

# 61-58.5

## Maximum Contaminant Levels in Drinking Water

Regulation History as Published in State Register			
Date	Document Number	Volume	Issue
May 22, 1981	-	5	11
November 25, 1988	1040	12	11
March 24, 1989 (Errata)	1040	13	3
July 28, 1989 (Errata)	1040	13	7
December 28, 1990	1301	14	13
August 27, 1993	1464	17	8
December 24, 1993	1683	17	12
November 25, 1994	1796	18	11
July 28, 1995	1830	19	7
June 26, 1998	2172	22	6, Part 2
February 25, 2000	2479	24	2
September 28, 2001	2641	25	9
December 27, 2002	2782	26	12
September 26, 2003	2842	27	9
January 23, 2004 (Errata)	2641, 2782, 2842	28	1
October 27, 2006	3070	30	10
April 25, 2008	3200	32	4
September 26, 2014	4469	38	9

### Table of Contents

A. Applicability.....	121
B. Maximum Contaminant Levels for Inorganic Chemicals .....	121
C. Primary Inorganic Chemical Sampling and Analytical Requirements.....	122
D. Maximum Contaminant Levels for Organic Chemicals.....	131
E. Organic Chemicals Other Than Total Trihalomethanes, Sampling and Analytical Requirements.....	132
F. Maximum Contaminant Levels (MCLs) for Microbiological Contaminants .....	136
G. Microbiological Contaminant Sampling and Analytical Requirements .....	138
H. Maximum Contaminant Levels for Radionuclides .....	144
I. Monitoring Frequency and Compliance Requirements for Radionuclides in Community Water Systems.....	147
J. Maximum Contaminant Level Goals for Radionuclides.....	151

K. Analytical Methods for Radionuclides.....	151
L. [Reserved].....	152
M. [Reserved].....	152
N. Maximum Contaminant Levels for Volatile Synthetic Organic Chemicals (VOCs).....	153
O. VOC Monitoring, Sampling and Analytical Requirements. ....	153
P. Maximum Contaminant Levels for Disinfection Byproducts. ....	157
Q. Maximum Residual Disinfectant Levels (MRDLs) for Disinfectants. ....	158
R. Secondary Maximum Contaminant Levels.....	159
S. Secondary Maximum Contaminant Levels Sampling and Analytical Requirements. ....	160
T. Special Monitoring for Inorganic and Organic Contaminants. ....	160
U. Special Monitoring for Sodium.....	163
V. Special Monitoring for Corrosivity Characteristics. ....	163
W. Special Monitoring and Notification Requirements.....	164
X. Monitoring of Consecutive Public Water Systems.....	164
Y. Criteria and Procedures for Public Water Systems using Point-of-Entry Devices.....	164
Z. Use of Other Non-Centralized Treatment Devices.....	165
AA. Treatment Techniques.....	165
BB. Approved Laboratories.....	165
CC. Alternative Analytical Techniques.....	165

**A. Applicability.**

This regulation shall apply to each public water system, unless the water system meets all of the following conditions:

- (1) Consists only of distribution and storage facilities (and does not have any collection and treatment facilities);
- (2) Obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;
- (3) Does not sell water to any person; and
- (4) Is not a carrier which conveys passengers in interstate commerce.

**B. Maximum Contaminant Levels for Inorganic Chemicals.**

(1) The Maximum Contaminant Levels (MCLs) for inorganic contaminants specified in R.61-58.5(B)(2) shall apply to all public water systems. Compliance with maximum contaminant levels for inorganic chemicals are calculated pursuant to Section (C) below:

(2) The maximum contaminant levels for inorganic chemicals are as follows:

<u>Contaminant</u>	<u>Level (mg/L)</u>
(a) Arsenic	0.010**
(b) Asbestos	7 Million Fibers/liter (longer than 10µm)
(c) Barium	2.0
(d) Cadmium	0.005
(e) Chromium	0.1
(f) Fluoride	4.0
(g) Mercury	0.002
(h) Nitrate (as Nitrogen)	10
(i) Nitrite (as Nitrogen)	1
(j) Total Nitrate and Nitrite (as Nitrogen)	10
(k) Selenium	0.05
(l) Antimony	0.006
(m) Beryllium	0.004
(n) Cyanide (as free Cyanide)	0.2
(o) Thallium	0.002

\*\* The MCL for arsenic is 0.05 milligrams per liter (mg/L) for all public water systems until January 23, 2006.

(3) At the discretion of the Department, nitrate levels not to exceed twenty milligrams per liter may be allowed in a non-community water system if the supplier of water demonstrates to the satisfaction of the Department that:

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

(b) The non-community water system is meeting the public notification requirements under R.61-58.6(E)(9), including continuous posting of the fact that nitrate levels exceed ten (10) milligrams per liter and the potential health effects of exposure; and,

(c) No adverse health effects shall result from the consumption of this water.

### **C. Primary Inorganic Chemical Sampling and Analytical Requirements.**

(1) The monitoring requirements for inorganic contaminants specified in Section B (2)(b), (c), (d), (e), (g), (k), (l), (m), (n), and (o) above apply to community water systems and non-transient non-community water systems. The monitoring requirements for inorganic contaminants specified in Section B (2)(a) and (f) above only apply to community water systems. Beginning January 22, 2004, the monitoring requirements for the inorganic contaminant specified in Section B (2)(a) above will apply to community water systems and non-transient, non-community water systems. The monitoring required for inorganic contaminants specified in Section B (2)(h), (i) and (j) above apply to community, non-transient non-community and transient non-community water systems.

(2) Analytical methods used to comply with Section B above, shall be made using EPA-approved methods listed in 40 CFR 141. Analyses for the purpose of determining compliance with Section B above are required as follows:

(a) Analyses for all community water systems utilizing surface water sources, in whole or in part, shall be completed within one year following the effective date of this regulation. These analyses shall be repeated at yearly intervals.

(b) Analyses for all community water systems utilizing only groundwater sources shall be completed within two years following the effective date of this regulation. These analyses shall be repeated at three-year intervals.

(c) For non-community water systems, whether supplied by surface or groundwater sources, analyses for nitrate shall be completed within two years following the effective date of this regulation. These analyses shall be repeated at intervals determined by the Department.

(d) The Department shall have the authority to determine compliance or to initiate enforcement action based upon analytical results and other information compiled by the Department.

(3) If the result of an analysis made pursuant to subsection (2) above indicates that the level of any contaminant listed in Section B above exceeds the maximum contaminant level, the supplier of water shall report to the Department within seven days.

(4) When the maximum contaminant level for any contaminant listed in Section B above is exceeded as determined in accordance with subsection (15) below, the supplier of water shall notify the Department and give notice to the public pursuant to R. 61-58.6, Reports, Record Retention, and Public Notification, Sections B and E. Monitoring after public notification shall be at a frequency designated by the Department 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.

(5) The provisions of subsections (3) and (4) above notwithstanding, compliance with the maximum contaminant level for nitrate and nitrite shall be determined in accordance with subsection (12)(b) below.

(6) For the initial analyses required by items (2)(a), (b), or (c) above, data for surface waters acquired within one year prior to the effective date and data for groundwater acquired within three years prior to the effective date of this regulation may be substituted at the discretion of the Department. Analyses conducted to determine compliance with Section B above shall be made in accordance with the analytical methods adopted by the Department.

