, September 2002 is available at *http://www.epa.gov/nerlcwww/ordmeth.htm.*

[f] EPA Method 535 " Measurement of Chloroacetanilide and Other Acetamide Herbicide Degradates in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)," Version 1.1, April 2005 is available at *http://www.epa.gov/nerlcwww/ordmeth.htm.*

[g] EPA Method 525.2 "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry," Revision 2.0, 1995 is available at *http://www.NEMI.gov.*

[h] EPA Method 521 "Determination of Nitrosamines in Drinking Water by Solid Phase Extraction and Capillary Column Gas Chromatography with Large Volume Injection and Chemical Ionization Tandem Mass Spectrometry (MS/MS)," Version 1.0, September 2004 is available at *http://www.epa.gov/nerlcwww/ordmeth.htm.*

[i] To be determined at a later time.

**(4) Sampling requirements —**

**(i) Large systems. If you serve more than 10,000 people and meet the UCMR applicability criteria specified in paragraph (a)(2)(i) of this section, you must comply with the requirements specified in paragraphs (a)(4)(i)(A) through (I) of this section. Your samples must be collected according to the schedule that you are assigned by EPA or your State, or the schedule that you revised using EPA's electronic data reporting system on or before August 2, 2007. Your schedule must follow both the timing and frequency of monitoring specified in Tables 1 and 2 of this section.**

**(A) Monitoring period. You must collect the samples in one continuous 12-month period for List 1 Assessment Monitoring, and, if applicable, for List 2 Screening Survey, or List 3 Pre-Screen Testing, during the time frame indicated in column 6 of Table 1, in paragraph (a)(3) of this section. EPA or your State will specify the month(s) and year(s) in which your monitoring must occur. As specified in §141.35(c)(5), you must contact EPA if you believe you cannot conduct monitoring according to your schedule.**

**(B) Frequency. You must collect the samples within the time frame and according to the frequency specified by contaminant type and water source type for each sampling location, as specified in Table 2, in this paragraph, with the following exception. For the second round of ground water sampling, if a sample location is non-operational for more than one month before and one month after the scheduled sampling month ( i.e. , it is not possible for you to sample within the five to seven month window specified the Table 2, in this paragraph), you must notify EPA as specified in §141.35(c)(5).**

**Table 2—Monitoring Frequency by Contaminant and Water Source Types**

| Contaminant type | Water source type | Time frame | Frequency |
|---|---|---|---|
| **Chemical** | **Surface water or ground water under the direct influence of surface water (GWUDI) (includes all sampling locations for which some or all of the water comes from a surface water or GWUDI source at any time during the 12 month monitoring period)** | **12 months** | **You must monitor for 4 consecutive quarters. Sample events must occur 3 months apart.** |
| | **Ground water** | **12 months** | **You must monitor twice in a consecutive 12-month period. Sample events must occur 5–7 months apart.** |

- (C) Location. You must collect samples for each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, as specified in Table 1, in paragraph (a)(3) of this section. Samples must be collected at each sample point that is specified in column 5 of Table 1, in paragraph (a)(3) of this section. If you are a ground water system with multiple EPTDSs, and you request and receive approval from EPA or the State for sampling at representative EPTDS(s), as specified in §141.35(c)(3), you must collect your samples from the approved representative sampling location(s). Systems conducting Screening Survey monitoring must also sample for nitrosamines at the disinfection byproduct distribution system maximum residence time (DSMRT) sampling location(s) if they are subject to sampling requirements in §141.132(b)(1).
- (D) Sampling instructions. For each List 1 Assessment Monitoring contaminant, and, if applicable, for each List 2 Screening Survey, or List 3 Pre-Screen Testing contaminant, you must follow the sampling procedure for the method specified in column 3 of Table 1, in paragraph (a)(3) of this section. In addition, you must not composite (that is, combine, mix, or blend) the samples; you must collect and preserve each sample separately. Samples collected for the analysis of Acetanilide "parent" pesticides and their degradation products (Methods 525.2 and 535) must be collected at the same sampling point, at the same time.
- (E) Sample collection and shipping time. If you must ship the samples for analysis, you must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory. You should not collect samples on Friday, Saturday, or Sunday because sampling on these days may not allow samples to be shipped and received at the laboratory at the required temperature, unless you have made special arrangements with your laboratory to receive the samples.
- (F) Analytical methods. For each contaminant, you must use the respective analytical methods for List 1, and, if applicable, for List 2, or List 3 that are specified in column 3 of Table 1, in paragraph (a)(3) of this section; report values at or above the minimum reporting levels for List 1, and, if applicable, for List 2 Screening Survey, or List 3 Pre-Screen Testing, that are specified in column 4 of Table 1, in paragraph (a)(3) of this section; and conduct the quality control procedures specified in paragraph (a)(5) of this section.
- (G) Laboratory errors or sampling deviations. If the laboratory data do not meet the required QC criteria, as specified in paragraph (a)(5) of this section, or you do not follow the required sampling procedures, as specified in paragraphs (a)(4) of this section, you must resample within 30 days of being informed or becoming aware of these facts. This resampling is not for the purpose of confirming previous results, but to correct the sampling or laboratory error. All systems must report the results obtained from the first sampling for each sampling period, except for cases of sampling or laboratory errors. For the purposes of this rule, no samples are to be recollected for the purposes of confirming the results observed in a previous sampling.
- (H) Analysis. For the List 1 contaminants, and, if applicable, List 2 Screening Survey, or List 3 Pre-Screen Testing contaminants, identified in Table 1, paragraph (a)(3) of this section, you must arrange for testing by a laboratory that has been approved by EPA according to requirements in paragraph (a)(5)(ii) of this section.
- (I) Review and reporting of results. After you have received the laboratory results, you must review, approve, and submit the system information, and sample collection data and test results. You must report the results as provided in §141.35(c)(6).

(ii) Small systems. If you serve 10,000 or fewer people and are notified that you are part of the State Monitoring Plan for Assessment Monitoring, Screening Survey or Pre-Screen monitoring, you must comply with the requirements specified in paragraphs (a)(4)(i)(A) through (H) of this section. If EPA or the State informs you that they will be collecting your UCMR samples, you must assist them in identifying the appropriate sampling locations and in collecting the samples.

- (A) Monitoring period and frequency. You must collect samples at the times specified for you by the State or EPA. Your schedule must follow both the timing of monitoring specified in Table 1, List 1, and, if applicable, List 2, or List 3, and the frequency of monitoring in Table 2 of this section.
- (B) Location. You must collect samples at the locations specified for you by the State or EPA.

**(C) Sample kits. You must store and maintain the sample collection kits sent to you by the UCMR Sampling Coordinator in accordance with the kit's instructions. The sample kit will include all necessary containers, packing materials and cold packs, instructions for collecting the sample and sample treatment (such as dechlorination or preservation), report forms for each sample, contact name and telephone number for the laboratory, and a prepaid return shipping docket and return address label. If any of the materials listed in the kit's instructions are not included in the kit or arrive damaged, you must notify the UCMR Sampling Coordinator who sent you the sample collection kits.**

**(D) Sampling instructions. You must comply with the instructions sent to you by the State or EPA concerning the use of containers, collection (how to fill the sample bottle), dechlorination and/or preservation, and sealing and preparation of sample and shipping containers for shipment. You must not composite (that is, combine, mix, or blend) the samples. You also must collect, preserve, and test each sample separately. You must also comply with the instructions sent to you by the UCMR Sampling Coordinator concerning the handling of sample containers for specific contaminants.**

**(E) Sampling deviations. If you do not collect a sample according to the instructions provided to you for a listed contaminant, you must report the deviation within 7 days of the scheduled monitoring on the sample reporting form, as specified in §141.35(d)(2). You must resample following instructions that you will be sent from the UCMR Sampling Coordinator or State. A copy of the form must be sent to the laboratory with the recollected samples, and to the UCMR Sampling Coordinator.**

**(F) Duplicate samples. EPA will select a subset of systems in the State Monitoring Plan that must collect duplicate samples for quality control. If your system is selected, you will receive two sample kits for an individual sampling location that you must use. You must use the same sampling protocols for both sets of samples, following the instructions in the duplicate sample kit.**

**(G) Sampling forms. You must completely fill out each of the sampling forms and bottles sent to you by the UCMR Sampling Coordinator, including data elements listed in §141.35(e) for each sample. If you are conducting Assessment Monitoring, you must include elements 1 through 5, and 7; and if you are conducting Screening Survey, you must include elements 1 through 7. You must sign and date the sampling forms.**

**(H) Sample collection and shipping. You must collect the samples early enough in the day to allow adequate time to send the samples for overnight delivery to the laboratory. You should not collect samples on Friday, Saturday, or Sunday because sampling on these days may not allow samples to be shipped and received at the laboratory at the required temperature unless you have made special arrangements with EPA for the laboratory to receive the samples. Once you have collected the samples and completely filled in the sampling forms, you must send the samples and the sampling forms to the laboratory designated on the air bill.**

**(5) Quality control requirements. If your system serves more than 10,000 people, you must ensure that the quality control requirements listed below are met during your sampling procedures and by the laboratory conducting your analyses. You must also ensure that all method quality control procedures and all UCMR quality control procedures are followed.**

**(i) Sample collection/preservation. You must follow the sample collection and preservation requirements for the specified method for each of the contaminants in Table 1, in paragraph (a)(3) of this section. These requirements specify sample containers, collection, dechlorination, preservation, storage, sample holding time, and extract storage and/or holding time that you must assure that the laboratory follow.**

**(ii) Laboratory approval for Lists 1, List 2 and List 3. To be approved to conduct UCMR testing, the laboratory must be certified under §141.28 for one or more compliance analyses; demonstrate for each analytical method it plans to use for UCMR testing that it can meet the Initial Demonstration of Capability (IDC) requirements detailed in the analytical methods specified in column 3 of Table 1, in paragraph (a)(3) of this section; and successfully participate in the UCMR Proficiency Testing (PT) Program administered by EPA for each analytical method it plans to use for UCMR testing. UCMR laboratory approval decisions will be granted on an individual method basis for the methods listed in column 3 of Table 1 in paragraph (a)(3) of this section for List 1, List 2, and List 3 contaminants. Laboratory approval is contingent upon the capability of the laboratory to post monitoring data to the EPA electronic data reporting system. To participate in the UCMR Laboratory Approval Program, the laboratory must**

**complete and submit the necessary registration forms by April 4, 2007. Correspondence must be addressed to: UCMR 2 Laboratory Approval Coordinator, USEPA, Technical Support Center, 26 West Martin Luther King Drive (MS 140), Cincinnati, OH 45268; or e-mailed to EPA at UCMR_Sampling_Coordinator@epa.gov .**

**(iii) Minimum Reporting Level. The MRL is the lowest analyte concentration for which future recovery is predicted to fall, with high confidence (at least 99%), between 50% and 150% recovery.**

**(A) Validation of laboratory performance. Your laboratory must be capable of quantifying each contaminant listed in Table 1, at or below the MRL specified in column 4 of Table 1, in paragraph (a)(3) of this section. You must ensure that the laboratory completes and has on file and available for your inspection, records of two distinct procedures. First, your laboratory must have conducted an IDC involving replicate analyses at or below the MRL as described in this paragraph. Second, for each day that UCMR analyses are conducted by your laboratory, a validation of its ability to quantify each contaminant, at or below the MRL specified in column 4 of Table 1, in paragraph (a)(3) of this section, following the procedure listed in paragraph (a)(5)(iii)(B) of this section, must be performed. The procedure for initial validation of laboratory performance at or below the MRL is as follows:**

*( 1 )* **All laboratories using EPA drinking water methods under UCMR must demonstrate that they are capable of meeting data quality objectives (DQOs) at or below the MRL listed in Table 1, column 4, in paragraph (a)(3) of this section.**

*( 2 )* **The MRL, or any concentration below the MRL, at which performance is being evaluated, must be contained within the range of calibration. The calibration curve regression model and the range of calibration levels that are used in these performance validation steps must be used in all routine sample analyses used to comply with this regulation. Only straight line or quadratic regression models are allowed. The use of either weighted or unweighted models is permitted. The use of cubic regression models is not permitted.**

*( 3 )* **Replicate analyses of at least seven (7) fortified samples in reagent water must be performed at or below the MRL for each analyte, and must be processed through the entire method procedure ( i.e. , including extraction, where applicable, and with all preservatives).**

*( 4 )* **A prediction interval of results (PIR), which is based on the estimated arithmetic mean of analytical results and the estimated sample standard deviation of measurement results, must be determined by Equation 1:**

$$\text{Equation 1} \qquad \text{PIR} = \text{Mean} \pm s \times t_{(df,\,1-\alpha/2)} \times \sqrt{1+\frac{1}{n}}$$

**Where:**
**t is the Student's t value with df degrees of freedom and confidence level (1–α),**
**s is the sample standard deviation of n replicate samples fortified at the MRL,**
**n is the number of replicates.**

*( 5 )* **The values needed to calculate the PIR using Equation 1 are: Number of replicates ( n ); Student's t value with a two-sided 99% confidence level for n number of replicates; the average (mean) of at least seven replicates; and the sample standard deviation. Factor 1 is referred to as the Half Range PIR ($HR_{PIR}$).**

$$HR_{PIR} = s \times t_{(df,\,1-\alpha/2)} \times \sqrt{1+\frac{1}{n}}$$

**For a certain number of replicates and for a certain confidence level in Student's t , this factor**

$$C = t_{(df,\,1-\alpha/2)} \times \sqrt{1+\frac{1}{n}}$$

**is constant, and can be tabulated according to replicate number and confidence level for the Student's t . Table 3 in this paragraph lists the constant factor ( C ) for replicate sample numbers 7 through 10 with a confidence level of 99% for Student's t .**

*( 6 )* **The HRPIR is calculated by Equation 2:**

$$\text{Equation 2} \qquad HR_{PIR} = s \times C$$

*( 7 )* **The PIR is calculated by Equation 3:**

$$\text{Equation 3} \qquad PIR = Mean \pm HR_{PIR}$$

**Table 3—The Constant Factor (C) to be Multiplied by the Standard Deviation to Determine the Half Range Interval of the PIR (Student's t 99% Confidence Level)[a]**

| Replicates | Degrees of freedom | Constant factor (C) to be multiplied by the standard deviation |
|---|---|---|
| 7 | 6 | 3.963 |
| 8 | 7 | 3.711 |
| 9 | 8 | 3.536 |
| 10 | 9 | 3.409 |

[a] The critical t -value for a two-sided 99% confidence interval is equivalent to the critical t -value for a one-sided 99.5% confidence interval, due to the symmetry of the t -distribution. PIR = Prediction Interval of Results.

*( 8 )* **The lower and upper result limits of the PIR must be converted to percent recovery of the concentration being tested. To pass criteria at a certain level, the PIR lower recovery limits cannot be lower than the lower recovery limits of the QC interval (50%), and the PIR upper recovery limits cannot be greater than the upper recovery limits of the QC interval (150%). When either of the PIR recovery limits falls outside of either bound of the QC interval of recovery (higher than 150% or less than 50%), laboratory performance is not validated at the concentration evaluated. If the PIR limits are contained within both bounds of the QC interval, laboratory performance is validated for that analyte.**

**(B) Quality control requirements for validation of laboratory performance at or below the MRL.**

*( 1 )* **You must ensure that the calibration curve regression model and that the range of calibration levels that are used in these performance validation steps are used in future routine sample analysis. Only straight line or quadratic regression models are allowed. The use of either weighted or unweighted models is permitted. The use of cubic regression models is not permitted.**

*( 2 )* **You must ensure, once your laboratory has performed an IDC as specified in each analytical method (demonstrating that DQOs are met at or below an MRL), that a daily performance check is performed for each analyte and method. A single laboratory blank, fortified at or below the MRL for each analyte, must be processed through the entire method procedure. The measured concentration for each analyte must be converted to a percent recovery, and if the recovery is within 50%–150% (inclusive), the daily performance of the laboratory has been validated. The results for any analyte for which 50%–150% recovery cannot be demonstrated during the daily check are not valid. Laboratories may elect to re-run the daily performance check sample if the performance for any analyte or analytes cannot be validated. If performance is validated for these analytes, the laboratory performance is considered validated. Alternatively, the laboratory may re-calibrate and repeat the performance validation process for all analytes.**

**(iv) Laboratory fortified sample matrix and laboratory fortified sample matrix duplicate. You must ensure that your laboratory prepares and analyzes the Laboratory Fortified Sample Matrix (LFSM) sample for accuracy and Laboratory Fortified Sample Matrix Duplicate (LFSMD) samples for precision to determine method accuracy and precision**

**for all contaminants in Table 1, in paragraph (a)(3) of this section. LFSM/LFSMD samples must be prepared using a sample collected and analyzed in accordance with UCMR 2 requirements and analyzed at a frequency of 5% (or 1 LFSM/LFSMD set per every 20 samples) or with each sample batch, whichever is more frequent. In addition, the LFSM/LFSMD fortification concentrations must be alternated between a low-level fortification and mid-level fortification approximately 50% of the time. (For example: A set of 40 samples will require preparation and analysis of 2 LFSM/LFSMD sets. The first set must be fortified at either the low-level or mid-level, and the second set must be fortified with the other standard, either the low-level or mid-level, whichever was not used for the initial LFSM/LFSMD set.) The low-level LFSM/LFSMD fortification concentration must be within ±50% of the MRL for each contaminant (e.g., for an MRL of 1 µg/L the acceptable fortification levels must be between 0.5 µg/L and 1.5 µg/L). The mid-level LFSM/LFSMD fortification concentration must be within ±20% of the mid-level calibration standard for each contaminant, and should represent, where possible and where the laboratory has data from previously analyzed samples, an approximate average concentration observed in previous analyses of that analyte. There are no acceptance criteria specified for LFSM/LFSMD analyses. All LFSM/LFSMD data are to be reported.**

**(v) Method defined quality control. You must ensure that your laboratory performs Laboratory Fortified Blanks and Laboratory Performance Checks, as appropriate to the method's requirements, for those methods listed in Table 1, column 3, in paragraph (a)(3) of this section. Each method specifies acceptance criteria for these QC checks.**

**(vi) Reporting. You must ensure that your laboratory reports the analytical results and other data, with the required data listed in Table 1, in §141.35(e). You must require your laboratory to submit these data electronically to the State and EPA using EPA's electronic data reporting system, accessible at ( http://www.epa.gov/safewater/ucmr/ucmr2/reporting.html ), within 120 days from the sample collection date. You then have 60 days from when the laboratory posts the data to review, approve, and submit the data to the State and EPA, via EPA's electronic data reporting system. If you do not electronically approve and submit the laboratory data to EPA within 60 days of the laboratory's posting to EPA's electronic reporting system, the data will be considered approved and final for State and EPA review.**