(7) Monitoring for the purpose of determining compliance with the maximum contaminant levels specified in Section B (2) above, shall be conducted as follows:

(a) 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.

(b) 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.]

(c) 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).

(d) The Department 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 inorganic contaminant shall be in accordance with those listed in 40 CFR 141.

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	0.00086
		ICP-Mass Spectrometry	0.0004
		Hydride-Atomic Absorption	0.001
Asbestos	7 MFL <sup>2</sup>	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) <sup>1</sup>

DETECTION LIMITS FOR INORGANIC CONTAMINANTS

Contaminant	MCL(mg/l)	Methodology	Detection Limit(mg/l)
Beryllium	0.004	Atomic Absorption; Furnace	0.0002
		Atomic Absorption; Platform	0.00002 <sup>6</sup>
		Inductively Coupled Plasma <sup>3</sup>	0.0003
		ICP-Mass Spectrometry	0.0003
Cadmium	0.005	Atomic Absorption; furnace technique	0.0001
		Inductively Coupled Plasma	0.001 <sup>1</sup>
Chromium	0.1	Atomic Absorption; furnace technique	0.001
		Inductively Coupled Plasma	0.007(0.001) <sup>1</sup>
Cyanide	0.2	Distillation, Spectrophotometric <sup>4</sup>	0.02
		Distillation, Automated, Spectrophotometric <sup>4</sup>	0.005
		Distillation, Selective Electrode <sup>4</sup>	0.05
		Distillation, Amenable, Spectrophotometric <sup>5</sup>	0.02
Mercury	0.002	Manual Cold Vapor Technique	0.0002
		Automated Cold Vapor Technique	0.0002
Nickel	0.1	Atomic Absorption; Furnace	0.001
		Atomic Absorption; Platform	0.0006 <sup>5</sup>
		Inductively Coupled Plasma <sup>3</sup>	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
Nitrite	1(as N)	Spectrophotometric	0.01
		Automated Cadmium Reduction	0.05
		Manual Cadmium Reduction	0.01
		Ion Chromatography	0.004
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 <sup>6</sup>
		ICP-Mass Spectrometry	0.0003

<sup>1</sup>MFL = million fibers per liter > 10µm.

<sup>2</sup>Using a 2X preconcentration step as noted in method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.

<sup>3</sup>Screening method for total cyanides.

<sup>4</sup>Measures “free” cyanides.

<sup>5</sup>Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

(ii) If the population served by the system is greater than 3,300 persons, then compositing may only be permitted by the Department at sampling points within a single system. In systems serving 3,300 persons or less, the Department 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 are available, the system may use these instead of resampling. The duplicates must be analyzed and the results reported to the Department within 14 days of collection.

(e) The frequency of monitoring for asbestos shall be in accordance with paragraph (8) 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 (9) of this section; the frequency of monitoring for nitrate shall be in accordance with paragraph (10) of this section; and the frequency of monitoring for nitrite shall be in accordance with paragraph (11) of this section.

(8) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in Section B(2) above shall be conducted as follows:

(a) 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.

(b) 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 Department for a waiver of the monitoring requirement in paragraph (8)(a) of this section. If the Department grants the waiver, the system is not required to monitor.

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

(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.

(d) 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 (8)(a) of this section.

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

(f) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of paragraph (7) of this section.

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

(h) A system which exceeds the maximum contaminant levels as determined in paragraph (15) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(i) The Department may decrease the quarterly monitoring requirement to the frequency specified in paragraph (8)(a) of this section provided the Department has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Department 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.

(j) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of paragraph (8) of this section, then the Department may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(9) The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in Section B(2) above for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, and thallium shall be as follows:

(a) 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.

(b) The system may apply to the Department for a waiver from the monitoring frequencies specified in paragraph (9)(a) of this section. The Department may grant a public water system a waiver for monitoring of cyanide, provided that the Department determines that the system is not vulnerable due to lack of any industrial source of cyanide.

(c) 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).

(d) The Department 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.

(e) In determining the appropriate reduced monitoring frequency, the Department 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.

(f) A decision by the Department 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 Department or upon an application by the public water system. The public water system shall specify the basis for its request. The Department 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.

(g) Systems which exceed the maximum contaminant levels as calculated in paragraph (15) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(h) The Department may decrease the quarterly monitoring requirement to the frequencies specified in paragraphs (9)(a) and (9)(c) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Department 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.

(i) 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 Department. The system must also comply with the initial sampling frequencies specified by the Department 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.

(10) All public water systems (community; non-transient, non-community; and transient, non-community) shall monitor to determine compliance with the maximum contaminant level for nitrate in Section B above.

(a) 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.

(b) For community and non-transient, non-community water systems, the repeat monitoring frequency for ground water systems shall be quarterly for at least one year following any one sample in which the concentration is 50 percent or more of the MCL. The Department 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.

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

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

(e) 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.

(11) 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 Section B above.

(a) 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

(b) After the initial sample, systems where an analytical result for nitrite is less than 50 percent of the MCL shall monitor at the frequency specified by the Department.

(c) 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 or more of the MCL. The Department may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.

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

(12) Confirmation samples:

(a) Where the results of sampling for asbestos, antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium indicate an exceedance of the maximum contaminant level, the Department 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.

(b) Where nitrate or nitrite sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within twenty-four (24) hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the twenty (24) hour sampling requirement must immediately notify the consumers served by the area served by the public water system in accordance with R.61-58.6.B and E and meet other Tier 1 public notification requirements under this regulation. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

(c) If a Department-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 (15) of this section. The Department has the discretion to delete results of obvious sampling errors.

(13) The Department may require more frequent monitoring than specified in paragraphs (8), (9), (10) and (11) of this section or may require confirmation samples for positive and negative results at its discretion.

(14) Systems may apply to the Department to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

(15) Compliance with Section B(2) above (as appropriate) shall be determined based on the analytical result(s) obtained at each sampling point.

(a) 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.

(b) For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for arsenic, asbestos, antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury nickel, selenium or thallium if the level of a contaminant at any

sampling point is greater than the MCL. If a confirmation sample is required by the Department, the determination of compliance will be based on the average of the two 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.

(c) Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants is 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 (12)(b) of this section, and compliance shall be determined based on the average of the initial and confirmation samples

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

(16) Each public water system shall monitor at the time designated by the Department during each compliance period

(17) Inorganic Analysis

(a) Analysis for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium, and thallium shall be conducted using EPA-approved methods listed in 40 CFR 141.

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology	Reference (Method Number)			USGS <sup>4</sup>	Other
		EPA	ASTM <sup>2</sup>	SM <sup>3</sup>		
Antimony	Atomic Absorption; Furnace <sup>6</sup>	204.2 <sup>1</sup>		3113		
	Atomic Absorption; Platform <sup>6</sup>	200.9 <sup>6</sup>				
	ICP-Mass Spectrometry <sup>6</sup>	200.8 <sup>6</sup>				
	Hydride-Atomic Absorption <sup>9</sup>		D-3697-87			
Asbestos	Transmission Electron Microscopy	EPA <sup>12</sup>				
Barium	Atomic Absorption; Furnace <sup>6</sup>	208.2 <sup>1</sup>		3113B		
	Atomic Absorption; Direct <sup>6</sup>	208.1 <sup>1</sup>		3111D		
	Inductively Coupled Plasma <sup>6</sup>	200.7 <sup>6</sup>		3120		
Beryllium	Atomic Absorption; Furnace <sup>6</sup>	210.2 <sup>1</sup>	D-3645-84B	3113		
	Atomic Absorption; Platform <sup>6</sup>	200.9 <sup>6</sup>				
	Inductively Coupled Plasma <sup>6</sup>	200.7 <sup>6</sup>		3120		
	ICP-Mass Spectrometry <sup>6</sup>	200.8 <sup>6</sup>				
Cadmium	Atomic Absorption; Furnace <sup>6</sup>	213.2 <sup>1</sup>		3113B		
	Inductively Coupled Plasma <sup>6</sup>	200.7 <sup>6</sup>				
Chromium	Atomic Absorption; Furnace <sup>6</sup>	218.2 <sup>1</sup>		3113B		
	Inductively Coupled Plasma <sup>6</sup>	200.7 <sup>6</sup>		3120		
Cyanide	Distillation, Spec.	335.2 <sup>1</sup>	D-2036-89A	4500-CN-D	1330085	
	Distillation, Automated, Spec.	335.3 <sup>1</sup>		4500-CN-E		
	Distillation, Selective Electrode		D-2036-89A	4500-CN-F		
	Distillation, Amenable, Spec.	335.1 <sup>1</sup>	D-2036-89B	4500-CN-G		
Mercury	Manual Cold Vapor Technique <sup>9</sup>	245.1 <sup>1</sup>	D3223-86	3112B		
	Automated Cold Vapor Technique <sup>9</sup>	245.2 <sup>1</sup>				

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology	Reference (Method Number)			USGS <sup>4</sup>	Other
		EPA	ASTM <sup>2</sup>	SM <sup>3</sup>		
Nickel	Atomic Absorption; Furnace <sup>6</sup>	249.2 <sup>1</sup>		3113		
	Atomic Absorption; Platform <sup>6</sup>	200.9 <sup>6</sup>				
	Atomic Absorption; Direct <sup>6</sup>	249.1 <sup>1</sup>		3111B		
	Inductively Coupled Plasma <sup>6</sup>	200.7 <sup>6</sup>		3120		
	ICP-Mass Spectrometry <sup>6</sup>	200.8 <sup>6</sup>				
Nitrate	Manual Cadmium Reduction	353.3 <sup>1</sup>	D3867-90	4500-NO <sub>3</sub> -E		
	Automated Hydrazine Reduction	353.1 <sup>1</sup>				
	Automated Cadmium Reduction	353.2 <sup>1</sup>	D3867-90	4500-NO <sub>3</sub> -F		
	Ion Selective Electrode				WeWWG/ 58807	
	Ion Chromatograph	300.0 <sup>11</sup>				B-1011 <sup>8</sup>
Nitrite	Spectrophotometric	354.1 <sup>1</sup>				
	Automated Cadmium Reduction	353.2 <sup>1</sup>	D3867-90	4500-NO <sub>3</sub> -F		
	Manual Cadmium Reduction	353.3 <sup>1</sup>	D3867-90	4500-NO <sub>3</sub> -E		
	Ion Chromatography	300.0 <sup>11</sup>				B-1011 <sup>8</sup>
Selenium	Hydride-Atomic Absorption <sup>9</sup>		D3859-84A	3114B		
	Atomic Absorption; Furnace <sup>6 10</sup>	270.2 <sup>1</sup>	D3959-88	3113B		
Thallium	Atomic Absorption; Furnace <sup>6</sup>	279.2 <sup>1</sup>		3113		
	Atomic Absorption; Platform <sup>6</sup>	200.9 <sup>5</sup>				
	ICP-Mass Spectrometry <sup>6</sup>	200.85				

<sup>1</sup>"Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring Systems Laboratory, Cincinnati, OH 45268 March 1983. EPA-600/4-79-020.

<sup>2</sup>Annual Book of ASTM Standards, Vols. 11.01 and 11.02, 1991. American Society of Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

<sup>3</sup>"Standard Methods for the Examination of Water and Wastewater," 17th edition, American Public Health Association, American Water Works Association. Water Pollution Control Federation, 1989.

<sup>4</sup>Techniques of Water Resources Investigations of the U.S. Geological Survey, "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Book 5, Chapter A-1, Third edition, 1989. Available at Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

<sup>5</sup>"Methods for Determination of Metals in Environmental Samples." Available at NTIS, PB 91-231498.

<sup>6</sup>Samples that contain less than 1 NTU (nephelometric turbidity unit) and are properly preserved (conc HNO<sub>3</sub> to pH < 2) may be analyzed directly (without digestion) for total metals, otherwise, digestion is required. Turbidity must be measured on the preserved samples just prior to initiation of metal analysis. When digestion is required, the total recoverable technique as defined in the method must be used.

<sup>7</sup>"Orion Guide to Water and Wastewater Analysis." For WeWWG/5880, p.5, 1985. Orion Research, Inc., Cambridge, MA.

<sup>8</sup>Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography, Method B-1011. Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

<sup>9</sup>For the gaseous hydride determinations of antimony and selenium and for the determination of mercury by the cold vapor techniques, the proper digestion technique as defined in the method must be followed to ensure the element is in the proper state for analyses.

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology	Reference (Method Number)				
		EPA	ASTM <sup>2</sup>	SM <sup>3</sup>	USGS <sup>4</sup>	Other

<sup>10</sup>Add 2 ml of 30% H<sub>2</sub>O<sub>2</sub> and an appropriate concentration of matrix modifier Ni(NO<sub>2</sub>) + 6H<sub>2</sub>O (nickel nitrate) to samples.

<sup>11</sup>Method 300. Determination of Inorganic Anions in Water by Ion Chromatography.” Inorganic Chemistry Branch, Environmental Monitoring Systems Laboratory. August 1991.

<sup>12</sup>”Analytical Method for Determination of Asbestos Fibers in Water,” EPA-600/4-83-043, September 1983, U.S. EPA Environmental Research Laboratory, Athens, GA 30613.

(b) 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 EPA-approved methods listed in 40 CFR 141.

(c) Analysis under this section shall only be conducted by laboratories that have been certified by the Department.

**D. Maximum Contaminant Levels for Organic Chemicals.**

(1) The following are the maximum contaminant levels for organic chemicals. The MCLs specified in R.61-58.5(D)(2) below, apply to all public water systems. The maximum contaminant level for total trihalomethanes is pursuant to Section P below.