**(6) Violation of this rule —**

**(i) Monitoring violations. Any failure to monitor in accordance with §141.40(a)(3)–(5) is a monitoring violation.**

**(ii) Reporting violations. Any failure to report in accordance with §141.35 is a reporting violation.**

**(b) Petitions and Waivers by States —**

**(1) Governors' petition for additional contaminants. The Safe Drinking Water Act allows Governors of seven (7) or more States to petition the EPA Administrator to add one or more contaminants to the UCMR Contaminant List in paragraph (a)(3) of this section. The petition must clearly identify the reason(s) for adding the contaminant(s) to the monitoring list, including the potential risk to public health, particularly any information that might be available regarding disproportional risks to the health and safety of children, the expected occurrence documented by any available data, any analytical methods known or proposed to be used to test for the contaminant(s), and any other information that could assist the Administrator in determining which contaminants present the greatest public health concern and should, therefore, be included on the UCMR Contaminant List in paragraph (a)(3) of this section.**

**(2) State-wide waivers. A State can waive monitoring requirements only with EPA approval and under very limited conditions. Conditions and procedures for obtaining a waiver are as follows:**

**(i) Application. A State may apply to EPA for a State-wide waiver from the unregulated contaminant monitoring requirements for PWSs serving more than 10,000 people. To apply for such a waiver, the State must submit an application to EPA that includes the following information: The list of contaminants on the UCMR Contaminant List for which a waiver is requested, along with documentation for each contaminant in the request demonstrating that the contaminants or their parent compounds do not occur naturally in the State, and certifying that during the past 15 years they have not been used, applied, stored, disposed of, released, or detected in the source waters or distribution systems in the State.**

**(ii) Approval. EPA will review State applications and notify the State whether it accepts or rejects the request. The State must receive written approval from EPA before issuing a State-wide waiver.**

## .1518 MAXIMUM CONTAMINANT LEVELS FOR ORGANIC CONTAMINANTS

The provisions of 40 C.F.R. 141.61 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Non-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. June 1, 1988;*
*Transferred and Recodified from 10 NCAC 10D .1639 Eff. April 4, 1990;*
*Amended Eff. April 1, 1992.*

## ADOPTED BY REFERENCE

**§ 141.61 Maximum contaminant levels for organic contaminants.**

**(a) The following maximum contaminant levels for organic contaminants apply to community and non-transient, non-community water systems.**

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| **(1) 75–01–4** | **Vinyl chloride** | **0.002** |
| **(2) 71–43–2** | **Benzene** | **0.005** |
| **(3) 56–23–5** | **Carbon tetrachloride** | **0.005** |
| **(4) 107–06–2** | **1,2-Dichloroethane** | **0.005** |
| **(5) 79–01–6** | **Trichloroethylene** | **0.005** |
| **(6) 106–46–7** | **para-Dichlorobenzene** | **0.075** |
| **(7) 75–35–4** | **1,1-Dichloroethylene** | **0.007** |
| **(8) 71–55–6** | **1,1,1-Trichloroethane** | **0.2** |
| **(9) 156–59–2** | **cis-1,2-Dichloroethylene** | **0.07** |
| **(10) 78–87–5** | **1,2-Dichloropropane** | **0.005** |
| **(11) 100–41–4** | **Ethylbenzene** | **0.7** |
| **(12) 108–90–7** | **Monochlorobenzene** | **0.1** |
| **(13) 95–50–1** | **o-Dichlorobenzene** | **0.6** |
| **(14) 100–42–5** | **Styrene** | **0.1** |
| **(15) 127–18–4** | **Tetrachloroethylene** | **0.005** |
| **(16) 108–88–3** | **Toluene** | **1** |
| **(17) 156–60–5** | **trans-1,2-Dichloroethylene** | **0.1** |

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| (18) 1330–20–7 | Xylenes (total) | 10 |
| (19) 75–09–2 | Dichloromethane | 0.005 |
| (20) 120–82–1 | 1,2,4-Trichloro-benzene | .07 |
| (21) 79–00–5 | 1,1,2-Trichloro- ethane | .005 |

**(b) The Administrator, pursuant to section 1412 of the Act, hereby identifies as indicated in the Table below granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in paragraphs (a) and (c) of this section:**

**BAT for Organic Contaminants Listed in §141.61 (a) and (c)**

| CAS No. | Contaminant | GAC | PTA | OX |
|---|---|---|---|---|
| 15972–60–8 | Alachlor | X | | |
| 116–06–3 | Aldicarb | X | | |
| 1646–88–4 | Aldicarb sulfone | X | | |
| 1646–87–3 | Aldicarb sulfoxide | X | | |
| 1912–24–9 | Atrazine | X | | |
| 71–43–2 | Benzene | X | X | |
| 50–32–8 | Benzo[a]pyrene | X | | |
| 1563–66–2 | Carbofuran | X | | |
| 56–23–5 | Carbon tetrachloride | X | X | |
| 57–74–9 | Chlordane | X | | |
| 75–99–0 | Dalapon | X | | |
| 94–75–7 | 2,4-D | X | | |
| 103–23–1 | Di (2-ethylhexyl) adipate | X | X | |
| 117–81–7 | Di (2-ethylhexyl) phthalate | X | | |
| 96–12–8 | Dibromochloropropane (DBCP) | X | X | |
| 95–50–1 | o-Dichlorobenzene | X | X | |
| 106–46–7 | para-Dichlorobenzene | X | X | |
| 107–06–2 | 1,2-Dichloroethane | X | X | |
| 75–35–4 | 1,1-Dichloroethylene | X | X | |
| 156–59–2 | cis-1,2-Dichloroethylene | X | X | |
| 156–60–5 | trans-1,2-Dichloroethylene | X | X | |
| 75–09–2 | Dichloromethane | | X | |
| 78–87–5 | 1,2-Dichloropropane | X | X | |
| 88–85–7 | Dinoseb | X | | |
| 85–00–7 | Diquat | X | | |

| CAS No. | Contaminant | GAC | PTA | OX |
|---|---|---|---|---|
| 145–73–3 | Endothall | X | | |
| 72–20–8 | Endrin | X | | |
| 100–41–4 | Ethylbenzene | X | X | |
| 106–93–4 | Ethylene Dibromide (EDB) | X | X | |
| 1071–83–6 | Gylphosate | | | X |
| 76–44–8 | Heptachlor | X | | |
| 1024–57–3 | Heptachlor epoxide | X | | |
| 118–74–1 | Hexachlorobenzene | X | | |
| 77–47–3 | Hexachlorocyclopentadiene | X | X | |
| 58–89–9 | Lindane | X | | |
| 72–43–5 | Methoxychlor | X | | |
| 108–90–7 | Monochlorobenzene | X | X | |
| 23135–22–0 | Oxamyl (Vydate) | X | | |
| 87–86–5 | Pentachlorophenol | X | | |
| 1918–02–1 | Picloram | X | | |
| 1336–36–3 | Polychlorinated biphenyls (PCB) | X | | |
| 122–34–9 | Simazine | X | | |
| 100–42–5 | Styrene | X | X | |
| 1746–01–6 | 2,3,7,8-TCDD (Dioxin) | X | | |
| 127–18–4 | Tetrachloroethylene | X | X | |
| 108–88–3 | Toluene | X | X | |
| 8001–35–2 | Toxaphene | X | | |
| 93–72–1 | 2,4,5-TP (Silvex) | X | | |
| 120–82–1 | 1,2,4-Trichlorobenzene | X | X | |
| 71–55–6 | 1,1,1-Trichloroethane | X | X | |
| 79–00–5 | 1,1,2-Trichloroethane | X | X | |
| 79–01–6 | Trichloroethylene | X | X | |
| 75–01–4 | Vinyl chloride | | X | |
| 1330–20–7 | Xylene | X | X | |

**(c)** **The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems:**

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| (1) 15972–60–8 | Alachlor | 0.002 |
| (2) 116–06–3 | Aldicarb | 0.003 |
| (3) 1646–87–3 | Aldicarb sulfoxide | 0.004 |

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| (4) 1646–87–4 | Aldicarb sulfone | 0.002 |
| (5) 1912–24–9 | Atrazine | 0.003 |
| (6) 1563–66–2 | Carbofuran | 0.04 |
| (7) 57–74–9 | Chlordane | 0.002 |
| (8) 96–12–8 | Dibromochloropropane | 0.0002 |
| (9) 94–75–7 | 2,4-D | 0.07 |
| (10) 106–93–4 | Ethylene dibromide | 0.00005 |
| (11) 76–44–8 | Heptachlor | 0.0004 |
| (12) 1024–57–3 | Heptachlor epoxide | 0.0002 |
| (13) 58–89–9 | Lindane | 0.0002 |
| (14) 72–43–5 | Methoxychlor | 0.04 |
| (15) 1336–36–3 | Polychlorinated biphenyls | 0.0005 |
| (16) 87–86–5 | Pentachlorophenol | 0.001 |
| (17) 8001–35–2 | Toxaphene | 0.003 |
| (18) 93–72–1 | 2,4,5-TP | 0.05 |
| (19) 50–32–8 | Benzo[a]pyrene | 0.0002 |
| (20) 75–99–0 | Dalapon | 0.2 |
| (21) 103–23–1 | Di(2-ethylhexyl) adipate | 0.4 |
| (22) 117–81–7 | Di(2-ethylhexyl) phthalate | 0.006 |
| (23) 88–85–7 | Dinoseb | 0.007 |
| (24) 85–00–7 | Diquat | 0.02 |
| (25) 145–73–3 | Endothall | 0.1 |
| (26) 72–20–8 | Endrin | 0.002 |
| (27) 1071–53–6 | Glyphosate | 0.7 |
| (28) 118–74–1 | Hexacholorbenzene | 0.001 |
| (29) 77–47–4 | Hexachlorocyclopentadiene | 0.05 |
| (30) 23135–22–0 | Oxamyl (Vydate) | 0.2 |

| CAS No. | Contaminant | MCL (mg/l) |
|---|---|---|
| **(31) 1918–02–1** | **Picloram** | **0.5** |
| **(32) 122–34–9** | **Simazine** | **0.004** |
| **(33) 1746–01–6** | **2,3,7,8-TCDD (Dioxin)** | **$3\times10^{-8}$** |

## .1519 MONITORING FREQUENCY FOR RADIOACTIVITY

(a) The requirements of this Rule shall apply to community water systems. The provisions of 40 C.F.R. 141.26 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/. Any dates set forth in the federal rule shall be applicable.

(b) An adjacent water system as defined in G.S. 130A-315(b2)shall conform to the following sampling schedule rather than the schedule set forth in 40 C.F.R. 141.26(a) and (b). A water supplier shall take samples for gross alpha particle activity, radium-226, radium-228, and uranium, and for man-made radioactivity from the water system when the Secretary determines that the system is in an area subject to radiological contamination. When the sampling is required, a water supplier shall submit samples every four years from each section of the water system supplied from a separate source.

(c) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall monitor the same as required by adjacent systems in Paragraph (b) of this Rule.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 1, 1989; September 9, 1980; December 19, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1627 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; July 1, 1994.*

## ADOPTED BY REFERENCE

**§ 141.26 Monitoring frequency and compliance requirements for radionuclides in community water systems.**

**(a) Monitoring and compliance requirements for gross alpha particle activity, radium-226, radium-228, and uranium.**

**(1) Community water systems (CWSs) must conduct initial monitoring to determine compliance with §141.66(b), (c), and (e) 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 as in §141.25(c).**

**(i) Applicability and sampling location for existing community water systems or sources. All existing CWSs using ground water, surface water or systems using both ground and surface water (for the purpose of this section hereafter referred to as systems) must 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 system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or the State has designated a distribution system location, in accordance with paragraph (a)(2)(ii)(C) of this section.**

**(ii) Applicability and sampling location for new community water systems or sources. All new CWSs or CWSs that use a new source of water must begin to conduct initial monitoring for the new source within the first quarter after initiating use of the source. CWSs must conduct more frequent monitoring when ordered by the State 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.**

**(2) Initial monitoring: Systems must conduct initial monitoring for gross alpha particle activity, radium-226, radium-228, and uranium as follows:**

**(i) Systems without acceptable historical data, as defined below, must collect four consecutive quarterly samples at all sampling points before December 31, 2007.**

**(ii) Grandfathering of data: States may allow 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 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 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 2000 and December 8, 2003, provided that the State 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 State must make a written finding indicating how the data conforms to these requirements.**

**(iii) For gross alpha particle activity, uranium, radium-226, and radium-228 monitoring, the State may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two quarters are below the detection limit.**

**(iv) If the average of the initial monitoring results for a sampling point is above the MCL, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are at or below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the State.**

**(3) Reduced monitoring: States may allow community water systems to reduce the future frequency of monitoring from once every three years to once every six or nine years at each sampling point, based on the following criteria.**

**(i) 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 Table B, in §141.25(c)(1), the system must collect and analyze for that contaminant using at least one sample at that sampling point every nine years.**

**(ii) 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 below1/2the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years. For combined radium-226 and radium-228, the analytical results must 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 below1/2the MCL, the system must collect and analyze for that contaminant using at least one sample at that sampling point every six years.**

**(iii) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above1/2the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years. For combined radium-226 and radium-228, the analytical results must be combined. If the average of the combined initial monitoring results for radium-226 and radium-228 is above1/2the MCL but at or below the MCL, the system must collect and analyze at least one sample at that sampling point every three years.**

**(iv) Systems must use the samples collected during the reduced monitoring period to determine the monitoring frequency for subsequent monitoring periods (e.g., if a system's sampling point is on a nine year monitoring period, and the sample result is above1/2MCL, then the next monitoring period for that sampling point is three years).**

**(v) If a system has a monitoring result that exceeds the MCL while on reduced monitoring, the system must collect and analyze quarterly samples at that sampling point until the system has results from four consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the State.**

**(4) Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a system may composite up to four consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. States 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 than1/2MCL, the State may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.**

**(5) A gross alpha particle activity measurement may be substituted 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% (1.65σ, where σ is the standard deviation of the net counting rate of the sample) for radium-226 and uranium. When a system uses a gross alpha particle activity measurement in lieu of a radium-226 and/or uranium measurement, the gross alpha particle activity analytical result will be used to determine the future monitoring frequency for radium-226 and/or uranium. If the gross alpha particle activity result is less than detection,1/2the detection limit will be used to determine compliance and the future monitoring frequency.**

**(b) Monitoring and compliance requirements for beta particle and photon radioactivity. To determine compliance with the maximum contaminant levels in §141.66(d) for beta particle and photon radioactivity, a system must monitor at a frequency as follows:**

**(1) Community water systems (both surface and ground water) designated by the State as vulnerable must sample for beta particle and photon radioactivity. Systems must collect quarterly samples for beta emitters 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 State. Systems already designated by the State must continue to sample until the State reviews and either reaffirms or removes the designation.**

**(i) If the gross beta particle activity 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 50 pCi/L (screening level), the State may reduce the frequency of monitoring at that sampling point to once every 3 years. Systems must collect all samples required in paragraph (b)(1) of this section during the reduced monitoring period.**

**(ii) For systems in the vicinity of a nuclear facility, the State may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the State determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with paragraph (b)(1) of this section.**

**(2) Community water systems (both surface and ground water) designated by the State as utilizing waters contaminated by effluents from nuclear facilities must sample for beta particle and photon radioactivity. Systems must 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 State. Systems already designated by the State as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the State reviews and either reaffirms or removes the designation.**

**(i) Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended.**

**(ii) For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the State, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water.**

**(iii) Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended.**

**(iv) If the gross beta particle activity 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 (screening level), the State may reduce the frequency of monitoring at that sampling point to every 3 years. Systems must collect the same type of samples required in paragraph (b)(2) of this section during the reduced monitoring period.**

**(v) For systems in the vicinity of a nuclear facility, the State may allow the CWS to utilize environmental surveillance data collected by the nuclear facility in lieu of monitoring at the system's entry point(s), where the State determines if such data is applicable to a particular water system. In the event that there is a release from a nuclear facility, systems which are using surveillance data must begin monitoring at the community water system's entry point(s) in accordance with paragraph (b)(2) of this section.**

**(3) Community water systems designated by the State to monitor for beta particle and photon radioactivity can not apply to the State for a waiver from the monitoring frequencies specified in paragraph (b)(1) or (b)(2) of this section.**

**(4) 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. Systems are allowed to subtract the potassium-40 beta particle activity value from the total gross beta particle activity value to determine if the screening level is exceeded. The potassium-40 beta particle activity must be calculated by multiplying elemental potassium concentrations (in mg/L) by a factor of 0.82.**

**(5) If the gross beta particle activity minus the naturally occurring potassium-40 beta particle activity exceeds the appropriate screening level, an analysis of the sample must be performed to identify the major radioactive constituents present in the sample and the appropriate doses must be calculated and summed to determine compliance with §141.66(d)(1), using the formula in §141.66(d)(2). Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.**

**(6) Systems must monitor monthly at the sampling point(s) which exceed the maximum contaminant level in §141.66(d) beginning the month after the exceedance occurs. Systems must continue monthly monitoring until the system has established, by a rolling average of 3 monthly samples, that the MCL is being met. Systems who establish that the MCL is being met must return to quarterly monitoring until they meet the requirements set forth in paragraph (b)(1)(i) or (b)(2)(iv) of this section.**

**(c) General monitoring and compliance requirements for radionuclides.**

**(1) The State may require more frequent monitoring than specified in paragraphs (a) and (b) of this section, or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.**

**(2) Each public water systems shall monitor at the time designated by the State during each compliance period.**

**(3) Compliance: Compliance with §141.66 (b) through (e) will be determined based on the analytical result(s) obtained at each sampling point. If one sampling point is in violation of an MCL, the system is in violation of the MCL.**

**(i) For 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 sampling point is greater than the MCL, then the system is out of compliance with the MCL.**

**(ii) For systems monitoring more than once per year, if any sample result will cause the running average to exceed the MCL at any sample point, the system is out of compliance with the MCL immediately.**

**(iii) Systems must include all samples taken and analyzed under the provisions of this section in determining compliance, even if that number is greater than the minimum required.**