(2) The maximum contaminant levels for organic chemicals are as follows:

<b>Contaminant</b>	<b>Level, mg/L</b>
(a) Reserved	
(b) (i) Alachlor	0.002
(ii) Atrazine	0.003
(iii) Carbofuran	0.04
(iv) Chlordane	0.002
(v) Dibromochloropropane	0.0002
(vi) 2,4-D	0.07
(vii) Ethylene dibromide (EDB)	0.00005
(viii) Heptachlor	0.0004
(ix) Heptachlor epoxide	0.0002
(x) Lindane	0.0002
(xi) Methoxychlor	0.04
(xii) Polychlorinated biphenyls(PCBs)	0.0005
(xiii) Pentachlorophenol	0.001
(xiv) Toxaphene	0.003
(xv) 2,4,5-TP	0.05
(xvi) Benzo[a]pyrene	0.0002
(xvii) Dalapon	0.2
(xviii) Di(2-ethylhexyl)adipate	0.4
(xvix) Di(2-ethylhexyl)phthalate	0.006
(xx) Dinoseb	0.007
(xxi) Diquat	0.02
(xxii) Endothall	0.1
(xxiii) Endrin	0.002

(xxiv)	Glyphosate	0.7
(xxv)	Hexachlorobenzene	0.001
(xxvi)	Hexachlorocyclopentadiene	0.05
(xxvii)	Oxamyl (vydate)	0.2
(xxviii)	Picloram	0.5
(xxvix)	Simazine	0.004
(xxx)	2,3,7,8-TCDD (Dioxin)	$3 \times 10^{-8}$

**E. Organic Chemicals Other Than Total Trihalomethanes, Sampling and Analytical Requirements.**

(1) The monitoring requirements for organic contaminants specified in R.61-58.5(D)(2)(a) shall apply to all community water systems. The monitoring requirements for organic contaminants specified in 61-58.5(D)(2)(b) shall apply to community water systems and non-transient non-community water systems.

(2) Reserved.

(3) Reserved.

(4) Reserved.

(5) Reserved.

(6) Reserved.

(7) Analytical methods used to comply with Section D(2)(b) above, shall be made using EPA-approved methods listed in 40 CFR 141. Analysis of the contaminants listed in Section D(2)(b) above, for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows:

(a) 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.

(b) 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.]

(c) 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).

(d) Monitoring frequency:

(i) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in Section D(2)(b) above, 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 3,300 persons or less which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period.

(e) Each community and non-transient water system may apply to the Department for a waiver from the requirement of paragraph (7)(d) of this section. A system must reapply for a waiver for each compliance period.

(f) The Department 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 Department 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.).

(g) If an organic contaminant listed in Section D(2)(b) above, is detected (as defined by paragraph (7)(r) of this section) in any sample, then:

(i) Each system must monitor quarterly at each sampling point which resulted in a detection.

(ii) The Department may decrease the quarterly monitoring requirement specified in paragraph (7)(g)(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 Department 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 Department determines the system is reliably and consistently below the maximum contaminant level the Department 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 Department for a waiver as specified in paragraph (7)(f) 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 Department 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 Department.

(h) Systems which violate the requirements of Section D(2)(b) above, as determined by paragraph (7)(k) of this section must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Department determines the system is reliably and consistently below the MCL, as specified in paragraph (7)(k) of this section, the system shall monitor at the frequency specified in paragraph (7)(g)(iii) of this section.

(i) The Department may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Department, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by paragraph (7)(k) of this section. The Department has the discretion to delete results of obvious sampling errors from this calculation.

(j) The Department 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 Section D(2)(b) above, then a follow-up sample must be taken 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 are available, the system may use these duplicates instead of resampling. The duplicate must be analyzed and the results reported to the Department within 14 days of collection.

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

(k) Compliance with Section D(2)(b) above, 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 (7)(r) 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.

(l) [Reserved]

(m) Analysis for PCBs shall be conducted using EPA-approved methods listed in 40 CFR 141.

(i) [Reserved]

(ii) [Reserved]

(iii) Compliance with the PCB MCL shall be determined based upon the quantitative results of analyses using EPA-approved methods listed in 40 CFR 141.

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

(o) The Department 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).

(p) The Department has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by the Department.

(q) Each public water system shall monitor at the time designated by the Department within each compliance period.

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

<b><u>Contaminant</u></b>	<b><u>Detection/Limit</u></b>
Alachlor	0.0002 mg/L
Atrazine	0.0001 mg/L
Benzo[a]pyrene	0.00002 mg/L
Carbofuran	0.0009 mg/L
Chlordane	0.0002 mg/L
Dalapon	0.001 mg/L
Dibromochloropropane (DBCP)	0.00002 mg/L
Di (2-ethylhexyl) adipate	0.0006 mg/L
Di (2-ethylhexyl) phthalate	0.0006 mg/L

Dinoseb	0.0002 mg/L
Diquat	0.0004 mg/L
2,4-D	0.0001 mg/L
Endothall	0.009 mg/L
Endrin	0.00001 mg/L
Ethylene dibromide (EDB)	0.00001 mg/L
Glyphosate	0.006 mg/L
Heptachlor	0.00004 mg/L
Heptachlor epoxide	0.00002 mg/L
Hexachlorobenzene	0.0001 mg/L
Hexachlorocyclopentadiene	0.0001 mg/L
Lindane	0.00002 mg/L
Methoxychlor	0.0001 mg/L
Oxamyl	0.002 mg/L
Picloram	0.0001 mg/L
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	0.0001 mg/L
Pentachlorophenol	0.00004 mg/
Simazine	0.00007 mg/L
Toxaphene	0.001 mg/L
2,3,7,8-TCDD (Dioxin)	0.000000005 mg/L
2,4,5-TP (Silvex)	0.0002 mg/L

(s) All new systems or systems that used 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 Department. The system must also comply with the initial sampling frequencies specified by the Department 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.

#### **F. Maximum Contaminant Levels (MCLs) for Microbiological Contaminants.**

These maximum contaminant levels shall apply to all public water systems.

(1) Until March 31, 2016, the total coliform MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

(a) For a system which collects at least forty (40) samples per month, if no more than five (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.

(b) For a system which collects fewer than forty (40) samples per month, if no more than one (1) sample collected during a month is total coliform-positive, the system is in compliance with the MCL for total coliforms.

(2) Until March 31, 2016, 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 R.61 58.6.E, this is a violation that may pose an acute risk to health.

(3) Beginning April 1, 2016, a system is in compliance with the MCL for E. coli for samples taken under provisions of R.61-58.17 unless any of the conditions identified in R.61-58.5.F(3)(a) through (d)

occur. For purposes of the public notification requirements in R.61-58.6.E, violation of the MCL may pose an acute risk to health.

(a) The system has an E. coli-positive repeat sample following a total coliform-positive routine sample.

(b) The system has a total coliform-positive repeat sample following an E. coli-positive routine sample.

(c) The system fails to take all required repeat samples following an E. coli-positive routine sample.

(d) The system fails to test for E. coli when any repeat sample tests positive for total coliform.

(4) Until March 31, 2016, a public water system must determine compliance with the MCL for total coliforms in R.61-58.5.F(1) and (2) for each month in which it is required to monitor for total coliforms. Beginning April 1, 2016, a public water system must determine compliance with the MCL for E. coli in R.61-58.5.F(3) for each month in which it is required to monitor for total coliforms.

(5) The United States Environmental Protection Agency Administrator, pursuant to section 1412 of the federal Safe Drinking Water Act, has identified the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant level for total coliforms in R.61-58.5.F(1) and (2) and for achieving compliance with the maximum contaminant level for E. coli in R.61-58.5.F(3):

(a) Protection of wells from fecal contamination by appropriate placement and construction;

(b) Maintenance of a disinfection residual throughout the distribution system;

(c) Proper maintenance of the distribution system including appropriate pipe placement and repair procedures, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, cross connection control, and continual maintenance of positive water pressure in all parts of the distribution system;

(d) Filtration and/or disinfection of surface water, as described in R.61-58.10, or disinfection of ground water, as described in R.61-58.16, using strong oxidants such as chlorine, chlorine dioxide, or ozone; and

(e) For systems using ground water, compliance with the requirements of an EPA- approved Department Wellhead Protection Program developed and implemented under section 1428 of the federal Safe Drinking Water Act.

(6) The United States Environmental Protection Agency Administrator, pursuant to section 1412 of the federal Safe Drinking Water Act, identifies the technology, treatment techniques, or other means available identified in R.61-58.5.F(5) as affordable technology, treatment techniques, or other means available to systems serving 10,000 or fewer people for achieving compliance with the maximum contaminant level for total coliforms in R.61-58.5.F(1) and (2) and for achieving compliance with the maximum contaminant level for E. coli in R.61-58.5.F(3).

**G. Microbiological Contaminant Sampling and Analytical Requirements.**

These sampling and analytical requirements shall apply to community and non-community water systems. Analytical methods used to comply with Section F above, shall be made using EPA-approved methods listed in 40 CFR 141.

(1) Routine Monitoring.

(a) Community and non-community water systems shall collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sample siting plan. These plans are subject to Department review and revision.

(b) The monitoring frequency for total coliforms for community water systems is based on the population served by the system, as follows:

<b>Population Served</b>		<b>Minimum # of Samples Per Month</b>
25	to 1,000 <sup>1</sup>	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

<sup>1</sup>Includes public water systems which have at least fifteen (15) service connections, but serve fewer than twenty-five (25) persons.

If a community water system serving twenty-five (25) to one-thousand (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 Department may reduce the monitoring frequency specified above, except that in no case may the Department reduce the monitoring frequency to less than one sample per quarter. The Department must approve the reduced monitoring frequency in writing.

(i) [Reserved]

(ii) Community water systems shall make at a minimum one fecal or total coliform density measurement each day from the raw water source, and one coliform density or presence/absence measurement from the finished water, if treating surface water. This requirement may be waived by the Department on a case-by-case basis if a public water supply can demonstrate that such monitoring is unnecessary.

(c) 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) and serving one-thousand (1,000) persons or fewer shall monitor each calendar quarter that the system provides water to the public, except that the Department 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 Department 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) and serving one-thousand (1,000) persons or fewer to less than once per year.

(ii) A non-community water system using only ground water (except ground water under the direct influence of surface water) and serving more than one- thousand (1,000) persons during any month shall monitor at the same frequency as a like-sized community water system, as specified in paragraph (1)(b) of this section, except that the Department may reduce this monitoring frequency, in writing, for any month the system serves one-thousand (1,000) persons or fewer. The Department cannot reduce the monitoring frequency to less than once per year. For systems using ground water under the direct influence of surface water, paragraph (1)(c)(iv) of this section applies.

(iii) A non-community water system using surface water, in total or in part, shall monitor at the same frequency as a like-sized community water system, as specified in paragraph (1)(b) 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 shall monitor at the same frequency as a like-sized community water system, as specified in paragraph (1)(b) of this section. The system shall begin monitoring at this frequency beginning six (6) months after the Department determines that the ground water is under the direct influence of surface water.

(d) The community or non-community water system shall collect samples at regular time intervals throughout the month, except that a system which uses ground water (except ground water under the direct influence of surface water), and serves 4,900 persons or fewer, may collect all required samples on a single day if they are taken from different sites.

(e) A community or non-community water systems that uses surface water or ground water under the direct influence of surface water and does not practice filtration in compliance with R.61-58.10 shall collect at least one sample near the first service connection each day the turbidity level of the source water, measured as specified in R.61-58.10.F(2)(b), exceeds 1 NTU. This sample shall be analyzed for the

presence of total coliforms. When one or more turbidity measurements in any day exceed 1 NTU, the system shall collect this coliform sample within 24 hours of the first exceedance, unless the Department determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within thirty (30) hours of collection. Sample results from this coliform monitoring shall be included in determining compliance with the MCL for total coliforms in Section F above.

(f) 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 Section F above. Repeat samples taken pursuant to paragraph (2) of this section are not considered special purpose samples, and shall be used to determine compliance with the MCL for total coliforms in Section F above.

(2) Repeat Monitoring.

(a) If a routine sample is total coliform-positive, the community or non-community water system shall collect a set of repeat samples within twenty-four (24) hours of being notified of the positive result. A system which collects more than one routine sample per month shall collect no fewer than three repeat samples for each total coliform-positive sample found. A system which collects one routine sample per month or fewer shall collect no fewer than four repeat samples for each total coliform-positive sample found. The Department may extend the twenty-four (24) hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within twenty-four (24) hours that is beyond its control. In the case of an extension, the Department shall specify how much time the system has to collect the repeat samples.

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

(c) The system shall collect all repeat samples on the same day, except that the Department may allow a system with a single service connection to collect the required set of repeat samples over a 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 per month).

(d) If one or more repeat samples in the set is total coliform-positive, the water system shall collect an additional set of repeat samples in the manner specified in paragraphs (2)(a) through (c) of this section. The additional samples shall be collected within twenty-four (24) hours of being notified of the positive result, unless the Department extends the limit as provided in paragraph (2)(a) of this section. The system shall repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the MCL for total coliforms in Section F above, has been exceeded and notifies the Department.

(e) If a system collecting fewer than five routine samples per month has one or more total coliform-positive samples and the Department does not invalidate the sample(s) under paragraph (3) of this section, it shall collect at least five routine samples during the next month the system provides water to the public, except that the Department may waive this requirement if the conditions of paragraph (2)(e)(i) or (ii) of this section are met. The Department cannot waive the requirement for a system to collect repeat samples in paragraphs (2)(a) through (d) of this section.

(i) The Department may waive the requirement to collect five routine samples the next month the system provides water to the public if the Department, or an agent approved by the Department, performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit shall be sufficiently detailed to allow the Department to determine whether additional monitoring and/or any corrective action is needed. The Department cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the Department to perform sanitary surveys.

(ii) The Department may waive the requirement to collect five routine samples the next month the system provides water to the public if the Department has determined why the sample was total coliform-positive and establishes that the 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 Department shall document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the Department official who recommends such a decision, and make this document available to the EPA and public. The written documentation shall 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 Department 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 shall 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 R.61-58.5.F, unless the Department has determined that the system has corrected the contamination problem before the system took the set of repeat samples required in paragraphs (2)(a) through (d) of this section, and all repeat samples were total coliform-negative.

(f) 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.

(g) Results of all routine and repeat samples not invalidated by the Department shall be included in determining compliance with the MCL for total coliforms in Section F above.

### (3) Invalidation of total coliform samples.

A total coliform-positive sample invalidated under this paragraph does not count towards meeting the minimum monitoring requirements of this section.

(a) The Department may invalidate a total coliform-positive sample only if the conditions of paragraph (3)(a)(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 Department, on the basis of the results of repeat samples collected as required by paragraphs (2)(a) through (d) of this section, determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem. The Department 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., the Department 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 Department has substantial grounds to believe that a total coliform- positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. In this case, the system shall still collect all repeat samples required under paragraphs (2)(a) through (d) of this section, and use them to determine compliance with the MCL for total coliforms in Section F above. To invalidate a total coliform-positive sample under this paragraph, the decision with the rationale for the decision shall be documented in writing, and approved and signed by the supervisor of the Department official who recommended the decision. The Department shall make this document available to the EPA and the public. The written documentation shall 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 Department may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

(b) A laboratory shall invalidate a total coliform sample (unless total coliforms are detected) if the sample produces a turbid culture in the absence of gas production using an analytical method where gas formation is examined (e.g., the Multiple-Tube Fermentation Technique), produces a turbid culture in the absence of an acid reaction in the Presence-Absence (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 Department shall be notified, and the system shall collect another sample from the same location as the original sample within twenty-four (24) hours of being notified of the interference problem, and shall have it analyzed for the presence of total coliforms. The system shall continue to re-sample within twenty-four (24) hours and have the samples analyzed until it obtains a valid result. The Department may waive the twenty-four (24) hour time limit on a case-by-case basis.