**(iv) If a system does not collect all required samples when compliance is based on a running annual average of quarterly samples, compliance will be based on the running average of the samples collected.**

**(v) 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 and/or uranium. If the gross alpha particle activity result is less than detection,1/2the detection limit will be used to calculate the annual average.**

**(4) States have the discretion to delete results of obvious sampling or analytic errors.**

**(5) If the MCL for radioactivity set forth in §141.66 (b) through (e) is exceeded, the operator of a community water system must give notice to the State pursuant to §141.31 and to the public as required by subpart Q of this part.**

## .1520 MAXIMUM CONTAMINANT LEVELS FOR RADIONUCLIDES

The provisions of 40 C.F.R. 141.66 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under “Notes” on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1617 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; July 1, 1994.*

## ADOPTED BY REFERENCE

**<u>§ 141.66 Maximum contaminant levels for radionuclides.</u>**

**(a) [Reserved]**

**(b) MCL for combined radium-226 and -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.**

**(c) 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.**

**(d) MCL for beta particle and photon radioactivity.**

**(1) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year (mrem/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 must be calculated on the basis of 2 liter per day drinking water intake using the 168 hour data list in “Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure,” NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. 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 of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800–553–6847. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 mrem/year.**

**Table A—Average Annual Concentrations Assumed To Produce: a Total Body or Organ Dose of 4 mrem/yr**

| **1. Radionuclide** | **Critical organ** | **pCi per liter** |
|---|---|---|
| **2. Tritium** | **Total body** | **20,000** |
| **3. Strontium-90** | **Bone Marrow** | **8** |

**(e) MCL for uranium. The maximum contaminant level for uranium is 30 µg/L.**

**(f) Compliance dates.**

**(1) Compliance dates for combined radium-226 and -228, gross alpha particle activity, gross beta particle and photon radioactivity, and uranium: Community water systems must comply with the MCLs listed in paragraphs (b), (c), (d), and (e) of this section beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of §§141.25 and 141.26. Compliance with reporting requirements for the radionuclides under appendix A to subpart O and appendices A and B to subpart Q is required on December 8, 2003.**

**(2) [Reserved]**

**(g) Best available technologies (BATs) for radionuclides. The Administrator, pursuant to section 1412 of the Act, hereby identifies as indicated in the following table the best technology available for achieving compliance with the maximum contaminant levels for combined radium-226 and -228, uranium, gross alpha particle activity, and beta particle and photon radioactivity.**

**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, reverse osmosis. |

**(h) Small systems compliance technologies list for radionuclides.**

**Table C—List of Small Systems Compliance Technologies for Radionuclides and Limitations to Use**

| Unit technologies | Limitations (see footnotes) | Operator skill level required[1] | Raw water quality range and considerations.[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 frequency. |
| 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] A POU, or "point-of-use" technology is a treatment device installed at a single tap used for the purpose of reducing contaminants in drinking water at that one tap. 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 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 systems that already have filtration in place.

**[h] Handling of chemicals required during regeneration and pH adjustment may be too difficult for small systems without an adequately trained operator.**
**[i] Assumes modification to a coagulation/filtration process already in place.**

**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 141.66(h).**

## .1521 MAXIMUM CONTAMINNT LEVEL GOALS FOR RADIONUCLIDES

The provisions of 40 C.F.R. 141.55 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1618 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; July 1, 1994.*

## ADOPTED BY REFERENCE

**§ 141.55 Maximum contaminant level goals for radionuclides.**
**MCLGs for radionuclides are as indicated in the following table:**

| Contaminant | MCLG |
|---|---|
| 1. Combined radium-226 and radium-228 | Zero. |
| 2. Gross alpha particle activity (excluding radon and uranium) | Zero. |
| 3. Beta particle and photon radioactivity | Zero. |
| 4. Uranium | Zero. |

## .1522 ANALYTICAL METHODS FOR RADIOACTIVITY

The provisions of 40 C.F.R. 141.25 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 31, 1981; March 31, 1980;*
*Transferred and Recodified from 10 NCAC 10D .1626 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; September 1, 1990.*

## ADOPTED BY REFERENCE

**<u>§ 141.25 Analytical methods for radioactivity.</u>**

(a) **Analysis for the following contaminants shall be conducted to determine compliance with §141.66 (radioactivity) in accordance with the methods in the following table, or the alternative methods listed in appendix A to subpart C this part, or their equivalent determined by EPA in accordance with §141.27.**

| Contaminant | Methodology | Reference (Method of Page Number) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EPA[1] | EPA[2] | EPA[3] | EPA[4] | SM[5] | ASTM[6] | USGS[7] | DOE[8] | Other |
| **Naturally Occurring:** | | | | | | | | | | |
| Gross alpha[11] and beta | Evaporation | 900.0 | p. 1 | 00–01 | p. 1 | 302, 7110 B, 7110 B–00 | | R–1120–76 | | |
| Gross alpha[11] | Coprecipitation | | | 00–02 | | 7110 C, 7110 C–00 | | | | |
| Radium 226 | Radon emanation | 903.1 | p. 16 | Ra–04 | p. 19 | 305, 7500–Ra C, 7500–Ra C–01 | D3454–97 | R–1141–76 | Ra-04 | NY[9], |
| | Radiochemical | 903.0 | p. 13 | Ra-03 | | 304, 7500–Ra B, 7500–Ra B–01 | D2460–97 | R–1140–76 | | GA[14] |
| Radium 228 | Radiochemical | 904.0 | p. 24 | Ra-05 | p. 19 | 7500–Ra D, 7500–Ra D–01 | | R–1142–76 | | NY[9],<br>NJ[10],<br>GA[14] |
| Uranium[12] | Radiochemical | 908.0 | | | | 7500–U B, 7500–U B–00 | | | | |
| | Fluorometric | 908.1 | | | | 7500–U C (17th Ed.) | D2907–97 | R–1180–76,<br>R–1181–76 | U–04 | |
| | ICP–MS | 200.8[13] | | | | 3125 | D5673–03 | | | |
| | Alpha Spectrometry | | | 00–07 | p. 33 | 7500–U C (18th, 19th, or 20th Ed.), 7500–U C–00 | D3972–97, 02 | R–1182–76 | U–02 | |
| | Laser Phosphorimetry | | | | | | D5174–97, 02 | | | |
| **Man-Made:** | | | | | | | | | | |
| Radioactive Cesium | Radiochemical | 901.0 | p. 4 | | | 7500–Cs B, 7500–Cs B–00 | D2459–72 | R–1111–76 | | |
| | Gamma Ray Spectrometry | 901.1 | | | p. 92 | 7120, 7120–97 | D3649–91, 98a | R–1110–76 | 4.5.2.3 | |
| Radioactive Iodine | Radiochemical | 902.0 | p. 6 | | | 7500–I B, 7500–I B–00 | | | | |
| | | | p. 9 | | | 7500–I C, 7500–I C–00 | | | | |
| | | | | | | 7500–I D, 7500–I D–00 | D3649–91, 98a | | | |
| | Gamma Ray Spectrometry | 901.1 | | | p. 92 | 7120, 7120–97 | D4785–93, 00a | | 4.5.2.3 | |
| Radioactive Strontium 89, 90 | Radiochemical | 905.0 | p. 29 | Sr–04 | p. 65 | 303, 7500–Sr B, 7500–Sr B–01 | | R–1160–76 | Sr–01,<br>Sr–02 | |
| Tritium | Liquid Scintillation | 906.0 | p. 34 | H–02 | p. 87 | 306, 7500–$^{3}$H B, 7500–$^{3}$H B–00 | D4107–91, 98 (Reapproved 2002) | R–1171–76 | | |
| Gamma Emitters | Gamma Ray Spectrometry | 901.1 | | | p. 92 | 7120, 7120–97 | D3649–91, 98a | R–1110–76 | Ga–01–R | |
| | | 902.0 | | | | 7500–Cs B, 7500–Cs B–00 | D4785–93, 00a | | | |
| | | 901.0 | | | | 7500–I B, 7500–I B–00 | | | | |

**The procedures shall be done in accordance with the documents listed below. The incorporation by reference of documents 1 through 10 and 13 through 14 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800–426–4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., Room 3334 , Washington, DC 20460 (Telephone: 202–566–2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*.**

[1] "Prescribed Procedures for the Measurement of Radioactivity in Drinking Water," EPA 600/4–80–032, August 1980. Available at the U.S. Department of Commerce, National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 (Telephone 800–553–6847), PB 80–224744.

[2] "Interim Radiochemical Methodology for Drinking Water," EPA 600/4–75–008 (revised), March 1976. Available NTIS, ibid.

[3] "Radiochemistry Procedures Manual," EPA 520/5–84–006, December 1987. Available NTIS, ibid.

[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, 17th, 18th, 19th or 20th edition, 1971, 1989, 1992, 1995, 1998. Available at American Public Health Association, 1015 Fifteenth Street, NW., Washington, DC 20005. Methods 302, 303, 304, 305 and 306 are only in the 13th edition. Methods 7110B, 7500–Ra B, 7500–Ra C, 7500–Ra D, 7500–U B, 7500–Cs B, 7500–I B, 7500–I C, 7500–I D, 7500–Sr B, and 7500–$^3$H B are in the 17th, 18th, 19th and 20th editions. Method 7110 C is in the 18th, 19th and 20th editions. Method 7500–U C Fluorometric Uranium is only in the 17th Edition, and 7500–U C Alpha spectrometry is only in the 18th, 19th and 20th editions. Method 7120 is only in the 19th and 20th editions. Method 3125 is only in the 20th edition. Methods 7110 B–00, 7110 C–00, 7500–Ra B–01, 7500–Ra C–01, 7500–Ra D–01, 7500–U B–00, 7500–U C–00, 7500–I B–00, 7500–I C–00, 7500–I D–00, 7120–97, 7500–Sr B–01, and 7500–$^3$H B–00 are available online 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.

[6] *Annual Book of ASTM Standards,* Vol. 11.01 and 11.02, 2002; ASTM International; any year containing the cited version of the method may be used. Copies of these two volumes and the 2003 version of D 5673–03 may be obtained from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428–2959.

[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,* 1977. Available at U.S. Geological Survey (USGS) Information Services, Box 25286, Federal Center, Denver, CO 80225–0425.

[8] "EML Procedures Manual," 28th (1997) or 27th (1990) Editions, Volumes 1 and 2; either edition may be used. In the 27th Edition Method Ra-04 is listed as Ra-05 and Method Ga-01–R is listed as Sect. 4.5.2.3. 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 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, NJ 08625.

[11] Natural uranium and thorium-230 are 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/µg of uranium conversion factor must be used. This conversion factor is based on the 1:1 activity ratio of U–234 and U–238 that is characteristic of naturally occurring uranium.

[13] "Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Revision 5.4, which is published in "Methods for the Determination of Metals in Environmental Samples—Supplement I,"' EPA 600–R–94–111, May 1994. Available at NTIS, PB 95–125472.

[14] "The Determination of Radium-226 and Radium-228 in Drinking Water by Gamma-ray Spectrometry Using HPGE or Ge(Li) Detectors," Revision 1.2, December 2004. Available from the Environmental Resources Center, Georgia Institute of Technology, 620 Cherry Street, Atlanta, GA 30332–0335, USA, Telephone: 404–894–3776. This method may be used to analyze for radium-226 and radium-228 in samples collected after January 1, 2005 to satisfy the radium-226 and radium-228 monitoring requirements specified at 40 CFR 141.26.

(b) When the identification and measurement of radionuclides other than those listed in paragraph (a) of this section is required, the following references are to be used, except in cases where alternative methods have been approved in accordance with §141.27.
  (1) *Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions,* H. L. Krieger and S. Gold, EPA-R4–73–014. USEPA, Cincinnati, Ohio, May 1973.
  (2) *HASL Procedure Manual,* Edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, NY., 1973.

(c) (c) 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 percent at the 95 percent confidence level (1.96σ where σ is the standard deviation of the net counting rate of the sample).
  (1) To determine compliance with §141.66(b), (c), and (e) the detection limit shall not exceed the concentrations in Table B to this paragraph.

**Table B—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** | **1 μg/L** |

**(2) To determine compliance with §141.66(d) the detection limits shall not exceed the concentrations listed in Table C to this paragraph.**

**Table C—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.** |

**(d) To judge compliance with the maximum contaminant levels listed in §141.66, 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.**

**(e) The State has the authority to determine compliance or initiate enforcement action based upon analytical results or other information compiled by their sanctioned representatives and agencies.**

## .1523 PUBLIC NOTIFICATION REQUIREMENTS

(a) The provisions of 40 C.F.R. 141.32 are hereby incorporated by reference including any subsequent amendments and editions, except that multi-lingual notice shall be given if 30 percent or more of the consumers served by the system are non-English speaking. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/. ***[Note: The provisions of 40 C.F.R. 141.32 are no longer valid. 40 C.F.R. 141.32 is now "Reserved".]***

(b) The provisions of 40 C.F.R. 141, Subpart Q – Public Notification of Drinking Water Violations are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/.

(c) Special notification for distribution system samples. The requirements of this Paragraph shall be additional to the public notice requirements in Paragraphs (a) and (b) of this Rule and to the reporting requirements contained in Rule .1525 of this Subchapter. When a distribution sample is taken on property not owned or controlled by the supplier of water, the supplier of water shall notify the person authorizing the sample if any individual water sample exceeds an action level, MCL or MRDL established in this Subchapter, or if any individual sample is positive for coliform bacteria. The supplier of water shall give notice to the person authorizing the sample in a format provided by the Department, as follows:

(1) For a contaminant listed as Tier 1 in Appendix A to 40 C.F.R. 141, Subpart Q, notice shall be provided by telephone within 24 hours of receipt of analytical results and shall be followed by

written notice by mail or direct delivery within 48 hours of receipt. The written notice shall include the analytical results and appropriate health effects language.

(2) For a contaminant listed as Tier 2 or Tier 3 in Appendix A to 40 C.F.R. 141, Subpart Q, notice shall be provided within 48 hours of receipt of analytical results. Written notice shall be provided by mail or direct delivery to the person authorizing the sample and shall include the analytical results and appropriate health effects language.

(3) The supplier of water shall submit a copy of the written notice and certification of delivery to the Department within 10 days of completing notification.

The person authorizing the sample may waive the notification required by this Paragraph. The waiver shall be documented in writing and signed by the authorizing person. The waiver is valid for five years and is renewable.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. January 1, 1990;*
*Transferred and Recodified from 10 NCAC 10D .1642 Eff. April 4, 1990;*
*Amended Eff. October 1, 2006; August 1, 2002; April 1, 1992; December 1, 1991; January 1, 1991; October 1, 1990.*

## ADOPTED BY REFERENCE

**SUBPART Q—PUBLIC NOTIFICATION OF DRINKING WATER VIOLATIONS**

**§ 141.201 General public notification requirements.**
**§ 141.202 *Tier 1 Public Notice*--Form, manner, and frequency of notice.**
**§ 141.203 *Tier 2 Public Notice*--Form, manner, and frequency of notice.**
**§ 141.204 *Tier 3 Public Notice*--Form, manner, and frequency of notice.**
**§ 141.205 Content of the public notice.**
**§ 141.206 Notice to new billing units or new customers.**
**§ 141.207 Special notice of the availability of unregulated contaminant monitoring results.**
**§ 141.208 Special notice for exceedance of the SMCL for fluoride.**
**§ 141.209 Special notice for nitrate exceedances above MCL by non-community water systems (NCWS), where granted permission by the primacy agency under §141.11(d)**
**§ 141.210 Notice by primacy agency on behalf of the public water system.**
**§ 141.211 Special notice for repeated failure to conduct monitoring of the source water for *Cryptosporidium* and for failure to determine bin classification or mean *Cryptosporidium* level.**
**Appendix A to Subpart Q of Part 141--NPDWR Violations and Other Situations Requiring Public Notice**
**Appendix B to Subpart Q of Part 141--Standard Health Effects Language for Public Notification**
**Appendix C to Subpart Q of Part 141--List of Acronyms Used in Public Notification Regulation**

**§ 141.201 General public notification requirements.**

**Public water systems in States with primacy for the public water system supervision (PWSS) program must comply with the requirements in this subpart no later than May 6, 2002 or on the date the State-adopted rule becomes effective, whichever comes first. Public water systems in jurisdictions where EPA directly implements the PWSS program must comply with the requirements in this subpart on October 31, 2000. Prior to these dates, public water systems must continue to comply with the public notice requirements in §141.32 of this part. The term “primacy agency” is used in this subpart to refer to either EPA or the State or the Tribe in cases where EPA, the State, or the Tribe exercises primary enforcement responsibility for this subpart.**

**(a) *Who must give public notice?* Each owner or operator of a public water system (community water systems, non-transient non-community water systems, and transient non-community water systems) must give notice for all violations of national primary drinking water regulations (NPDWR) and for other situations, as listed in Table 1. The term “NPDWR violations” is used in this subpart to include violations of the maximum contaminant level (MCL), maximum residual disinfection level (MRDL), treatment technique (TT), monitoring requirements, and testing procedures in this part 141. Appendix A to this subpart identifies the tier assignment for each specific violation or situation requiring a public notice.**

**Table 1 to §141.201—Violation Categories and Other Situations Requiring a Public Notice**

| **(1) NPDWR violations:** |
|---|
| **(i) Failure to comply with an applicable maximum contaminant level (MCL) or maximum residual disinfectant level (MRDL).** |
| **(ii) Failure to comply with a prescribed treatment technique (TT).** |
| **(iii) Failure to perform water quality monitoring, as required by the drinking water regulations.** |
| **(iv) Failure to comply with testing procedures as prescribed by a drinking water regulation.** |

| **(2) Variance and exemptions under sections 1415 and 1416 of SDWA:** |
|---|
| **(i) Operation under a variance or an exemption.** |
| **(ii) Failure to comply with the requirements of any schedule that has been set under a variance or exemption.** |
| **(3) Special public notices:** |
| **(i) Occurrence of a waterborne disease outbreak or other waterborne emergency.** |
| **(ii) Exceedance of the nitrate MCL by non-community water systems (NCWS), where granted permission by the primacy agency under 141.11(d) of this part.** |
| **(iii) Exceedance of the secondary maximum contaminant level (SMCL) for fluoride.** |
| **(iv) Availability of unregulated contaminant monitoring data.** |
| **(v) Other violations and situations determined by the primacy agency to require a public notice under this subpart, not already listed in Appendix A.** |