#### (4) Sanitary Surveys.

(a) (i) Public water systems which do not collect five (5) or more routine samples per month shall undergo an initial sanitary survey by June 29, 1994, for community water systems and June 29, 1999, for non-community water systems. hereafter, systems shall undergo another sanitary survey every five (5) years, except that non-community water systems using only protected and disinfected ground water, as defined by the Department, shall undergo subsequent sanitary surveys at least every ten (10) years after the initial sanitary survey. The Department shall 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 the Federal 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.

(b) Sanitary surveys shall be performed by the Department or an agent approved by the Department. The system is responsible for ensuring the survey takes place.

(c) Sanitary surveys conducted by the Department under the provisions of 40 CFR 142.16(o)(2) may be used to meet the sanitary survey requirements of R.61-58.5.G(4).

#### (5) Fecal coliforms/*Escherichia coli* (E. coli) testing.

(a) If any routine or repeat sample is total coliform positive, the system shall analyze that total coliform-positive culture medium to determine if fecal coliforms are present, except that the system may test for *E. coli* in lieu of fecal coliforms. If fecal coliforms or *E. coli* are present, the system shall notify the Department by the end of the day when the system is notified of the test result, unless the system is notified of the result after the Department is closed, in which case the system shall notify the Department before the end of the next business day.

(b) The Department has the discretion to allow a public water system, on a case-by- case basis, to forego 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 shall notify the Department as specified in paragraph (5)(a) of this section and the provisions of Section F(2) above, apply.

(6) Analytical methodology.

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

(b) Water systems need only determine the presence or absence of total coliforms; a determination of total coliform density is not required.

(c) Analytical methods used to comply with R.61-58.5.G shall be in accordance with EPA-approved methods listed in 40 CFR 141 (11-8-06 edition).

(d) Water systems must conduct fecal coliform analysis in accordance with the procedure outlined in 40 CFR 141.21(f)(5) (11-8-06 edition).

(e) Water systems must conduct *Escherichia coli* analysis in accordance with the analytical methods outlined in 40 CFR 141.21(f)(6) (11-8-06 edition).

(7) Response to violation.

(a) A water system which has exceeded the MCL for total coliforms in Section F above, shall report the violation to the Department no later than the end of the next business day after it learns of the violation, and shall notify the public in accordance with R.61-58.6.E.

(b) A water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey requirement, shall report the monitoring violation to the Department within ten days after the system discovers the violation, and shall notify the public in accordance with R.61-58.6.E.

(8) The provisions of R.61-58.5.G(1) and (4) are applicable until March 31, 2016. The provisions of R.61-58.5.G(2), (3), (5), (6), and (7) are applicable until all required repeat monitoring under R.61-58.5.G(2) and fecal coliform or *E. coli* testing under R.61-58.5.G(5) that was initiated by a total coliform-positive sample taken before April 1, 2016 is completed, as well as analytical method, reporting, recordkeeping, public notification, and consumer confidence report requirements associated with that monitoring and testing. Beginning April 1, 2016, the provisions of R.61-58.17 are applicable, with systems required to begin regular monitoring at the same frequency as the system-specific frequency required on March 31, 2016.

## H. Maximum Contaminant Levels for Radionuclides.

(1) The maximum contaminant level for radionuclides are applicable to all public water systems. Compliance with the maximum contaminant levels for radionuclides is calculated pursuant to Section I below.

(2) 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.

(3) 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.

(4) MCL for beta particle and photon radioactivity.

(a) 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).

(b) 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 two (2) liters 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 Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC. 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**

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

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

(6) Compliance dates. 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 (2), (3), (4), and (5) of this section beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of Sections I and K below. Compliance with reporting requirements for the radionuclides under Appendix D to R.61-58.12 and Appendices A , B and C to R.61-58.6 is required on December 8, 2003.

(7) Best available technologies (BATs) for radionuclides. The Administrator, pursuant to section 1412 of the Federal Safe Drinking Water 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.

(8) 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. <sup>1</sup>	Raw water quality range and considerations. <sup>1</sup>
1. Ion exchange (IE)	( <sup>a</sup> )	Intermediate	All ground waters.
2. Point of use (POU <sup>2</sup> ) IE	( <sup>b</sup> )	Basic	All ground waters.
3. Reverse osmosis (RO)	( <sup>c</sup> )	Advanced	Surface waters usually require pre-filtration.
4. POU <sup>2</sup> RO	( <sup>b</sup> )	Basic	Surface waters usually require pre-filtration.
5. Lime softening	( <sup>d</sup> )	Advanced	All waters.
6. Green sand filtration	( <sup>e</sup> )	Basic.	
7. Co-precipitation with Barium sulfate	( <sup>f</sup> )	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	( <sup>g</sup> )	Intermediate	All ground waters.

10. Activated alumina	( <sup>a</sup> ), ( <sup>b</sup> )	Advanced	All ground waters; competing anion concentrations may affect regeneration frequency.
11. Enhanced coagulation/filtration	( <sup>i</sup> )	Advanced	Can treat a wide range of water qualities.

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

<sup>2</sup> 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:

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

<sup>b</sup> 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.

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

<sup>d</sup> 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.

<sup>e</sup> Removal efficiencies can vary depending on water quality.

<sup>f</sup> 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.

<sup>g</sup> This technology is most applicable to small systems that already have filtration in place.

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

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

**TABLE D: COMPLIANCE TECHNOLOGIES BY SYSTEM SIZE CATEGORY FOR RADIONUCLIDES**

Contaminant	Compliance technologies <sup>1</sup> 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: <sup>1</sup> Numbers correspond to those technologies found listed in the Table C above.

## **I. Monitoring Frequency and Compliance Requirements for Radionuclides in Community Water Systems.**

(1) This section shall apply only to community water systems which serve at least fifteen (15) service connections used by year-round residents or systems which regularly serve at least twenty- five (25) year -round residents. Suppliers of water for applicable community water systems shall analyze for radionuclides to determine compliance with Section H above.

(2) The monitoring and compliance requirements for gross alpha particle activity, radium- 226, radium-228, and uranium.

(a) Community water systems (CWSs) must conduct initial monitoring to determine compliance with Section H(2), (3) and (5) above 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 Section K(3) below.

(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 Department has designated a distribution system location, in accordance with paragraph (2)(b)(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 Department in the event of possible contamination or when changes in the distribution system or treatment processes occur which may increase the concentration of radioactivity in finished water.

(b) 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: The Department 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 Department finds that the historical data satisfactorily demonstrate that each entry point to the distribution system is expected to be in compliance based upon the historical data and reasonable assumptions about the variability of contaminant levels between entry points. The Department 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 Department may waive the final two quarters of initial monitoring for a sampling point if the results of the samples from the previous two (2) 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 (4) 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 Department.