**(b) *What type of public notice is required for each violation or situation?* Public notice requirements are divided into three 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 Table 1 of this section are determined by the tier to which it is assigned. Table 2 of this section provides the definition of each tier. Appendix A of this part identifies the tier assignment for each specific violation or situation.**

**Table 2 to §141.201—Definition of Public Notice Tiers**

| |
|---|
| **(1) *Tier 1 public notice* —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* —required for all other NPDWR violations and situations with potential to have serious adverse effects on human health.** |
| **(3) *Tier 3 public notice* —required for all other NPDWR violations and situations not included in Tier 1 and Tier 2.** |

**(c) *Who must be notified?***

**(1) Each public water system must provide public notice to persons served by the water system, in accordance with this subpart. Public water systems that sell or otherwise provide drinking water to other public water systems ( *i.e.* , 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.**

**(2) 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 primacy agency 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 primacy agency for limiting distribution of the notice must be granted in writing.**

**(3) A copy of the notice must also be sent to the primacy agency, in accordance with the requirements under §141.31(d).**

**§ 141.202 Tier 1 Public Notice —Form, manner, and frequency of notice.**

**(a) *Which violations or situations require a Tier 1 public notice?* Table 1 of this section lists the violation categories and other situations requiring a Tier 1 public notice. Appendix A to this subpart identifies the tier assignment for each specific violation or situation.**

**Table 1 to §141.202—Violation Categories and Other Situations Requiring a Tier 1 Public Notice**

| |
|---|
| **(1) Violation of the MCL for total coliforms when fecal coliform or *E.coli* are present in the water distribution system (as specified in §141.63(b)), 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 §141.21(e));** |
| **(2) Violation of the MCL for nitrate, nitrite, or total nitrate and nitrite, as defined in §141.62, or when the water system fails to take a confirmation sample within 24 hours of the system's receipt of the first sample showing an exceedance of the nitrate or nitrite MCL, as specified in §141.23(f)(2);** |

| |
|---|
| **(3) Exceedance of the nitrate MCL by non-community water systems, where permitted to exceed the MCL by the primacy agency under §141.11(d), as required under §141.209;** |
| **(4) Violation of the MRDL for chlorine dioxide, as defined in §141.65(a), 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 §141.133(c)(2)(i);** |
| **(5) Violation of the turbidity MCL under §141.13(b), where the primacy agency 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), Interim Enhanced Surface Water Treatment Rule (IESWTR) or Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit (as identified in appendix A), where the primacy agency 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 §141.2, 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) Detection of *E.coli* , enterococci, or coliphage in source water samples as specified in §141.402(a) and §141.402(b);** |
| **(9) 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 primacy agency either in its regulations or on a case-by-case basis.** |

**(b) *When is the Tier 1 public notice to be provided?* What additional steps are required? Public water systems must:**

**(1) Provide a public notice as soon as practical but no later than 24 hours after the system learns of the violation;**

**(2) Initiate consultation with the primacy agency 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; and**

**(3) 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 primacy agency. Such requirements may include the timing, form, manner, frequency, and content of repeat notices (if any) and other actions designed to reach all persons served.**

**(c) *What is the form and manner of the public notice?* Public water systems must 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 are to fit the specific situation, but must be designed to reach residential, transient, and non-transient users of the water system. In order to reach all persons served, water systems are to use, at a minimum, one or more of the following forms of delivery:**

**(1) Appropriate broadcast media (such as radio and television);**

**(2) Posting of the notice in conspicuous locations throughout the area served by the water system;**

**(3) Hand delivery of the notice to persons served by the water system; or**

**(4) Another delivery method approved in writing by the primacy agency.**

## § 141.203 Tier 2 Public Notice —Form, manner, and frequency of notice.

**(a) *Which violations or situations require a Tier 2 public notice?* Table 1 of this section lists the violation categories and other situations requiring a Tier 2 public notice. Appendix A to this subpart identifies the tier assignment for each specific violation or situation.**

**Table 1 to §141.203—Violation Categories and Other Situations Requiring a Tier 2 Public Notice**

| |
|---|
| **(1) All violations of the MCL, MRDL, and treatment technique requirements, except where a Tier 1 notice is required under §141.202(a) or where the primacy agency determines that a Tier 1 notice is required;** |
| **(2) Violations of the monitoring and testing procedure requirements, where the primacy agency 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; and** |
| **(3) Failure to comply with the terms and conditions of any variance or exemption in place.** |
| **(4) Failure to take corrective action or failure to maintain at least 4-log treatment of viruses (using inactivation, removal, or a State-approved combination of 4-log virus inactivation and removal) before or at the first customer under §141.403(a).** |

**(b) When is the Tier 2 public notice to be provided?**

**(1) Public water systems must 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 must remain in place for as long as the violation or situation persists, but in no case for less than seven days, even if the violation or situation is resolved. The primacy agency may, in appropriate circumstances, allow additional time for the initial notice of up to three months from the date the system learns of the violation. It is not appropriate for the primacy agency to grant an extension to the 30-day deadline for any unresolved violation or to allow across-the-board extensions by rule or policy for other violations or situations requiring a Tier 2 public notice. Extensions granted by the primacy agency must be in writing.**

**(2) The public water system must repeat the notice every three months as long as the violation or situation persists, unless the primacy agency determines that appropriate circumstances warrant a different repeat notice frequency. In no circumstance may the repeat notice be given less frequently than once per year. It is not appropriate for the primacy agency to allow less frequent repeat notice for an MCL violation under the Total Coliform Rule or a treatment technique violation under the Surface Water Treatment Rule or Interim Enhanced Surface Water Treatment Rule. It is also not appropriate for the primacy agency to allow through its rules or policies across-the-board reductions in the repeat notice frequency for other ongoing violations requiring a Tier 2 repeat notice. Primacy agency determinations allowing repeat notices to be given less frequently than once every three months must be in writing.**

**(3) For the turbidity violations specified in this paragraph, public water systems must consult with the primacy agency 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 §141.202(a) is required to protect public health. When consultation does not take place within the 24-hour period, the water system must distribute a Tier 1 notice of the violation within the next 24 hours ( i.e., no later than 48 hours after the system learns of the violation), following the requirements under §141.202(b) and (c). Consultation with the primacy agency is required for:**

**(i) Violation of the turbidity MCL under §141.13(b); or**

**(ii) Violation of the SWTR, IESWTR or LT1ESWTR treatment technique requirement resulting from a single exceedance of the maximum allowable turbidity limit.**

**(c) *What is the form and manner of the Tier 2 public notice?* Public water systems must 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 must at a minimum meet the following requirements:**

**(1) Unless directed otherwise by the primacy agency in writing, community water systems must provide notice by:**

**(i) 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; and**

**(ii) 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 paragraph (c)(1)(i) of this section. Such 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 (e.g., apartment building owners or large private employers); posting in public places served by the system or on the Internet; or delivery to community organizations.**

**(2) Unless directed otherwise by the primacy agency in writing, non-community water systems must provide notice by:**

**(i) 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); and**

**(ii) 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 paragraph (c)(2)(i) of this section. Such persons may include those served who may not see a posted notice because the posted notice is not in a location they routinely pass by. 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 (e.g., community centers).**

## § 141.204 Tier 3 Public Notice —Form, manner, and frequency of notice.

**(a) *Which violations or situations require a Tier 3 public notice?* Table 1 of this section lists the violation categories and other situations requiring a Tier 3 public notice. Appendix A to this subpart identifies the tier assignment for each specific violation or situation.**

**Table 1 to §141.204—Violation Categories and Other Situations Requiring a Tier 3 Public Notice**

| |
|---|
| **(1) Monitoring violations under 40 CFR part 141, except where a Tier 1 notice is required under §141.202(a) or where the primacy agency determines that a Tier 2 notice is required;** |
| **(2) Failure to comply with a testing procedure established in 40 CFR part 141, except where a Tier 1 notice is required under §141.202(a)) or where the primacy agency determines that a Tier 2 notice is required;** |
| **(3) Operation under a variance granted under Section 1415 or an exemption granted under Section 1416 of the Safe Drinking Water Act;** |
| **(4) Availability of unregulated contaminant monitoring results, as required under §141.207; and** |
| **(5) Exceedance of the fluoride secondary maximum contaminant level (SMCL), as required under §141.208.** |

**(b) *When is the Tier 3 public notice to be provided?***

**(1) Public water systems must provide the 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 must repeat the notice annually for as long as the violation, variance, exemption, or other situation persists. If the public notice is posted, the notice must remain in place for as long as the violation, variance, exemption, or other situation persists, but in no case less than seven days (even if the violation or situation is resolved).**

**(2) 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 twelve months, as long as the timing requirements of paragraph (b)(1) of this section are met.**

**(c) *What is the form and manner of the Tier 3 public notice?* Public water systems must 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 must at a minimum meet the following requirements:**

**(1) Unless directed otherwise by the primacy agency in writing, community water systems must provide notice by:**

**(i) 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; and**

**(ii) 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 paragraph (c)(1)(i) of this section. Such 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 (e.g., apartment building owners or large private employers); posting in public places or on the Internet; or delivery to community organizations.

(2) Unless directed otherwise by the primacy agency in writing, non-community water systems must provide notice by:
  (i) 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); and
  (ii) 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 paragraph (c)(2)(i) of this section. Such persons may include those who may not see a posted notice because the notice is not in a location they routinely pass by. 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 (e.g., community centers).

(d) *In what situations may the Consumer Confidence Report be used to meet the Tier 3 public notice requirements?* For community water systems, the Consumer Confidence Report (CCR) required under Subpart O of this part may be used as a vehicle for the initial Tier 3 public notice and all required repeat notices, as long as:
  (1) The CCR is provided to persons served no later than 12 months after the system learns of the violation or situation as required under §141.204(b);
  (2) The Tier 3 notice contained in the CCR follows the content requirements under §141.205; and
  (3) The CCR is distributed following the delivery requirements under §141.204(c).

<u>§ 141.205 Content of the public notice.</u>

(a) *What elements must 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 NPDWR or has a situation requiring public notification, each public notice must include the following elements:
  (1) A description of the violation or situation, including the contaminant(s) of concern, and (as applicable) the contaminant level(s);
  (2) When the violation or situation occurred;
  (3) Any potential adverse health effects from the violation or situation, including the standard language under paragraph (d)(1) or (d)(2) of this section, whichever is applicable;
  (4) The population at risk, including subpopulations particularly vulnerable if exposed to the contaminant in their drinking water;
  (5) Whether alternative water supplies should be used;
  (6) What actions consumers should take, including when they should seek medical help, if known;
  (7) What the system is doing to correct the violation or situation;
  (8) When the water system expects to return to compliance or resolve the situation;
  (9) 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; and
  (10) A statement to encourage the notice recipient to distribute the public notice to other persons served, using the standard language under paragraph (d)(3) of this section, where applicable.

(b) *What elements must be included in the public notice for public water systems operating under a variance or exemption?*
  (1) If a public water system has been granted a variance or an exemption, the public notice must contain:
    (i) An explanation of the reasons for the variance or exemption;
    (ii) The date on which the variance or exemption was issued;
    (iii) 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; and
    (iv) A notice of any opportunity for public input in the review of the variance or exemption.
  (2) If a public water system violates the conditions of a variance or exemption, the public notice must contain the ten elements listed in paragraph (a) of this section.

(c) *How is the public notice to be presented?*
  (1) Each public notice required by this section:
    (i) Must be displayed in a conspicuous way when printed or posted;
    (ii) Must not contain overly technical language or very small print;
    (iii) Must not be formatted in a way that defeats the purpose of the notice;

**(iv) Must not contain language which nullifies the purpose of the notice.**

**(2) Each public notice required by this section must comply with multilingual requirements, as follows:**

**(i) For public water systems serving a large proportion of non-English speaking consumers, as determined by the primacy agency, the public notice must contain information in the appropriate language(s) 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 language.**

**(ii) In cases where the primacy agency has not determined what constitutes a large proportion of non-English speaking consumers, the public water system must include in the public notice the same information as in paragraph (c)(2)(i) of this section, where appropriate to reach a large proportion of non-English speaking persons served by the water system.**

**(d) *What standard language must public water systems include in their public notice?* Public water systems are required to include the following standard language in their public notice:**

**(1) 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 must include in each public notice the health effects language specified in appendix B to this subpart corresponding to each MCL, MRDL, and treatment technique violation listed in appendix A to this subpart, and for each violation of a condition of a variance or exemption.**

**(2) Standard language for monitoring and testing procedure violations. Public water systems must 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 to this subpart:**

***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*.**

**(3) Standard language to encourage the distribution of the public notice to all persons served. Public water systems must 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.***

## § 141.206 Notice to new billing units or new customers.

**(a) *What is the requirement for community water systems?* Community water systems must 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.**

**(b) *What is the requirement for non-community water systems?* Non-community water systems must 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.**

## § 141.207 Special notice of the availability of unregulated contaminant monitoring results.

**(a) *When is the special notice to be given?* The owner or operator of a community water system or non-transient, non-community water system required to monitor under §141.40 must 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.**

**(b) What is the form and manner of the special notice? The form and manner of the public notice must follow the requirements for a Tier 3 public notice prescribed in §§141.204(c), (d)(1), and (d)(3). The notice must also identify a person and provide the telephone number to contact for information on the monitoring results.**

## § 141.208 Special notice for exceedance of the SMCL for fluoride.

**(a) *When is the special notice to be given?* Community water systems that exceed the fluoride secondary maximum contaminant level (SMCL) of 2 mg/l as specified in §143.3 (determined by the last single sample taken in accordance with §141.23), but do not exceed the maximum contaminant level (MCL) of 4 mg/l for fluoride (as specified in §141.62), must provide the public notice in paragraph (c) of this section to persons served. Public notice must 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 must 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 must repeat the notice at least annually for as long as the SMCL is exceeded. If the public notice is posted, the notice must remain in place for as long as the SMCL is exceeded, but in no case less than seven days (even if the exceedance is eliminated). On a case-by-case basis, the primacy agency may require an initial notice sooner than 12 months and repeat notices more frequently than annually.**

**(b) *What is the form and manner of the special notice?* The form and manner of the public notice (including repeat notices) must follow the requirements for a Tier 3 public notice in §141.204(c) and (d)(1) and (d)(3).**

**(c) *What mandatory language must be contained in the special notice?* The notice must 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 nine 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 (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 nine 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.”***

## § 141.209 Special notice for nitrate exceedances above MCL by non-community water systems (NCWS), where granted permission by the primacy agency under §141.11(d)

**(a) *When is the special notice to be given?* The owner or operator of a non-community water system granted permission by the primacy agency under §141.11(d) to exceed the nitrate MCL must provide notice to persons served according to the requirements for a Tier 1 notice under §141.202(a) and (b).**

**(b) *What is the form and manner of the special notice?* Non-community water systems granted permission by the primacy agency to exceed the nitrate MCL under §141.11(d) must 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 §141.202(c) and the content requirements under §141.205.**

## § 141.210 Notice by primacy agency on behalf of the public water system.

**(a) May the primacy agency give the notice on behalf of the public water system? The primacy agency may give the notice required by this subpart on behalf of the owner and operator of the public water system if the primacy agency complies with the requirements of this subpart.**

**(b) What is the responsibility of the public water system when notice is given by the primacy agency? The owner or operator of the public water system remains responsible for ensuring that the requirements of this subpart are met.**

**§ 141.211 Special notice for repeated failure to conduct monitoring of the source water for *Cryptosporidium* and for failure to determine bin classification or mean *Cryptosporidium* level.**

**(a) When is the special notice for repeated failure to monitor to be given? The owner or operator of a community or non-community water system that is required to monitor source water under §141.701 must notify persons served by the water system that monitoring has not been completed as specified no later than 30 days after the system has failed to collect any 3 months of monitoring as specified in §141.701(c). The notice must be repeated as specified in §141.203(b).**

**(b) When is the special notice for failure to determine bin classification or mean Cryptosporidium level to be given? The owner or operator of a community or non-community water system that is required to determine a bin classification under §141.710, or to determine mean Cryptosporidium level under §141.712, must notify persons served by the water system that the determination has not been made as required no later than 30 days after the system has failed report the determination as specified in §141.710(e) or §141.712(a), respectively. The notice must be repeated as specified in §141.203(b). The notice is not required if the system is complying with a State-approved schedule to address the violation.**

**(c) What is the form and manner of the special notice? The form and manner of the public notice must follow the requirements for a Tier 2 public notice prescribed in §141.203(c). The public notice must be presented as required in §141.205(c).**

**(d) What mandatory language must be contained in the special notice? The notice must contain the following language, including the language necessary to fill in the blanks.**

**(1) The special notice for repeated failure to conduct monitoring must contain the following language:**

***We are required to monitor the source of your drinking water for Cryptosporidium. Results of the monitoring are to be used to determine whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We are required to complete this monitoring and make this determination by (required bin determination date). We "did not monitor or test" or "did not complete all monitoring or testing" on schedule and, therefore, we may not be able to determine by the required date what treatment modifications, if any, must be made to ensure adequate Cryptosporidium removal. Missing this deadline may, in turn, jeopardize our ability to have the required treatment modifications, if any, completed by the deadline required, (date).***

***For more information, please call (name of water system contact) of (name of water system) at (phone number).***

**(2) The special notice for failure to determine bin classification or mean Cryptosporidium level must contain the following language:**

***We are required to monitor the source of your drinking water for Cryptosporidium in order to determine by (date) whether water treatment at the (treatment plant name) is sufficient to adequately remove Cryptosporidium from your drinking water. We have not made this determination by the required date. Our failure to do this may jeopardize our ability to have the required treatment modifications, if any, completed by the required deadline of (date). For more information, please call (name of water system contact) of (name of water system) at (phone number).***

**(3) Each special notice must also include a description of what the system is doing to correct the violation and when the system expects to return to compliance or resolve the situation.**

**Appendix A to Subpart Q**

### Appendix A to Subpart Q -- 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 (NPDWR):[3]** | | | | |
| **A. Microbiological Contaminants** | | | | |
| 1. Total coliform | 2 | 141.63(a) | 3 | 141.21(a)–(e) |
| 2. Fecal coliform/*E.coli* | 1 | 141.63(b) | [4]1, 3 | 141.21(e) |
| 3. Turbidity MCL | 2 | 141.13(a) | 3 | 141.22 |
| 4. Turbidity MCL (average of 2 days' samples >5 NTU) | [5]2, 1 | 141.13(b) | 3 | 141.22 |
| 5. Turbidity (for TT violations resulting from a single exceedance of maximum allowable turbidity level) | [6]2, 1 | 141.71(a)(2), 141.71(c)(2)(i), 141.73(a)(2), 141.73 (b)(2), 141.73 (c)(2), 141.73(d), 141.173(a)(2), 141.173(b), 141.551(b) | 3 | 141.74(a)(1), 141.74(b)(2), 141.74(c)(1), 141.174, 141.560(a)–(c), 141.561. |
| 6. Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. allowable turbidity level (TT) | 2 | 141.70–141.73 | 3 | 141.74 |
| 7. Interim Enhanced Surface Water Treatment Rule violations, other than violations resulting from single exceedance of max. turbidity level (TT) | [7]2 | 141.170–141.173, 141.500–141.553 | 3 | 141.172, 141.174, 141.530–141.544, 141.560–141.564. |
| 8. Filter Backwash Recycling Rule violations | 2 | 141.76(c) | 3 | 141.76(b), (d) |
| 9. Long Term 1 Enhanced Surface Water Treatment Rule violations | 2 | 141.500–141.553 | 3 | 141.530–141.544, 141.560–141.564. |
| 10. LT2ESWTR violations | 2 | 141.710–141.720 | [22]2, 3 | 141.701–141.705 and 141.708–141.709. |
| 11. Ground Water Rule violations | 2 | 141.404 | 3 | 141.402(h), 141.403(d). |
| **B. Inorganic Chemicals (IOCs)** | | | | |
| 1. Antimony | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 2. Arsenic | 2 | [8]141.62(b) | 3 | [11]141.23(a), (c) |
| 3. Asbestos (fibers >10 μm) | 2 | 141.62(b) | 3 | 141.23(a)–(b) |
| 4. Barium | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 5. Beryllium | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 6. Cadmium | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 7. Chromium (total) | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 8. Cyanide | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 9. Fluoride | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 10. Mercury (inorganic) | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 11. Nitrate | 1 | 141.62(b) | [12]1, 3 | 141.23(a), (d), 141.23(f)(2) |
| 12. Nitrite | 1 | 141.62(b) | [12]1, 3 | 141.23(a), (e), 141.23(f)(2) |
| 13. Total Nitrate and Nitrite | 1 | 141.62(b) | 3 | 141.23(a) |
| 14. Selenium | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| 15. Thallium | 2 | 141.62(b) | 3 | 141.23(a), (c) |
| **C. Lead and Copper Rule (Action Level for lead is 0.015 mg/L, for copper is 1.3 mg/L)** | | | | |
| 1. Lead and Copper Rule (TT) | 2 | 141.80–141.85 | 3 | 141.86–141.89 |

| | | | | |
|---|---|---|---|---|
| **D. Synthetic Organic Chemicals (SOCs)** | | | | |
| **1. 2,4–D** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **2. 2,4,5–TP (Silvex)** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **3. Alachlor** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **4. Atrazine** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **5. Benzo(a)pyrene (PAHs)** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **6. Carbofuran** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **7. Chlordane** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **8. Dalapon** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **9. Di (2-ethylhexyl) adipate** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **10. Di (2-ethylhexyl) phthalate** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **11. Dibromochloropropane** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **12. Dinoseb** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **13. Dioxin (2,3,7,8-TCDD)** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **14. Diquat** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **15. Endothall** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **16. Endrin** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **17. Ethylene dibromide** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **18. Glyphosate** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **19. Heptachlor** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **20. Heptachlor epoxide** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **21. Hexachlorobenzene** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **22. Hexachlorocyclo-pentadiene** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **23. Lindane** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **24. Methoxychlor** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **25. Oxamyl (Vydate)** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **26. Pentachlorophenol** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **27. Picloram** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **28. Polychlorinated biphenyls (PCBs)** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **29. Simazine** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **30. Toxaphene** | **2** | **141.61(c)** | **3** | **141.24(h)** |
| **E. Volatile Organic Chemicals (VOCs)** | | | | |
| **1. Benzene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **2. Carbon tetrachloride** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **3. Chlorobenzene (monochlorobenzene)** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **4. o-Dichlorobenzene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **5. p-Dichlorobenzene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **6. 1,2-Dichloroethane** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **7. 1,1-Dichloroethylene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **8. cis-1,2-Dichloroethylene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **9. trans-1,2-Dichloroethylene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **10. Dichloromethane** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **11. 1,2-Dichloropropane** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **12. Ethylbenzene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **13. Styrene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **14. Tetrachloroethylene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **15. Toluene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **16. 1,2,4-Trichlorobenzene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **17. 1,1,1-Trichloroethane** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **18. 1,1,2-Trichloroethane** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **19. Trichloroethylene** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **20. Vinyl chloride** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **21. Xylenes (total)** | **2** | **141.61(a)** | **3** | **141.24(f)** |
| **F. Radioactive Contaminants** | | | | |
| **1. Beta/photon emitters** | **2** | **141.66(d)** | **3** | **141.25(a)**<br>**141.26(b)** |
| **2. Alpha emitters** | **2** | **141.66(c)** | **3** | **141.25(a)**<br>**141.26(a)** |

| | | | | |
|---|---|---|---|---|
| 3. Combined radium (226 and 228) | 2 | 141.66(b) | 3 | 141.25(a)<br>141.26(a) |
| 4. Uranium | [9]2 | 141.66(e) | [10]3 | 141.25(a)<br>141.26(a) |
| **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 (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs).[13]** | | | | |
| 1. Total trihalomethanes (TTHMs) | 2 | [14]141.64(b) | 3 | 141.132(a)–(b),<br>141.600–141.605,<br>141.620–141.629 |
| 2. Haloacetic Acids (HAA5) | 2 | 141.64(b) | 3 | 141.132(a)–(b),<br>141.600–141.605,<br>141.620–141.629 |
| 3. Bromate | 2 | 141.64(a) | 3 | 141.132(a)–(b) |
| 4. Chlorite | 2 | 141.64(a) | 3 | 141.132(a)–(b) |
| 5. Chlorine (MRDL) | 2 | 141.65(a) | 3 | 141.132(a), (c) |
| 6. Chloramine (MRDL) | 2 | 141.65(a) | 3 | 141.132(a), (c) |
| 7. Chlorine dioxide (MRDL), where any 2 consecutive daily samples at entrance to distribution system only are above MRDL | 2 | 141.65(a), 141.133(c)(3) | 2[15], 3 | 141.132(a), (c),<br>141.133(c)(2) |
| 8. Chlorine dioxide (MRDL), where sample(s) in distribution system the next day are also above MRDL | [16]1 | 141.65(a), 141.133(c)(3) | 1 | 141.132(a), (c),<br>141.133(c)(2) |
| 9. Control of DBP precursors—TOC (TT) | 2 | 141.135(a)–(b) | 3 | 141.132(a), (d) |
| 10. Bench marking and disinfection profiling | N/A | N/A | 3 | 141.172 141.530–141.544. |
| 11. Development of monitoring plan | N/A | N/A | 3 | 141.132(f) |
| **H. Other Treatment Techniques** | | | | |
| 1. Acrylamide (TT) | 2 | 141.111 | N/A | N/A |
| 2. Epichlorohydrin (TT) | 2 | 141.111 | N/A | N/A |
| **II. Unregulated Contaminant Monitoring:[17]** | | | | |
| A. Unregulated contaminants | N/A | N/A | 3 | 141.40 |
| B. Nickel | N/A | N/A | 3 | 141.23(c), (k) |
| **III. Public Notification for Variances and Exemptions:** | | | | |
| A. Operation under a variance or exemption | 3 | [18]1415, 1416, | N/A | N/A |
| B. Violation of conditions of a variance or exemption | 2 | 1415, 1416,[19]142.307 | N/A | N/A |
| **IV. Other Situations Requiring Public Notification:** | | | | |
| A. Fluoride secondary maximum contaminant level (SMCL) exceedance | 3 | 143.3 | N/A | N/A |
| B. Exceedance of nitrate MCL for non-community systems, as allowed by primacy agency | 1 | 141.11(d) | N/A | N/A |
| C. Availability of unregulated contaminant monitoring data | 3 | 141.40 | N/A | N/A |
| D. Waterborne disease outbreak | 1 | 141.2, 141.71(c)(2)(ii) | N/A | N/A |
| E. Other waterborne emergency[20] | 1 | N/A | N/A | N/A |
| F. Source Water Sample Positive for GWR Fecal indicators: *E.coli*, enterococci, or coliphage | 1 | 141.402(g) | N/A | N/A |
| G. Other situations as determined by primacy agency | [21]1, 2, 3 | N/A | N/A | N/A |

**Appendix A—Endnotes**

**1. Violations and other situations not listed in this table (e.g., failure to prepare Consumer Confidence Reports), do not require notice, unless otherwise determined by the primary agency. Primacy agencies 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 §141.202(a) and §141.203(a).**

**2. MCL—Maximum contaminant level, MRDL—Maximum residual disinfectant level, TT—Treatment technique**

**3. The term Violations of National Primary Drinking Water Regulations (NPDWR) is used here to include violations of MCL, MRDL, treatment technique, 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 two consecutive days must consult with the primacy agency within 24 hours after learning of the violation. Based on this consultation, the primacy agency may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the primacy agency in the 24-hour period, the violation is automatically elevated to Tier 1.**

**6. Systems with treatment technique violations involving a single exceedance of a maximum turbidity limit under the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR), or the Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) are required to consult with the primacy agency within 24 hours after learning of the violation. Based on this consultation, the primacy agency may subsequently decide to elevate the violation to Tier 1. If a system is unable to make contact with the primacy agency 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) (§§141.170–141.171, 141.173–141.174) become effective January 1, 2002 for Subpart H systems (surface water systems and ground water systems under the direct influence of surface water) serving at least 10,000 persons. However, §141.172 has some requirements that become effective as early as April 16, 1999. The Surface Water Treatment Rule remains in effect for systems serving at least 10,000 persons even after 2002; the Interim Enhanced Surface Water Treatment Rule adds additional requirements and does not in many cases supercede the SWTR.**

**8. The arsenic MCL citations are effective January 23, 2006. Until then, the citations are §141.11(b) and §141.23(n).**

**9. The uranium MCL Tier 2 violation citations are effective December 8, 2003 for all community water systems.**

**10. The uranium Tier 3 violation citations are effective December 8, 2000 for all community water systems.**

**11. The arsenic Tier 3 violation MCL citations are effective January 23, 2006. Until then, the citations are §141.23(a), (l).**

**12. 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.**

**13. Subpart H community and non-transient non-community systems serving ≥10,000 must comply with new DBP 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. Subpart H 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. Subpart H 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.**

**14. §§141.64(b)(1) 141.132(a)–(b) apply until §§141.620–141.630 take effect under the schedule in §141.620(c).**

**15. 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.**

**16. 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.**

**17. Some water systems must monitor for certain unregulated contaminants listed in §141.40.**

**18. This citation refers to §§1415 and 1416 of the Safe Drinking Water Act. §§1415 and 1416 require that "a schedule prescribed. . . for a public water system granted a variance [or exemption] shall require compliance by the system. . ."**

**19. In addition to §§1415 and 1416 of the Safe Drinking Water Act, 40 CFR 142.307 specifies the items and schedule milestones that must be included in a variance for small systems.**

**20. 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 failures or significant interruption in water treatment processes, natural disasters that disrupt the water supply or distribution system, chemical spills, or unexpected loading of possible pathogens into the source water.**

**21. Primacy agencies may place other situations in any tier they believe appropriate, based on threat to public health.**

**22. Failure to collect three or more samples for *Cryptosporidium* analysis is a Tier 2 violation requiring special notice as specified in §141.211. All other monitoring and testing procedure violations are Tier 3.**

**Appendix B to Subpart Q**

## Appendix B to Subpart Q of Part 141—Standard Health Effects Language for Public Notification

| Contaminant | MCLG[1]mg/L | MCL[2]mg/L | Standard health effects language for public notification |
|---|---|---|---|
| **National Primary Drinking Water Regulations (NPDWR)** | | | |
| **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 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. |
| 1c. Fecal indicators (GWR):<br>i. *E.coli*<br>ii. enterococci<br>iii. coliphage | <br>Zero<br>None<br>None | <br>TT<br>TT<br>TT | Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health 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. |
| 1d. Ground Water Rule (GWR) TT violations | None | TT | Inadequately treated or inadequately protected water may contain disease-causing organisms. These organisms can cause symptoms such as diarrhea, nausea, cramps, and associated headaches. |
| 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 and LT1ESWTR 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. |

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| **B. Surface Water Treatment Rule (SWTR), Interim Enhanced Surface Water Treatment Rule (IESWTR), Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) and the Filter Backwash Recycling Rule (FBRR) violations** | | | |
| **3. Giardia lamblia (SWTR/IESWTR/LT1ESWTR)** | **Zero** | **TT[10]** | **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 (SWTR/IESWTR/LT1ESWTR)** | | | |
| **5. Heterotrophic plate count (HPC) bacteria[9](SWTR/IESWTR/LT1ESWTR)** | | | |
| **6. Legionella (SWTR/IESWTR/LT1ESWTR)** | | | |
| **7. *Cryptosporidium* (IESWTR/FBRR/LT1ESWTR)** | | | |
| **C. Inorganic Chemicals (IOCs)** | | | |
| **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[11]** | **0** | **0.010** | **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 μm)** | **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 nine 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 six 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.** |

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| **19. Nitrite** | **1** | **1** | **Infants below the age of six 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 six 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.** |
| **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 (SOCs)** | | | |
| **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.** |

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| **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.** |
| **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 (DBCP)** | **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** | $3\times10^{-8}$ | **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.** |
| **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 intestines.** |
| **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.** |

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| **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.** |
| **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 (PCBs)** | **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 (VOCs)** | | | |
| **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 (monochloro-benzene)** | **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.** |

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| **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.** |
| **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.** |

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| **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.** |
| **77. Alpha emitters** | **Zero** | **17 pCi/L[17]** | **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.** |
| **78. Combined radium (226 & 228)** | **Zero** | **5 pCi/L** | **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.** |
| **79. Uranium[16]** | **Zero** | **30 µg/L** | **Some people who drink water containing uranium in excess of the MCL over many years may have an increased risk of getting cancer and kidney toxicity.** |
| **H. Disinfection Byproducts (DBPs), 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 (DBPs). EPA sets standards for controlling the levels of disinfectants and DBPs in drinking water, including trihalomethanes (THMs) and haloacetic acids (HAAs)[18]** | | | |
| **80. Total trihalomethanes (TTHMs)** | **N/A** | **0.080[19,20]** | **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.** |
| **81. Haloacetic Acids (HAA)** | **N/A** | **0.060[21]** | **Some people who drink water containing haloacetic acids in excess of the MCL over many years may have an increased risk of getting cancer.** |
| **82. 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.** |
| **83. 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.** |
| **84. Chlorine** | **4 (MRDLG)[22]** | **4.0 (MRDL)[23]** | **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.** |
| **85. 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.** |

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| 86a. 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.<br>*Add for public notification only:* The chlorine dioxide violations reported today are the result of exceedances at the treatment facility only, not within the distribution system which delivers water to consumers. Continued compliance with chlorine dioxide levels within the distribution system minimizes the potential risk of these violations to consumers. |
| 86b. 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.<br>*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. |
| 87. 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 (THMs) and haloacetic acids (HAAs). 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 | | | |
| 88. 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. |
| 89. 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—Endnotes**

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, and the 1989 Surface Water Treatment Rule, the 1998 Interim Enhanced Surface Water Treatment Rule and the 2002 Long Term 1 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, and the 1989 Surface Water Treatment Rule, the 1998 Interim Enhanced Surface Water Treatment Rule and the 2001 Long Term 1 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 must not exceed 0.5 NTU in systems using conventional or direct filtration and must not exceed 1 NTU in systems using slow sand or diatomaceous earth filtration or other filtration technologies approved by the primacy agency.**

**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 (SWTR), the 1998 Interim Enhanced Surface Water Treatment Rule (IESWTR) and the 2002 Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR). For systems subject to the IESWTR (systems serving at least 10,000 people, 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 must not exceed 1 NTU at any time. Systems subject to the IESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the primacy agency. For systems subject to the LT1ESWTR (systems serving fewer than 10,000 people, using surface water or ground water under the direct influence of surface water) that use conventional filtration or direct filtration, after January 1, 2005, 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 must not exceed 1 NTU at any time. Systems subject to the LT1ESWTR using technologies other than conventional, direct, slow sand, or diatomaceous earth filtration must meet turbidity limits set by the primacy agency.**

**9. The bacteria detected by heterotrophic plate count (HPC) are not necessarily harmful. HPC is simply an alternative method of determining disinfectant residual levels. The number of such bacteria is an indicator of whether there is enough disinfectant in the distribution system.**

**10. SWTR, IESWTR, and LT1ESWTR treatment technique violations that involve turbidity exceedances may use the health effects language for turbidity instead.**

**11. These arsenic values are effective January 23, 2006. Until then, the MCL is 0.05 mg/L and there is no MCLG.**

**12. Millions fibers per liter.**

**13. Action Level = 0.015 mg/L**

**14. Action Level = 1.3 mg/L**

**15. Millirems per years**

**16. The uranium MCL is effective December 8, 2003 for all community water systems.**

**17. Picocuries per liter**

**18. Surface water systems and ground water systems under the direct influence of surface water are regulated under subpart H of 40 CFR 141. Subpart H community and non-transient non-community systems serving ≥10,000 must comply with subpart L DBP MCLs and disinfectant maximum residual disinfectant levels (MRDLs) beginning January 1, 2002. All other community and non-transient non-community systems must comply with subpart L DBP MCLs and disinfectant MRDLs beginning January 1, 2004. Subpart H transient non-community systems serving ≥10,000 that use chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. All other transient non-community systems that use chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.**

**19. Community and non-transient non-community systems must comply with subpart V TTHM and HAA5 MCLs of 0.080 mg/L and 0.060 mg/L, respectively (with compliance calculated as a locational running annual average) on the schedule in §141.620.**

**20. The MCL for total trihalomethanes is the sum of the concentrations of the individual trihalomethanes.**

**21. The MCL for haloacetic acids is the sum of the concentrations of the individual haloacetic acids.**

**22. MRDLG—Maximum residual disinfectant level goal.**

**23. MRDL—Maximum residual disinfectant level.**

## <u>Appendix C to Subpart Q</u>

### Appendix C to Subpart Q of Part 141—List of Acronyms Used in Public Notification Regulation

**CCR  Consumer Confidence Report**
**CWS  Community Water System**
**DBP  Disinfection Byproduct**
**EPA  Environmental Protection Agency**
**GWR  Ground Water Rule**
**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**

### .1524 REPORTING FOR ORGANIC CHEMICALS

(a) The requirements of this Rule only apply to the contaminants listed in 15A NCAC 18C .1516.