(c) Reduced monitoring: The Department may allow community water systems to reduce the future frequency of monitoring from once every three (3) years to once every six (6) or nine (9) 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 Section K(3)(a) below, the system must collect and analyze for that contaminant using at least one (1) sample at that sampling point every nine (9) 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 below one-half (1/2) the MCL, the system must collect and analyze for that contaminant using at least one (1) sample at that sampling point every six (6) 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 below one-half (1/2) the MCL, the system must collect and analyze for that contaminant using at least one (1) sample at that sampling point every six (6) years.

(iii) For gross alpha particle activity and uranium, if the average of the initial monitoring results for each contaminant is above one-half (1/2) the MCL but at or below the MCL, the system must collect and analyze at least one (1) sample at that sampling point every three (3) 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 above one-half (1/2) the MCL but at or below the MCL, the system must collect and analyze at least one (1) sample at that sampling point every three (3) 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 (9) year monitoring period, and the sample result is above one-half (1/2) MCL, then the next monitoring period for that sampling point is three (3) 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 (4) consecutive quarters that are below the MCL, unless the system enters into another schedule as part of a formal compliance agreement with the Department.

(d) Compositing: To fulfill quarterly monitoring requirements for gross alpha particle activity, radium-226, radium-228, or uranium, a system may composite up to four

(4) consecutive quarterly samples from a single entry point if analysis is done within a year of the first sample. The Department will treat analytical results from the composited as the average analytical result to determine compliance with the MCLs and the future monitoring frequency. If the analytical result from the composited sample is greater than one-half (1/2) MCL, the Department may direct the system to take additional quarterly samples before allowing the system to sample under a reduced monitoring schedule.

(e) 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 percent (1.65 sigma, where sigma 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, one-half (1/2) the detection limit will be used to determine compliance and the future monitoring frequency.

(3) Monitoring and compliance requirements for beta particle and photon radioactivity.

To determine compliance with the maximum contaminant levels in paragraph (4) of this section for beta particle and photon radioactivity, a system must monitor at a frequency as follows:

(a) Community water systems (both surface and ground water) designated by the Department 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 Department. Systems already designated by the Department must continue to sample until the Department 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 Department may reduce the frequency of monitoring at that sampling point to once every three (3) years. Systems must collect all samples required in paragraph (2)(a) of this section during the reduced monitoring period.

(ii) For systems in the vicinity of a nuclear facility, the Department 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 Department 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 (2)(a) of this section.

(b) Community water systems (both surface and ground water) designated by the Department 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 Department. Systems already designated by

the Department as systems using waters contaminated by effluents from nuclear facilities must continue to sample until the Department 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 Department, 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 beta minus the naturally occurring potassium-40 beta particle activity at a sampling point has a running annual average (computed quarterly) less than or equal to 15 pCi/L (screening level), the Department may reduce the frequency of monitoring at that sampling point to every three (3) years. Systems must collect all samples required in paragraph (2)(a) of this section during the reduced monitoring period.

(v) For systems in the vicinity of a nuclear facility, the Department 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 Department 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 (2)(a) of this section.

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

(d) Community water systems may analyze for naturally occurring potassium-40 beta particle activity from the same or equivalent sample used for the gross beta particle activity analysis. 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.

(e) 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 Section H(4)(a) above, using the formula in Section H(4)(b) above. Doses must also be calculated and combined for measured levels of tritium and strontium to determine compliance.

(f) Systems must monitor monthly at the sampling point(s) which exceed the maximum contaminant level in R.61-58.5.H(4)(a), beginning the month after the exceedance occurs. Systems must continue monthly monitoring until the system has established, by a rolling average of three (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 paragraphs (3)(a)(i) or (3)(b)(iv) of this section.

(4) General monitoring and compliance requirements for radionuclides.

(a) The Department may require more frequent monitoring than specified R.61-58.5.I(1) or (2), or may require confirmation samples at its discretion. The results of the initial and confirmation samples will be averaged for use in compliance determinations.

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

(c) Compliance: Compliance with Section H(2) through (5) above, will be determined based on the analytical result(s) obtained at each sampling point. If one (1) 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, one-half (1/2) the detection limit will be used to calculate the annual average.

(d) The Department has the discretion to delete results of obvious sampling or analytic errors.

(e) If the MCL for radioactivity set forth in Section H(2) through (5) above, is exceeded, the operator of a community water system must give notice to the Department pursuant to R.61-58.6.

#### **J. 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.

#### **K. Analytical Methods for Radionuclides.**

(1) Analysis for the following contaminants shall be conducted to determine compliance with Section H above, (radioactivity) in accordance with the methods adopted by the Department.

(2) For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radio-analysis is defined in terms of detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus one hundred percent at the ninety-five percent confidence level (1.96 sigma where sigma is the standard deviation of the net counting rate of the sample). To determine compliance with Sections H and J above, the detection limits shall not exceed those set form by the Administrator.

(3) To judge compliance with the maximum contaminant levels listed in Sections H and J above, averages of data shall be used and shall be round to the same number of significant figures as the maximum contaminant level for the substance in question.

(a) To determine compliance with Section H(2), (3), and (5), above 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	I microgram/L

(b) To determine compliance with Section H(4) above, the detection limits shall not exceed the concentrations listed in Table C to this paragraph.

**TABLE C: DETECTION LIMITS FOR MAN-MADE BETA PARTICLES AND PHOTON EMITTERS**

Contaminant	Detection limit
Tritium	1,000 pCi/l
Strontium-89	10 pCi/l
Strontium - 90	2 pCi/l
Iodine-131	1 pCi/l
Cesium-134	10 pCi/l
Gross Beta	4 pCi/l
Other radionuclides	1/10 of the applicable limit

(4) To judge compliance with the maximum contaminant levels listed in Section H above, 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.

**L. [Reserved]**

**M. [Reserved]**

## N. Maximum Contaminant Levels for Volatile Synthetic Organic Chemicals (VOCs).

(1) The maximum contaminant levels for volatile synthetic organic chemicals (VOCs) apply to all public water systems.

(2) The maximum contaminant levels for volatile synthetic organic chemicals (VOCs) are as follows:

<u>Contaminant</u>	<u>MCL (mg/L)</u>
(a) Vinyl chloride	0.002
(b) Benzene	0.005
(c) Carbon tetrachloride	0.005
(d) 1,2-Dichloroethane	0.005
(e) Trichloroethylene	0.005
(f) para-Dichlorobenzene	0.075
(g) 1,1-Dichloroethylene	0.007
(h) 1,1,1-Trichloroethane	0.2
(i) cis-1,2-Dichloroethylene	0.07
(j) 1,2-Dichloropropane	0.005
(k) Ethylbenzene	0.7
(l) Monochlorobenzene	0.1
(m) o-Dichlorobenzene	0.6
(n) Styrene	0.1
(o) Tetrachloroethylene	0.005
(p) Toluene	1
(q) trans-1,2-Dichloroethylene	0.1
(r) Xylenes (total)	10
(s) Dichloromethane	0.005
(t) 1,2,4-Trichlorobenzene	0.07
(u) 1,1,2-Trichloroethane	0.005

## O. VOC Monitoring, Sampling and Analytical Requirements.

(1) This section shall apply to community and non-transient non-community water systems.