(b) The water supplier for a community water system or non-transient, non-community water system who is required to monitor under 15A NCAC 18C .1516 shall send a copy of the results of such monitoring within 30 days of receipt and any public notice under Paragraph (d) of this Rule to the Department.

(c) The Department shall furnish the following information to the administrator for each sample analyzed:

(1) Results of all analytical methods, including negatives;
(2) Name and address of the system that supplied the sample;
(3) Contaminants;
(4) Analytical methods used;
(5) Date of sample;
(6) Date of analysis.

(d) The water supplier shall notify persons served by the system of the availability of the results of sampling by including a notice in the first set of water bills issued after the receipt of the results, or by written or newspaper notice, within three months. The notice shall identify a person and telephone number to contact for information on the monitoring results. For surface water systems, public notice is required only after the first quarter's monitoring and shall include a statement that additional monitoring will be conducted for three more quarters with the results available upon request.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. June 1, 1988;*
*Amended Eff. November 1, 1989;*
*Transferred and Recodified from 10 NCAC 10D .1640 Eff. April 4, 1990.*

### .1525 REPORTING REQUIREMENTS

(a) The requirements of this Rule shall apply to all public water systems. The provisions of 40 C.F.R. 141.31 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/. Any dates set forth in the federal rule shall be applicable.

(b) When a certified laboratory analyzes a compliance sample for a supplier of water, the certified laboratory shall report the results to both the Department and to the supplier of water or his designated representative within the required periods as set forth in 40 C.F.R. 141.31. The laboratory reporting to the State shall include analytical results for any MCL exceedence within the timeframes applicable to the system owner. Reporting shall be in a format, to include electronic reporting, provided by the Department and shall contain all required information. Should a certified laboratory fail to properly report a compliance sample result, it shall be the responsibility of the supplier of water to report results to the Department as required by this Rule.

*History Note:* *Authority G.S. 130A-315;*
*Eff. September 1, 1979;*
*Amended Eff. February 1, 1987; October 1, 1984; March 31, 1981; March 31, 1980;*
*Transferred and Recodified from 10 NCAC 10D .1631 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002; January 1, 1991.*

## ADOPTED BY REFERENCE

**§ 141.31 Reporting requirements.**

**(a) Except where a shorter period is specified in this part, the supplier of water shall report to the State the results of any test measurement or analysis required by this part within (1) The first ten days following the month in which the result is received, or (2) the first ten days following the end of the required monitoring period as stipulated by the State, whichever of these is shortest.**

**(b) Except where a different reporting period is specified in this part, the supplier of water must report to the State within 48 hours the failure to comply with any national primary drinking water regulation (including failure to comply with monitoring requirements) set forth in this part.**

**(c) The supplier of water is not required to report analytical results to the State in cases where a State laboratory performs the analysis and reports the results to the State office which would normally receive such notification from the supplier.**

**(d) The public water system, within 10 days of completing the public notification requirements under Subpart Q of this part for the initial public notice and any repeat notices, must submit to the primacy agency a certification that it has fully complied with the public notification regulations. The public water system must include with this certification a representative copy of each type of notice distributed, published, posted, and made available to the persons served by the system and to the media.**

**(e) The water supply system shall submit to the State within the time stated in the request copies of any records required to be maintained under §141.33 hereof or copies of any documents then in existence which the State or the Administrator is entitled to inspect pursuant to the authority of section 1445 of the Safe Drinking Water Act or the equivalent provisions of State law.**

## .1526 RECORD MAINTENANCE

The provisions of 40 C.F.R. 141.33 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's homepage at http://www.epa.gov/OGWDW/.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1632 Eff. April 4, 1990;*
*Amended Eff. August 1, 2002.*

## ADOPTED BY REFERENCE

**§ 141.33 Record maintenance.**

**Any owner or operator of a public water system subject to the provisions of this part shall retain on its premises or at a convenient location near its premises the following records:**

**(a) Records of microbiological analyses and turbidity 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:**

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

**(b) Records of action taken by the system to correct violations of primary drinking water regulations shall be kept for a period not less than 3 years after the last action taken with respect to the particular violation involved.**

**(c) Copies of any written reports, summaries or communications relating to sanitary surveys of the system conducted by the system itself, 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.**

**(d) 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.**

**(e)** **Copies of public notices issued pursuant to Subpart Q of this part and certifications made to the primacy agency pursuant to §141.31 must be kept for three years after issuance.**

**(f)** **Copies of monitoring plans developed pursuant to this part shall be kept for the same period of time as the records of analyses taken under the plan are required to be kept under paragraph (a) of this section, except as specified elsewhere in this part.**

### .1527 CERTIFIED LABORATORIES

(a) For the purpose of determining compliance with the requirements of this Section, samples may be considered only if they have been analyzed by a laboratory certified by the Division of Laboratory Services Laboratory Certification Branch. However, measurements for turbidity, free chlorine residual, temperature and pH may be performed by any person who has been instructed in the appropriate procedure by the Department or a certified laboratory. Measurements may also be performed by a person who holds a valid certificate issued by the North Carolina Water Treatment Facility Operators Board of Certification.

(b) Nothing in this Section shall be construed to preclude the Department or any duly designated representative from taking samples or from using the results from such samples to determine compliance by a supplier of water with the applicable requirements of this Section.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 31, 1981;*
*Transferred and Recodified from 10 NCAC 10D .1629 Eff. April 4, 1990;*
*Amended Eff. April 1, 1992; September 1, 1990.*

### .1528 ALTERNATE ANALYTICAL TECHNIQUES

With the written permission of the Secretary, concurred in by the Administrator of the U.S. Environmental Protection Agency, an alternate analytical technique may be employed. An alternate technique shall be acceptable only if it is substantially equivalent to the prescribed test in both precision and accuracy as it relates to the determination of compliance with any maximum contaminant level. The use of the alternate analytical technique shall not decrease the frequency of monitoring required by this Section.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 31, 1981;*
*Transferred and Recodified from 10 NCAC 10D .1630 Eff. April 4, 1990.*

### .1529 POINT-OF-ENTRY AND OTHER TREATMENT DEVICES

(a) Public water systems may use point-of-entry devices to comply with maximum contaminant levels only if they meet the requirements of this Rule.

(b) The water supplier shall operate and maintain the point-of-entry treatment system.

(c) The water supplier shall develop a monitoring plan and obtain department approval of the plan before point-of-entry devices are installed for compliance. The approved plan shall provide health protection equivalent to central water treatment. "Equivalent" means that the water would meet all maximum contaminant levels in this Subchapter and would be of an acceptable quality similar to water distributed by a well operated central treatment plant. In addition to monitoring for volatile organic chemicals, monitoring shall include physical measurements and observations such as total flow treated and mechanical condition of the treatment equipment.

(d) Effective technology shall be properly applied under a plan approved by the Department and the microbiological safety of the water must be maintained as follows:

(1) Certification of performance, field testing, and, if not included in the certification process, an engineering design review of the point-of-entry devices shall be provided; and

(2) The tendency for increase in heterotrophic bacteria concentrations in water treated with activated carbon shall be considered in the design and application of the point-of-entry devices. Frequent backwashing, post-contactor disinfection, and Heterotrophic Plate Count monitoring shall be used when necessary to ensure that the microbiological safety of the water is not compromised.

(e) Every building connected to the system shall have a point-of-entry device installed, maintained, and adequately monitored. The rights and responsibilities of the public water system consumer shall be conveyed with title upon sale of property.

(f) Public water systems shall not use bottled water or point-of-use devices to achieve compliance with a maximum contaminant level. Bottled water or point-of-use devices may be used on a temporary basis to avoid an unreasonable risk to health.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. June 1, 1988;*
*Transferred and Recodified from 10 NCAC 10D .1641 Eff. April 4, 1990;*
*Amended Eff. September 1, 1990.*

## .1530 CONSTRUCTION

This Section shall be construed as enabling the State of North Carolina to undertake primary responsibility for the enforcement of the federal act.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1611 Eff. April 4, 1990.*

## .1531 SITING REQUIREMENTS

(a) Any person constructing or modifying a public water system shall to the extent practicable, avoid locating all or part of a new or expanded facility at a site which:

(1) is subject to a significant risk from earthquakes, floods, fires or other disasters which could cause a breakdown of the public water system or a portion thereof; or
(2) except for intake structures, is within the floodplain of a 100-year flood or is lower than any recorded high tide where appropriate records exist.

(b) Additional requirements concerning the siting of raw water intakes shall be found in 15A NCAC 18C .0602.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Amended Eff. March 31, 1980;*
*Transferred and Recodified from 10 NCAC 10D .1612 Eff. April 4, 1990.*

## .1532 VARIANCES AND EXEMPTIONS

The provisions of 40 C.F.R. 141.4 are hereby adopted by reference in accordance with G.S. 150B-14(c).

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. September 1, 1979;*
*Transferred and Recodified from 10 NCAC 10D .1634 Eff. April 4, 1990;*
*Amended Eff. January 1, 1991.*

### ADOPTED BY REFERENCE

**§ 141.4 Variances and exemptions.**

**(a) Variances or exemptions from certain provisions of these regulations may be granted pursuant to sections 1415 and 1416 of the Act and subpart K of part 142 of this chapter (for small system variances) by the entity with primary enforcement responsibility, except that variances or exemptions from the MCL for total coliforms and variances from any of the treatment technique requirements of subpart H of this part may not be granted.**

**(b) EPA has stayed the effective date of this section relating to the total coliform MCL of §141.63(a) for systems that demonstrate to the State that the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system rather than fecal or pathogenic contamination, a treatment lapse or deficiency, or a problem in the operation or maintenance of the distribution system.**

## .1534 COLIFORM SAMPLING

(a) The provisions of 40 C.F.R. 141.21 are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* *N*on-members may obtain copies from the American Water Works Association, Information Services, 666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page. The provisions are incorporated with the following exceptions:

(1) The provision of 40 C.F.R. 141.21(a)(2) concerning the reduction of monitoring frequency for community water systems serving 25 to 1,000 persons is not adopted;
(2) The provision of 40 C.F.R. 141.21(b)(3) concerning collection of large volume repeat samples in containers of any size is not adopted; and
(3) The provision of 40 C.F.R. 141.21(c)(2) concerning waiver of the 24-hour limit for re-sampling is not adopted.

(b) An adjacent water system shall submit samples monthly from each section of the water system supplied from a separate source. The minimum number of samples each month per section is based on the population served by the section and shall be determined by the table in 40 C.F.R. 141.21(a)(2).

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141.21;*
*Eff. January 1, 1991;*
*Amended Eff. February 1, 1992.*

## ADOPTED BY REFERENCE

**§ 141.21 Coliform sampling.**

**(a) *Routine monitoring.***

**(1) Public water systems must 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 State review and revision.**

**(2) The monitoring frequency for total coliforms for community water systems is based on the population served by the system, as follows:**

**Total Coliform Monitoring Frequency for Community Water Systems**

| Population served | Minimum number of samples per month |
|---|---|
| 25 to 1,000[1] | 1 |
| 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 |

**[1] Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.**

**If a community water system serving 25 to 1,000 persons has no history of total coliform contamination in its current configuration and a sanitary survey conducted in the past five years shows that the system is supplied solely by a protected groundwater source and is free of sanitary defects, the State may reduce the monitoring frequency specified above, except that in no case may the State reduce the**

**monitoring frequency to less than one sample per quarter. The State must approve the reduced monitoring frequency in writing.**

**(3) The monitoring frequency for total coliforms for non-community water systems is as follows:**

**(i) A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in §141.2) and serving 1,000 persons or fewer must monitor each calendar quarter that the system provides water to the public, except that the State may reduce this monitoring frequency, in writing, if a sanitary survey shows that the system is free of sanitary defects. Beginning June 29, 1994, the State cannot reduce the monitoring frequency for a non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in §141.2) and serving 1,000 persons or fewer to less than once/year.**

**(ii) A non-community water system using only ground water (except ground water under the direct influence of surface water, as defined in §141.2) and serving more than 1,000 persons during any month must monitor at the same frequency as a like-sized community water system, as specified in paragraph (a)(2) of this section, except the State may reduce this monitoring frequency, in writing, for any month the system serves 1,000 persons or fewer. The State cannot reduce the monitoring frequency to less than once/year. For systems using ground water under the direct influence of surface water, paragraph (a)(3)(iv) of this section applies.**

**(iii) A non-community water system using surface water, in total or in part, must monitor at the same frequency as a like-sized community water system, as specified in paragraph (a)(2) of this section, regardless of the number of persons it serves.**

**(iv) A non-community water system using ground water under the direct influence of surface water, as defined in §141.2, must monitor at the same frequency as a like-sized community water system, as specified in paragraph (a)(2) of this section. The system must begin monitoring at this frequency beginning six months after the State determines that the ground water is under the direct influence of surface water.**

**(4) The public water system must collect samples at regular time intervals throughout the month, except that a system which uses only ground water (except ground water under the direct influence of surface water, as defined in §141.2), and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.**

**(5) A public water system that uses surface water or ground water under the direct influence of surface water, as defined in §141.2, and does not practice filtration in compliance with Subpart H must collect at least one sample near the first service connection each day the turbidity level of the source water, measured as specified in §141.74(b)(2), exceeds 1 NTU. This sample must be analyzed for the presence of total coliforms. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection. Sample results from this coliform monitoring must be included in determining compliance with the MCL for total coliforms in §141.63.**

**(6) Special purpose samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms in §141.63. Repeat samples taken pursuant to paragraph (b) of this section are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms in §141.63.**

**(b) *Repeat monitoring.***

**(1) If a routine sample is total coliform-positive, the public water system must collect a set of repeat samples within 24 hours of being notified of the positive result. A system which collects more than one routine sample/month must collect no fewer than three repeat samples for each total coliform-positive sample found. A system which collects one routine sample/month or fewer must collect no fewer than four repeat samples for each total coliform-positive sample found. The State 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 State must specify how much time the system has to collect the repeat samples.**

**(2) The system must 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 five service connections upstream and at least one repeat sample at a tap within five 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 State may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.**

**(3) The system must collect all repeat samples on the same day, except that the State may allow a system with a single service connection to collect the required set of repeat samples over a four-day period or to collect a larger volume repeat sample(s) 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).**

**(4) If one or more repeat samples in the set is total coliform-positive, the public water system must collect an additional set of repeat samples in the manner specified in paragraphs (b) (1)–(3) of this section. The additional samples must be collected within 24 hours of being notified of the positive result, unless the State extends the limit as provided in paragraph (b)(1) of this section. The system must 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 §141.63 has been exceeded and notifies the State.**

**(5) If a system collecting fewer than five routine samples/month has one or more total coliform-positive samples and the State does not invalidate the sample(s) under paragraph (c) of this section, it must collect at least five routine samples during the next month the system provides water to the public, except that the State may waive this requirement if the conditions of paragraph (b)(5) (i) or (ii) of this section are met. The State cannot waive the requirement for a system to collect repeat samples in paragraphs (b) (1)–(4) of this section.**

**(i) The State may waive the requirement to collect five routine samples the next month the system provides water to the public if the State, or an agent approved by the State, 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 must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys.**

**(ii) The State may waive the requirement to collect five routine samples the next month the system provides water to the public if the State has determined why the sample was total coliform-positive and establishes that the system 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 State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem. The State cannot waive the requirement to collect five routine samples the next month the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. Under this paragraph, a system must still take 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 §141.63, unless the State has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in paragraphs (b) (1)–(4) of this section, and all repeat samples were total coliform-negative.**

**(6) After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five 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(s) as a repeat sample instead of as a routine sample.**

**(7) Results of all routine and repeat samples not invalidated by the State must be included in determining compliance with the MCL for total coliforms in §141.63.**

**(c) *Invalidation of total coliform samples*. A total coliform-positive sample invalidated under this paragraph (c) does not count towards meeting the minimum monitoring requirements of this section.**

**(1) The State may invalidate a total coliform-positive sample only if the conditions of paragraph (c)(1) (i), (ii), or (iii) of this section are met.**

**(i) The laboratory establishes that improper sample analysis caused the total coliform-positive result.**

**(ii) The State, on the basis of the results of repeat samples collected as required by paragraphs (b) (1) through (4) of this section, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The State cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected within five service connections of the original tap are total coliform-negative (e.g., a**

**State cannot 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).**

**(iii) The State 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 must still collect all repeat samples required under paragraphs (b) (1)–(4) of this section, and use them to determine compliance with the MCL for total coliforms in §141.63. To invalidate a total coliform-positive sample under this paragraph, the decision with the rationale for the decision must be documented in writing, and approved and signed by the supervisor of the State official who recommended the decision. The State must make this document available to EPA and the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem. The State may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.**

**(2) A laboratory must 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 (P-A) 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 must 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 must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The State may waive the 24-hour time limit on a case-by-case basis.**

**(d) *Sanitary surveys.***

**(1)**

**(i) Public water systems which do not collect five or more routine samples/month must undergo an initial sanitary survey by June 29, 1994, for community public water systems and June 29, 1999, for non-community water systems. Thereafter, systems must undergo another sanitary survey every five years, except that non-community water systems using only protected and disinfected ground water, as defined by the State, must undergo subsequent sanitary surveys at least every ten years after the initial sanitary survey. The State must 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.**

**(ii) In conducting a sanitary survey of a system using ground water in a State having an EPA-approved wellhead protection program under section 1428 of the Safe Drinking Water Act, information on sources of contamination within the delineated wellhead protection area that was collected in the course of developing and implementing the program should be considered instead of collecting new information, if the information was collected since the last time the system was subject to a sanitary survey.**

**(2) Sanitary surveys must be performed by the State or an agent approved by the State. The system is responsible for ensuring the survey takes place.**

**(3) Sanitary surveys conducted by the State under the provisions of §142.16(o)(2) of this chapter may be used to meet the sanitary survey requirements of this section.**

**(e) *Fecal coliforms/Escherichia coli (E.coli) testing*.**

**(1) If any routine or repeat sample is total coliform-positive, the system must 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 must notify the State by the end of the day when the system is notified of the test result, unless the system is notified of the result after the State office is closed, in which case the system must notify the State before the end of the next business day.**

**(2) The State has the discretion to 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 assumes that the total coliform-positive sample is fecal coliform-positive or *E.coli* -positive. Accordingly, the system must notify the State as specified in paragraph (e)(1) of this section and the provisions of §141.63(b) apply.**

**(f) *Analytical methodology.***

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

**(2) Public water systems need only determine the presence or absence of total coliforms; a determination of total coliform density is not required.**

(3) Public water systems must conduct total coliform analyses in accordance with one of the analytical methods in the following table or one of the alternative methods listed in appendix A to subpart C of this part.

| Organism | Methodology[12] | Citation[1] |
|---|---|---|
| Total Coliforms[2] | Total Coliform Fermentation Technique[3,4,5] | 9221A, B |
| | Total Coliform Membrane Filter Technique[6] | 9222A, B, C |
| | Presence-Absence (P-A) Coliform Test[5,7] | 9221D |
| | ONPG-MUG Test[8] | 9223 |
| | Colisure Test.[9] | |
| | E*Colite®Test.[10] | |
| | m-ColiBlue24®Test.[11] | |
| | Readycult®Coliforms 100 Presence/Absence Test.[13] | |
| | Membrane Filter Technique using Chromocult®Coliform Agar.[14] | |
| | Colitag®Test.[15] | |

The procedures shall be done in accordance with the documents listed below. The incorporation by reference of the following documents listed in footnotes 1, 6, 8, 9, 10 , 11, 13, 14 and 15 was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies of the documents may be obtained from the sources listed below. Information regarding obtaining these documents can be obtained from the Safe Drinking Water Hotline at 800–426–4791. Documents may be inspected at EPA's Drinking Water Docket, EPA West, 1301 Constitution Avenue, NW., EPA West, Room B102, Washington DC 20460 (Telephone: 202–566–2426); or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

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. In addition, the following online versions may also be used: 9221 A, B, D–99, 9222 A, B, C–97, and 9223 B–97. 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.

[2] The time from sample collection to initiation of analysis may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10 deg. C during transit.

[3] Lactose broth, as commercially available, may be used in lieu of lauryl tryptose 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 and false-negative rate for total coliform, 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] MI agar also may be used. Preparation and use of MI agar is set forth in the article, "New medium for the simultaneous detection of total coliform and *Escherichia coli* in water" by Brenner, K.P., et. al., 1993, Appl. Environ. Microbiol. 59:3534–3544. Also available from the Office of Water Resource Center (RC–4100T), 1200 Pennsylvania Avenue, NW., Washington, DC 20460, EPA/600/J–99/225. Verification of colonies is not required.

[7] Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

[8] The ONPG-MUG Test is also known as the Autoanalysis Collect System.

[9] A description of the Colisure Test, Feb 28, 1994, may be obtained from IDEXX Laboratories, Inc., One IDEXX Drive, Westbrook, Maine 04092. The Colisure Test may be read after an incubation time of 24 hours.

[10] A description of the E*Colite®Test, "Presence/Absence for Coliforms and *E.coli* in Water," Dec 21, 1997, is available from Charm Sciences, Inc., 36 Franklin Street, Malden, MA 02148–4120.

[11] A description of the m-ColiBlue24®Test, Aug 17, 1999, is available from the Hach Company, 100 Dayton Avenue, Ames, IA 50010.

[12] EPA strongly recommends that laboratories evaluate the false-positive and negative rates for the method(s) they use for monitoring total coliforms. EPA also encourages laboratories to establish false-positive and false-negative rates within their own laboratory and sample matrix (drinking water or source water) with the intent that if the method they choose has an unacceptable false-positive or negative rate, another method can be used. The Agency suggests that laboratories perform these studies on a minimum of 5% of all total coliform-positive samples, except for those methods where verification/confirmation is already required, e.g., the M-Endo and LES Endo Membrane Filter Tests, Standard Total Coliform Fermentation Technique, and Presence-Absence Coliform Test. Methods for establishing false-positive and negative-rates may be based on lactose fermentation, the rapid test for β-galactosidase and cytochrome oxidase, multi-test identification systems, or equivalent confirmation tests. False-positive and false-negative information is often available in published studies and/or from the manufacturer(s).

[13] **The Readycult® Coliforms 100 Presence/Absence Test is described in the document, "Readycult® Coliforms 100 Presence/Absence Test for Detection and Identification of Coliform Bacteria and** *Escherichia coli* **in Finished Waters", November 2000, Version 1.0, available from EM Science (an affiliate of Merck KGgA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027–1297. Telephone number is (800) 222–0342, e-mail address is:** adellenbusch@emscience.com.

[14] **Membrane Filter Technique using Chromocult® Coliform Agar is described in the document, "Chromocult® Coliform Agar Presence/Absence Membrane Filter Test Method for Detection and Identification of Coliform Bacteria and** Escherichia coli **in Finished Waters", November 2000, Version 1.0, available from EM Science (an affiliate of Merck KGgA, Darmstadt Germany), 480 S. Democrat Road, Gibbstown, NJ 08027–1297. Telephone number is (800) 222–0342, e-mail address is:** adellenbusch@emscience.com.

[15] **Colitag® product for the determination of the presence/absence of total coliforms and *E.coli* is described in "Colitag® Product as a Test for Detection and Identification of Coliforms and *E.coli* Bacteria in Drinking Water and Source Water as Required in National Primary Drinking Water Regulations," August 2001, available from CPI International, Inc., 5580 Skylane Blvd., Santa Rosa, CA, 95403, telephone (800) 878–7654, Fax (707) 545–7901, Internet address *http://www.cpiinternational.com*.**

**(4) [Reserved]**

**(5) Public water systems must conduct fecal coliform analysis in accordance with the following procedure. When the MTF Technique or Presence-Absence (PA) Coliform Test is used to test for total coliforms, shake the lactose-positive presumptive tube or P-A vigorously and transfer the growth with a sterile 3-mm loop or sterile applicator stick into brilliant green lactose bile broth and EC medium to determine the presence of total and fecal coliforms, respectively. For EPA-approved analytical methods which use a membrane filter, transfer the total coliform-positive culture by one of the following methods: remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium (the laboratory may first remove a small portion of selected colonies for verification), swab the entire membrane filter surface with a sterile cotton swab and transfer the inoculum to EC medium (do not leave the cotton swab in the EC medium), or inoculate individual total coliform-positive colonies into EC Medium. Gently shake the inoculated tubes of EC medium to insure adequate mixing and incubate in a waterbath at 44.5 ±0.2 °C for 24 ±2 hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in Method 9221E (paragraph 1a) in Standard Methods for the Examination of Water and Wastewater, 18th edition (1992), 19th edition (1995), and 20th edition (1998); the cited method in any one of these three editions may be used. Public water systems need only determine the presence or absence of fecal coliforms; a determination of fecal coliform density is not required.**

**(6) Public water systems must conduct analysis of *Escherichia coli* in accordance with one of the following analytical methods or one of the alternative methods listed in appendix A to subpart C of this part.**

**(i) EC medium supplemented with 50 µg/mL of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration), as described in Method 9222G in Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) and 20th edition (1998). Either edition may be used. Alternatively, the 18th edition (1992) may be used if at least 10 mL of EC medium, as described in paragraph (f)(5) of this section, is supplemented with 50 µg/mL of MUG before autoclaving. The inner inverted fermentation tube may be omitted. If the 18th edition is used, apply the procedure in paragraph (f)(5) of this section for transferring a total coliform-positive culture to EC medium supplemented with MUG, incubate the tube at 44.5 ±0.2 °C for 24 ±2 hours, and then observe fluorescence with an ultraviolet light (366 nm) in the dark. If fluorescence is visible, *E.coli* are present.**

**(ii) Nutrient agar supplemented with 100 µg/mL of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration), as described in Method 9222G in Standard Methods for the Examination of Water and Wastewater, 19th edition (1995) and 20th edition (1998). Either edition may be used for determining if a total coliform-positive sample, as determined by a membrane filter technique, contains *E.coli*. Alternatively, the 18th edition (1992) may be used if the membrane filter containing a total coliform-positive colony(ies) is transferred to nutrient agar, as described in Method 9221B (paragraph 3) of Standard Methods (18th edition), supplemented with 100 µg/mL of MUG. If the 18th edition is used, incubate the agar plate at 35 °C for 4 hours and then observe the colony(ies) under ultraviolet light (366 nm) in the dark for fluorescence. If fluorescence is visible, *E.coli* are present.**

**(iii) Minimal Medium ONPG-MUG (MMO-MUG) Test, as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Detection of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with Presence-Absence Techniques" (Edberg et al.), Applied and Environmental Microbiology, Volume 55, pp. 1003–1008, April 1989. (Note: The Autoanalysis Colilert System is an**

**MMO-MUG test). If the MMO-MUG test is total coliform-positive after a 24-hour incubation, test the medium for fluorescence with a 366-nm ultraviolet light (preferably with a 6-watt lamp) in the dark. If fluorescence is observed, the sample is *E.coli* -positive. If fluorescence is questionable (cannot be definitively read) after 24 hours incubation, incubate the culture for an additional four hours (but not to exceed 28 hours total), and again test the medium for fluorescence. The MMO-MUG Test with hepes buffer in lieu of phosphate buffer is the only approved formulation for the detection of *E.coli*.**

**(iv) The Colisure Test. A description of the Colisure Test may be obtained from the Millipore Corporation, Technical Services Department, 80 Ashby Road, Bedford, MA 01730.**

**(v) The membrane filter method with MI agar, a description of which is cited in footnote 6 to the table in paragraph (f)(3) of this section.**

**(vi) E*Colite®Test, a description of which is cited in footnote 10 to the table at paragraph (f)(3) of this section.**

**(vii) m-ColiBlue24®Test, a description of which is cited in footnote 11 to the table in paragraph (f)(3) of this section.**

**(viii) Readycult®Coliforms 100 Presence/Absence Test, a description of which is cited in footnote 13 to the table at paragraph (f)(3) of this section.**

**(ix) Membrane Filter Technique using Chromocult®Coliform Agar, a description of which is cited in footnote 14 to the table at paragraph (f)(3) of this section.**

**(x) Colitag®, a description of which is cited in footnote 15 to the table at paragraph (f)(3) of this section.**

**(7) As an option to paragraph (f)(6)(iii) of this section, a system with a total coliform-positive, MUG-negative, MMO-MUG test may further analyze the culture for the presence of *E.coli* by transferring a 0.1 ml, 28-hour MMO-MUG culture to EC Medium + MUG with a pipet. The formulation and incubation conditions of EC Medium + MUG, and observation of the results are described in paragraph (f)(6)(i) of this section.**

**(8) The following materials are incorporated by reference in this section with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the analytical methods cited in Standard Methods for the Examination of Water and Wastewater (18th, 19th, and 20th editions) may be obtained from the American Public Health Association et al. ; 1015 Fifteenth Street, NW., Washington, DC 20005–2605. Copies of the MMO-MUG Test, as set forth in the article “National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and Escherichia coli from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method” (Edberg et al. ) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235. Copies of the MMO-MUG Test as set forth in the article “National Field Evaluation of a Defined Substrate Method for the Simultaneous Enumeration of Total Coliforms and *Escherichia coli* from Drinking Water: Comparison with the Standard Multiple Tube Fermentation Method” (Edberg et al. ) may be obtained from the American Water Works Association Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235. A description of the Colisure Test may be obtained from the Millipore Corp., Technical Services Department, 80 Ashby Road, Bedford, MA 01730. Copies may be inspected at EPA's Drinking Water Docket; 401 M St., SW.; Washington, DC 20460, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.**

**(g) *Response to violation.***

**(1) A public water system which has exceeded the MCL for total coliforms in §141.63 must report the violation to the State no later than the end of the next business day after it learns of the violation, and notify the public in accordance with subpart Q.**

**(2) A public water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, must report the monitoring violation to the State within ten days after the system discovers the violation, and notify the public in accordance with subpart Q.**

## .1535 MAXIMUM CONTAMINANT LEVELS FOR COLIFORM BACTERIA

(a) The provisions of 40 C.F.R. 141.63 are hereby adopted by reference in accordance with G.S. 150B-14(c).

(b) The provisions of 40 C.F.R. 141.52 are hereby adopted by reference in accordance with G.S. 150B-14(c).

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141.52; 40 C.F.R. 141.63;*
*Eff. January 1, 1991.*

## ADOPTED BY REFERENCE

**§ 141.63 Maximum contaminant levels (MCLs) for microbiological contaminants.**

**(a) The MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.**

- **(1) For a system which collects at least 40 samples per month, if no more than 5.0 percent of the samples collected during a month are total coliform-positive, the system is in compliance with the MCL for total coliforms.**
- **(2) For a system which collects fewer than 40 samples/month, if no more than one sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms.**

**(b) 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 subpart Q, this is a violation that may pose an acute risk to health.**

**(c) A public water system must determine compliance with the MCL for total coliforms in paragraphs (a) and (b) of this section for each month in which it is required to monitor for total coliforms.**

**(d) The Administrator, pursuant to section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant level for total coliforms in paragraphs (a) and (b) of this section:**

- **(1) Protection of wells from contamination by coliforms by appropriate placement and construction;**
- **(2) Maintenance of a disinfectant residual throughout the distribution system;**
- **(3) 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;**
- **(4) Filtration and/or disinfection of surface water, as described in subpart H, or disinfection of ground water using strong oxidants such as chlorine, chlorine dioxide, or ozone; and**
- **(5) For systems using ground water, compliance with the requirements of an EPA-approved State Wellhead Protection Program developed and implemented under section 1428 of the SDWA.**

**§ 141.52 Maximum contaminant level goals for microbiological contaminants.**
**MCLGs for the following contaminants are as indicated:**

| Contaminant | MCLG |
|---|---|
| **(1) *Giardia lamblia*** | **zero** |
| **(2) Viruses** | **zero** |
| **(3) *Legionella*** | **zero** |
| **(4) Total coliforms (including fecal coliforms and *Escherichia coli* )** | **zero** |
| **(5) *Cryptosporidium*** | **zero** |

## .1536 TREATMENT TECHNIQUES

The provisions of 40 C.F.R. 141. Subpart K are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* *N*on-members may obtain copies from the American Water Works Association, Information Services, 6666 West Quincy Avenue, Denver, Colorado 80235 at a cost of fifteen dollars ($15.00) up to 20 pages and thirty cents ($0.30) per page for each additional page.

*History Note:* *Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. April 1, 1992.*

**ADOPTED BY REFERENCE**

**SUBPART K – TREATMENT TECHNIQUES**

**§ 141.110 General requirements.**
**The requirements of subpart K of this part constitute national primary drinking water regulations. These regulations establish treatment techniques in lieu of maximum contaminant levels for specified contaminants.**

**§ 141.111 Treatment techniques for acrylamide and epichlorohydrin.**
**Each public water system must certify annually in writing to the State (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:**

**Acrylamide=0.05% dosed at 1 ppm (or equivalent)**
**Epichlorohydrin=0.01% dosed at 20 ppm (or equivalent)**
**Certifications can rely on manufacturers or third parties, as approved by the State.**

## .1537 DRINKING WATER ADDITIVES

(a) The standards set forth in American National Standards Institute/NSF International, codified at ANSI/NSF Standard 60 and ANSI/NSF Standard 61, are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Environmental Health, 1330 Saint Mary's Street, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies of ANSI/NSF 60: Drinking Water Treatment Chemicals - Health Effects or ANSI/NSF 61: Drinking Water System Components - Health Effects may be obtained at a cost of forty-five dollars ($45.00) each from NSF International, P. O. Box 130140, Ann Arbor, Michigan 48113-0140.
(b) A water supply product used in a public water system shall meet the standards incorporated by reference in Paragraph (a) of this Rule. A product certified by an organization having a third-party certification program accredited by the American National Standards Institute to test and certify such products is acceptable for use in a public water system.
(c) A supplier of water shall maintain a list of all water supply products used in a public water system for inspection by the Department. Prior to using a product not previously listed, a supplier of water shall either determine the product is certified as required by Paragraph (b) of this Rule or notify the Department of the type, name and manufacturer of a product.
(d) A supplier of water shall not willfully introduce or permit the introduction of a water supply product into a public water system which does not meet the requirements of this Rule.

*History Note: Authority G.S. 103A-315; P.L. 93-523;*
*Eff. July 1, 1994.*

## .1538 CONSUMER CONFIDENCE REPORT

(a) The provisions of 40 C.F.R. 141, Subpart O - Consumer Confidence Reports are hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment and Natural Resources, Division of Environmental Health, 2728 Capital Boulevard, Raleigh, North Carolina. *[See current agency name, location and mailing address under "Notes" on first page of this document.]* Copies may be obtained from the Environmental Protection Agency's (USEPA) Drinking Water Hotline at 1-800-426-4791 or from EPA's Consumer Confidence Report Rule homepage at http://www.epa.gov/safewater/ccr1.html.
(b) Travel trailer parks, campgrounds, and marina slips that are community water systems as defined by G.S. 130A-313(10), but do not serve 25 or more of the same persons more than six months per year shall be exempt from the provisions of this Rule.

*History Note: Authority G.S. 130A-315; P.L. 93-523; 40 C.F.R. 141;*
*Eff. August 1, 2000.*

**ADOPTED BY REFERENCE**

## SUBPART O – CONSUMER CONFIDENCE REPORT

### § 141.151 Purpose and applicability of this subpart.

- **(a)** **This subpart establishes the minimum requirements for the content of annual reports that community water systems must deliver to their customers. These reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner.**
- **(b)** **Notwithstanding the provisions of §141.3, this subpart applies only to community water systems.**
- **(c)** **For the purpose of this subpart, customers are defined as billing units or service connections to which water is delivered by a community water system.**
- **(d)** **For the purpose of this subpart, detected means: at or above the levels prescribed by §141.23(a)(4) for inorganic contaminants, at or above the levels prescribed by §141.24(f)(7) for the contaminants listed in §141.61(a), at or above the levels prescribed by §141.24(h)(18) for the contaminants listed in §141.61(c), at or above the levels prescribed by §141.131(b)(2)(iv) for the contaminants or contaminant groups listed in §141.64, and at or above the levels prescribed by §141.25(c) for radioactive contaminants.**
- **(e)** **A State that has primary enforcement responsibility may adopt by rule, after notice and comment, alternative requirements for the form and content of the reports. The alternative requirements must provide the same type and amount of information as required by §§141.153 and 141.154, and must be designed to achieve an equivalent level of public information and education as would be achieved under this subpart.**
- **(f)** **For purpose of §§141.154 and 141.155 of this subpart, the term "primacy agency" refers to the State or tribal government entity that has jurisdiction over, and primary enforcement responsibility for, public water systems, even if that government does not have interim or final primary enforcement responsibility for this rule. Where the State or tribe does not have primary enforcement responsibility for public water systems, the term "primacy agency" refers to the appropriate EPA regional office.**

### § 141.152 Effective dates.

- **(a)** **The regulations in this subpart shall take effect on September 18, 1998.**
- **(b)** **Each existing community water system must deliver its first report by October 19, 1999, its second report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1998 as prescribed in §141.153(d)(3). Each report thereafter must contain data collected during, or prior to, the previous calendar year.**
- **(c)** **A new community water system must deliver its first report by July 1 of the year after its first full calendar year in operation and annually thereafter.**
- **(d)** **A community water system that sells water to another community water system must deliver the applicable information required in §141.153 to the buyer system:**
  - **(1)** **No later than April 19, 1999, by April 1, 2000, and by April 1 annually thereafter or**
  - **(2)** **On a date mutually agreed upon by the seller and the purchaser, and specifically included in a contract between the parties.**

### § 141.153 Content of the reports.

- **(a)** **Each community water system must provide to its customers an annual report that contains the information specified in this section and §141.154.**
- **(b)** **Information on the source of the water delivered:**
  - **(1)** **Each report must identify the source(s) of the water delivered by the community water system by providing information on:**
    - **(i)** **The type of the water: e.g., surface water, ground water; and**
    - **(ii)** **The commonly used name (if any) and location of the body (or bodies) of water.**
  - **(2)** **If a source water assessment has been completed, the report must 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 primacy agency, the report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the primacy agency or written by the operator.**
- **(c)** **Definitions.**
  - **(1)** **Each report must include the following definitions:**
    - **(i)** **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.**

**(ii) 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.**

**(2) A report for a community water system operating under a variance or an exemption issued under §1415 or 1416 of SDWA must include the following definition: Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.**

**(3) A report that contains data on contaminants that EPA regulates using any of the following terms must include the applicable definitions:**

**(i) Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.**

**(ii) Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.**

**(iii) 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.**

**(iv) 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.**

**(d) Information on detected contaminants.**

**(1) This sub-section specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except *Cryptosporidium* ). It applies to:**

**(i) Contaminants subject to a MCL, action level, maximum residual disinfectant level, or treatment technique (regulated contaminants).**

**(ii) Contaminants for which monitoring is required by §141.40 (unregulated contaminants); and**

**(iii) Disinfection by-products or microbial contaminants for which monitoring is required by §§141.142 and 141.143, except as provided under paragraph (e)(1) of this section, and which are detected in the finished water.**

**(2) The data relating to these contaminants must 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 must be displayed separately.**

**(3) The data must 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:**

**(i) Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) must include the date and results of the most recent sampling and the report must 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.**

**(ii) Results of monitoring in compliance with §§141.142 and 141.143 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.**

**(4) For detected regulated contaminants (listed in appendix A to this subpart), the table(s) must contain:**

**(i) The MCL for that contaminant expressed as a number equal to or greater than 1.0 (as provided in appendix A to this subpart);**

**(ii) The MCLG for that contaminant expressed in the same units as the MCL;**

**(iii) If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique and/or action level, as appropriate, specified in paragraph (c)(3) of this section;**

**(iv) For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with an NPDWR 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 monitoring location: the highest average of any of the monitoring locations and the range of all monitoring locations expressed in the same units as the MCL. For the MCLs for TTHM and HAA5 in §141.64(b)(2), systems must include the highest locational running annual average for TTHM and HAA5 and the range of individual sample results for all monitoring locations expressed in the same units as the MCL. If more than**

**one location exceeds the TTHM or HAA5 MCL, the system must include the locational running annual averages for all locations that exceed the MCL.**

**(C) When compliance with the MCL is determined on a system-wide basis by calculating a running annual average of all samples at all monitoring locations: the average and range of detection expressed in the same units as the MCL. The system is required to include individual sample results for the IDSE conducted under subpart U of this part when determining the range of TTHM and HAA5 results to be reported in the annual consumer confidence report for the calendar year that the IDSE samples were taken.**

**Note to paragraph (d)(4)(iv): 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 subpart.**

**(v) For turbidity.**

**(A) When it is reported pursuant to §141.13: The highest average monthly value.**

**(B) When it is reported pursuant to the requirements of §141.71: the highest monthly value. The report should include an explanation of the reasons for measuring turbidity.**

**(C) When it is reported pursuant to §141.73 or §141.173 or §141.551: the highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in §141.73 or §141.173, or §141.551 for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity;**

**(vi) For lead and copper: the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level;**

**(vii) 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;**

**(viii) For fecal coliform: The total number of positive samples; and**

**(ix) The likely source(s) of detected contaminants to the best of the 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 operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in appendix A to this subpart that is most applicable to the system.**

**(5) 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.**

**(6) The table(s) must clearly identify any data indicating violations of MCLs, MRDLs, or treatment techniques, and the report must 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 must use the relevant language of appendix A to this subpart.**

**(7) For detected unregulated contaminants for which monitoring is required (except Cryptosporidium ), the table(s) must 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.**

**(e) Information on *Cryptosporidium*, radon, and other contaminants:**

**(1) If the system has performed any monitoring for *Cryptosporidium*, including monitoring performed to satisfy the requirements of §141.143, which indicates that *Cryptosporidium* may be present in the source water or the finished water, the report must include:**

**(i) A summary of the results of the monitoring; and**

**(ii) An explanation of the significance of the results.**

**(2) If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:**

**(i) The results of the monitoring; and**

**(ii) An explanation of the significance of the results.**

**(3) If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, EPA strongly encourages systems to report any results which may indicate a health concern. To determine if results may indicate a health concern, EPA recommends that systems find out if EPA has proposed an NPDWR or issued a health advisory for that contaminant by calling the Safe Drinking Water Hotline**

**(800–426–4791). EPA considers detects above a proposed MCL or health advisory level to indicate possible health concerns. For such contaminants, EPA recommends that the report include:**

- **(i) The results of the monitoring; and**
- **(ii) An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.**

**(f) Compliance with NPDWR. In addition to the requirements of §141.153(d)(6), the report must note any violation that occurred during the year covered by the report of a requirement listed below, and 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.**

- **(1) Monitoring and reporting of compliance data;**
- **(2) Filtration and disinfection prescribed by subpart H of this part. For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must 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.**
- **(3) Lead and copper control requirements prescribed by subpart I of this part. For systems that fail to take one or more actions prescribed by §§141.80(d), 141.81, 141.82, 141.83 or 141.84, the report must include the applicable language of appendix A to this subpart for lead, copper, or both.**
- **(4) Treatment techniques for Acrylamide and Epichlorohydrin prescribed by subpart K of this part. For systems that violate the requirements of subpart K of this part, the report must include the relevant language from appendix A to this subpart.**
- **(5) Recordkeeping of compliance data.**
- **(6) Special monitoring requirements prescribed by §§141.40 and 141.41; and**
- **(7) Violation of the terms of a variance, an exemption, or an administrative or judicial order.**

**(g) Variances and Exemptions. If a system is operating under the terms of a variance or an exemption issued under §1415 or 1416 of SDWA, the report must contain:**

- **(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; and**
- **(4) A notice of any opportunity for public input in the review, or renewal, of the variance or exemption.**

**(h) Additional information:**

- **(1) The report must 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 paragraphs (h)(1) (i) through (iii) or systems may use their own comparable language. The report also must include the language of paragraph (h)(1)(iv) of this section.**
  - **(i) 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 cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.**
  - **(ii) 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.**
  - **(iii) In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems.**

FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

(iv) 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).

(2) The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.

(3) In communities with a large proportion of non-English speaking residents, as determined by the Primacy Agency, the report must contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

(4) The report must 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.

(5) The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

(6) Systems required to comply with subpart S.

(i) Any ground water system that receives notice from the State of a significant deficiency or notice from a laboratory of a fecal indicator-positive ground water source sample that is not invalidated by the State under §141.402(d) must inform its customers of any significant deficiency that is uncorrected at the time of the next report or of any fecal indicator-positive ground water source sample in the next report. The system must continue to inform the public annually until the State determines that particular significant deficiency is corrected or the fecal contamination in the ground water source is addressed under §141.403(a). Each report must include the following elements.

(A) The nature of the particular significant deficiency or the source of the fecal contamination (if the source is known) and the date the significant deficiency was identified by the State or the dates of the fecal indicator-positive ground water source samples;

(B) If the fecal contamination in the ground water source has been addressed under §141.403(a) and the date of such action;

(C) For each significant deficiency or fecal contamination in the ground water source that has not been addressed under §141.403(a), the State-approved plan and schedule for correction, including interim measures, progress to date, and any interim measures completed; and

(D) If the system receives notice of a fecal indicator-positive ground water source sample that is not invalidated by the State under §141.402(d), the potential health effects using the health effects language of Appendix A of subpart O.

(ii) If directed by the State, a system with significant deficiencies that have been corrected before the next report is issued must inform its customers of the significant deficiency, how the deficiency was corrected, and the date of correction under paragraph (h)(6)(i) of this section.

## § 141.154 Required additional health information.

(a) All reports must 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 Safe Drinking Water Hotline (800–426–4791).

(b) Ending in the report due by July 1, 2001, a system which detects arsenic at levels above 0.025 mg/L, but below the 0.05 mg/L, and beginning in the report due by July 1, 2002, a system that detects arsenic above 0.005 mg/L and up to and including 0.010 mg/L:

(1) Must include in its report a short informational 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.

(2) May write its own educational statement, but only in consultation with the Primacy Agency.

(c) A system which detects nitrate at levels above 5 mg/l, but below the MCL:

(1) Must include a short informational statement about the impacts of nitrate on children using language such as: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

(2) May write its own educational statement, but only in consultation with the Primacy Agency.

(d) Every report must include the following lead-specific information:

(1) A short informational statement about lead in drinking water and its effects on children. The statement must include the following information:

*If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. [NAME OF UTILITY] is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.*

(2) A system may write its own educational statement, but only in consultation with the State.

(e) Community water systems that detect TTHM above 0.080 mg/l, but below the MCL in §141.12, as an annual average, monitored and calculated under the provisions of §141.30, must include health effects language for TTHMs prescribed by appendix A.

(f) Beginning in the report due by 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 must include the arsenic health effects language prescribed by appendix A to subpart O of this part.

## § 141.155 Report delivery and recordkeeping.

(a) Except as provided in paragraph (g) of this section, each community water system must mail or otherwise directly deliver one copy of the report to each customer.

(b) The system must make a good faith effort to reach consumers who do not get water bills, using means recommended by the primacy agency. 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.

(c) No later than the date the system is required to distribute the report to its customers, each community water system must mail a copy of the report to the primacy agency, followed within 3 months by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the primacy agency.

(d) No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to any other agency or clearinghouse identified by the primacy agency.

(e) Each community water system must make its reports available to the public upon request.

(f) Each community water system serving 100,000 or more persons must post its current year's report to a publicly-accessible site on the Internet.

(g) The Governor of a State or his designee, or the Tribal Leader where the tribe has met the eligibility requirements contained in §142.72 for the purposes of waiving the mailing requirement, can waive the requirement of paragraph (a) of this section for community water systems serving fewer than 10,000 persons. In consultation with the tribal government, the Regional Administrator may waive the requirement of §141.155(a) in areas in Indian country where no tribe has been deemed eligible.

(1) Such systems must:

(i) Publish the reports in one or more local newspapers serving the area in which the system is located;

(ii) 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 State; and

(iii) Make the reports available to the public upon request.

(2) Systems serving 500 or fewer persons may forego the requirements of paragraphs (g)(1)(i) and (ii) of this section 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.

(h) Any system subject to this subpart must retain copies of its Consumer Confidence Report for no less than 3 years.

**APPENDIX A to Subpart O of Part 141 – Regulated Contaminants**

| 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 | | 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 | | 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. |
| Fecal Indicators (enterococci or coliphage) | TT | | TT | N/A | Human and animal fecal waste | Fecal indicators are microbes whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health 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 | | TT | N/A | Naturally present in the environment | Total organic carbon (TOC) has no health effects. However, total organic carbon provides a medium for the formation of disinfection by products. These byproducts include trihalomethanes (THMs) and haloacetic acids (HAAs). 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. |

| 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 |
|---|---|---|---|---|---|---|
| Turbidity (NTU) | TT | | 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 | – | 4 | 0 | 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 particle and photon radioactivity in excess of the MCL over many years may have an increased risk of getting cancer. |
| Alpha emitters (pCi/L) | 15 pCi/L | – | 15 | 0 | 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 | – | 5 | 0 | 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. |
| Uranium (pCi/L) | 30 µg/L | – | 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 and kidney toxicity. |
| Inorganic Contaminants | | | | | | |
| Antimony (ppb) | 0.006 | 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) | 10.01 | 1000 | 110 | 10 | 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 | | 7 | 7 | Decay of asbestos cement water mains; 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. |

| 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 |
|---|---|---|---|---|---|---|
| **Barium (ppm)** | **2** | | **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)** | **0.004** | **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)** | **0.01** | **1000** | **10** | **0** | **By-product of drinkig water disinfection** | **Some people who drink water of containing bromate in excess of the MCL over many years may have an increased risk of getting cancer.** |
| **Cadmium (ppb)** | **0.005** | **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** | | **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** | | **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.** |
| **Chlorine dioxide (ppb)** | **MRDL=.8** | **1000** | **MRDL=800** | **MRDLG =800** | **Water additive used to control micorbes** | **Some infants and young children who drink water 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.** |

| 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 |
|---|---|---|---|---|---|---|
| Chlorite (ppm) | 1 | | 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) | 0.1 | 1000 | 100 | 100 | Discharge from steel and pulp mills; Erosion of natural deposits | Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis. |
| Copper (ppm) | AL=1.3 | | 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) | 0.2 | 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 | | 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 the bones. Fluoride in drinking water at half the MCL or more may cause mottling of children's teeth, usually in children less than nine 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 systems; 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 attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure. |

| 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)** | **0.002** | **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** | | **10** | **10** | **Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits** | **Infants below the age of six 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** | | **1** | **1** | **Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits** | **Infants below the age of six 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)** | **0.05** | **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 losses, numbness in fingers or toes, or problems with their circulation.** |
| **Thallium (ppb)** | **0.002** | **1000** | **2** | **0.5** | **Leaching from ore-processing sites; Discharge from electronics, 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)** | **0.07** | **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)** | **0.05** | **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** | | **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.** |

| 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 |
|---|---|---|---|---|---|---|
| **Alachlor (ppb)** | **0.002** | **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)** | **0.003** | **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)** | **0.0002** | **1,000,000** | **200** | **0** | **Leaching from linings 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.** |
| **Carbofuran (ppb)** | **0.04** | **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)** | **0.002** | **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)** | **0.2** | **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)** | **0.4** | **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)** | **0.006** | **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.** |
| **Dibromochloro-propane (ppt)** | **0.0002** | **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)** | **0.007** | **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)** | **0.02** | **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.** |

| 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 |
|---|---|---|---|---|---|---|
| Dioxin [2,3,7,8-TCDD] (ppq) | 3E-08 | 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) | 0.1 | 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) | 0.002 | 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 | | 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. |
| Ethylene dibromide (ppt) | 0.00005 | 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 system, or kidneys, and may have an increased risk of getting cancer. |
| Glyphosate (ppb) | 0.7 | 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) | 0.0004 | 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) | 0.0002 | 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. |
| Hexachloro-benzene (ppb) | 0.001 | 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. |
| Hexachlorocyclo-pentadiene (ppb) | 0.05 | 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. |

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|---|---|---|---|---|---|---|
| **Lindane (ppt)** | **0.0002** | **1,000,000** | **200** | **200** | **Runoff / leaching from insecticide used on cattle, lumber, 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)** | **0.04** | **1000** | **40** | **40** | **Runoff / leaching from insecticide used on fruits, vegetables, alfalfa, livestock** | **Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.** |
| **Oxamyl [Vydate] (ppb)** | **0.2** | **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 [Polychlorinated biphenyls] (ppt)** | **0.0005** | **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.** |
| **Penta-chlorophenol (ppb)** | **0.001** | **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.** |
| **Picloram (ppb)** | **0.5** | **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)** | **0.004** | **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)** | **0.003** | **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)** | **0.005** | **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)** | **0.005** | **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.** |

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|---|---|---|---|---|---|---|
| **Chlorobenzene (ppb)** | **0.1** | **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)** | **0.6** | **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)** | **0.075** | **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)** | **0.005** | **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)** | **0.007** | **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)** | **0.07** | **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)** | **0.1** | **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)** | **0.005** | **1000** | **5** | **0** | **Discharge from pharmaceutical and chemical factories** | **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.** |
| **1,2-Dichloropropane (ppb)** | **0.005** | **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)** | **0.7** | **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 (HAA) (ppb)** | **0.06** | **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)** | **0.1** | **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.** |

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| **Tetrachloroethylene (ppb)** | **0.005** | **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)** | **0.07** | **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)** | **0.2** | **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)** | **0.005** | **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)** | **0.005** | **1000** | **5** | **0** | **Discharge from metal degreasing sites and other factories** | **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.** |
| **TTHMs [Total trihalomethanes] (ppb)** | **0.10/.080** | **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** | | **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)** | **0.002** | **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** | | **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 damage to their nervous system.** |

**[1]These arsenic values are effective January 23, 2006. Until then, the MCL is 0.05 mg/L and there is no MCLG.**

***Key:***

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|---|---|
| **AL=Action Level**<br>**MCL=Maximum Contaminant Level**<br>**MCLG=Maximum Contaminant Level Goal**<br>**MFL=million fibers per liter**<br>**MRDL=Maximum Residual Disinfectant Level**<br>**MRDLG=Maximum Residual Disinfectant Level Goal**<br>**mrem/year=millirems per year (a measure of radiation absorbed by the body)** | **N/A=Not Applicable**<br>**NTU=Nephelometric Turbidity Units (a measure of water clarity)**<br>**pCi/l=picocuries per liter (a measure of radioactivity)**<br>**ppm=parts per million, or milligrams per liter (mg/l)**<br>**ppb=parts per billion, or micrograms per liter (µg/l)**<br>**ppt=parts per trillion, or nanograms per liter**<br>**ppq=parts per quadrillion, or picograms per liter**<br>**TT=Treatment Technique** |