(2) Beginning with the initial compliance period analysis of the contaminants listed in Section N(2) above, for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:

(a) Groundwater systems shall take a minimum of one (1) 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.

(b) Surface water systems (or combined surface/ground) shall take a minimum of one (1) 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.

(c) If the system draws water from more than one (1) 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).

(d) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in Section N(2)(b) through (u) above, during each compliance period beginning in the initial compliance period.

(e) If the initial monitoring for contaminants listed in Section N(2)(a) through (h) and the monitoring for the contaminants listed in Section N(2)(i) through (u) as allowed in paragraph (2)(r) of this section, has been completed by December 31, 1992, and the system did not detect any contaminant listed in Section N(2) above, then each ground and surface water system shall take one (1) sample annually beginning with the initial compliance period.

(f) After a minimum of three (3) years of annual sampling, the Department may allow groundwater systems with no previous detection of any contaminant listed in Section N(2) above, to take one (1) sample during each compliance period.

(g) Each community and non-transient non-community ground water system which does not detect a contaminant listed in Section N(2) above, may apply to the Department for a waiver from the requirement of paragraphs (4)(e) and (4)(f) of this section after completing the initial monitoring. (For the purposes of this section, detection is defined as 0.0005 mg/L.) A waiver shall be effective for no more than six (6) years (two compliance periods). The Department may also issue waivers to small systems for the initial round of monitoring for 1,2,4-trichlorobenzene.

(h) The Department 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 Department 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.

(i) As a condition of the waiver a groundwater system must take one (1) 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 (2)(h) of this section. Based on this vulnerability assessment the Department must reconfirm that the system is non-vulnerable. If the Department does not make this reconfirmation within three (3) years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in paragraph (e) of this section.

(j) Each community and non-transient non-community surface water system which does not detect a contaminant listed in Section N(2) above may apply to the Department for a waiver from the requirements of paragraph (4)(e) 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 criteria must be determined by the Department to be non-vulnerable based upon a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the Department (if any).

(k) If a contaminant listed in Section N (2)(b) through (u) above, is detected at a level exceeding 0.0005 mg/L in any sample, then:

(l) Systems which violate the requirements of Section N(2) above, as determined by paragraph (2)(o) of this section must monitor quarterly. After a minimum of four (4) consecutive quarterly samples which shows the system is in compliance as specified in paragraph (2)(o) of this section, the system and the Department determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in paragraph (4)(k)(iii) of this section.

(m) The Department may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Department, the result must be averaged with the first sampling result and the average is used for the compliance determination as specified by paragraph (2)(o) of this section. The Department has the discretion to delete results of obvious sampling errors from this calculation.

(n) The Department 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 fourteen (14) days of sample collection.

(i) If the concentration in the composite sample is 0.0005 mg/L for any contaminant listed in Section N(2) above, then a follow-up sample must be taken within fourteen (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 are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the Department within fourteen (14) days of collection.

(iii) If the population served by the system is greater than 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 Department 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.

(o) Compliance with Section N(2) above, 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.

(p) Analysis for the contaminants listed in Section N(2) above, shall be conducted using EPA-approved methods listed in 40 CFR 141.

(q) Analysis under this section shall only be conducted by laboratories that are certified by the Department.

(r) The Department may allow the use of monitoring data collected after January 1, 1988, for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements in this section, the Department may use those data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of paragraph (2)(d) of this section. Systems which use

grandfathered samples and did not detect any contaminant listed in Section N(2)(b) through (u) above shall begin monitoring annually in accordance with paragraph (2)(e) of this section beginning with the initial compliance period.

(s) The Department may increase required monitoring where necessary to detect variations within the system.

(t) Each public water system shall monitor at the time designated by the Department within each compliance period.

(u) 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 Department. The system must also comply with the initial sampling frequencies specified by the Department 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.

(3) If a community or a non-transient non-community water system fails to comply with an applicable VOC MCL, that system shall give notice to the customers served by the system in accordance with the requirements of R.61-58.6.E.

**P. Maximum Contaminant Levels for Disinfection Byproducts.**

(1) Bromate and Chlorite

The maximum contaminant levels (MCLs) for bromate and chlorite are as follows:

Disinfection Byproduct	MCL (mg/L)
Bromate	0.010
Chlorite	1.0

(a) Compliance Dates. Community water systems and non-transient non- community water systems that use a surface water source or a ground water source under the influence of surface water serving 10,000 or more persons must comply with this section beginning January 1, 2002. Community water systems and non-community non-transient water systems that use a surface water source or a ground water source under the influence of surface water serving fewer than 10,000 persons and community water systems and non-community non-transient water systems using only ground water not under the direct influence of surface water must comply with this section beginning January 1, 2004.

(b) Best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for bromate and chlorite identified in this section are specified in 40 CFR 141.64 (a)(2) (1-04-06 edition).

(2) TTHM and HAA5.

(a) Stage 1 DBP Rule Running Annual Average (RAA) compliance.

The maximum contaminant levels (MCLs) for TTHM and HAA5 are as follows:

---

---

Disinfection Byproduct	MCL (mg/L)
Total Trihalomethanes (TTHM)	0.080
Haloacetic Acids (five) (HAA5)	0.060

(i) Compliance dates. Subpart H systems serving 10,000 or more persons must comply with this paragraph (2)(a) beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and systems using only ground water not under the direct influence of surface water must comply with this paragraph (2)(a) beginning January 1, 2004. All systems must comply with these MCLs until the date specified for Stage 2 DBP Rule compliance in R.61-58.15.B(2).

(ii) Best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in this section are specified in 40 CFR 141.64 (b)(1)(ii) (1-04-06 edition).

(b) Stage 2 DBP Rule Locational Running Annual Average (LRAA) compliance.

The maximum contaminant levels (MCLs) for TTHM and HAA5 are as follows:

Disinfection Byproduct	MCL (mg/L)
Total Trihalomethanes (TTHM)	0.080
Haloacetic Acids (five) (HAA5)	0.060

(i) Compliance dates. The MCLs for TTHM and HAA5 must be complied with as a locational running annual average at each monitoring location beginning the date specified in R.61-58.15.B(2).

(ii) Best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for TTHM and HAA5 identified in this section are specified in 40 CFR 141.64 (b)(2)(ii), and 40 CFR 141.64 (b)(2)(iii) (1-04-06 edition).

**Q. Maximum Residual Disinfectant Levels (MRDLs) for Disinfectants.**

(1) Maximum residual disinfectant levels (MRDLs) are as follows:

Disinfectant Residual	MRDL (mg/L)
Chlorine	4.0 (as Cl <sub>2</sub> )
Chloramines	4.0 (as Cl <sub>2</sub> )
Chlorine dioxide	0.8 (as ClO <sub>2</sub> )

(2) Compliance dates.

(a) Community water systems and non-transient non-community water systems that use a surface water source or a ground water source under the influence of surface water serving 10,000 or more persons must comply with this section beginning January 1, 2002. Community water systems and non-community non-transient water systems that use a surface water source or a ground water source under the influence of surface water serving fewer than 10,000 persons and community water systems and non-community non-

transient water systems using only ground water not under the direct influence of surface water must comply with this section beginning January 1, 2004.

(b) Transient non-community water systems that use a surface water source or a ground water source under the influence of surface water 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. Transient non-community water systems that use a surface water source or a ground water source under the influence of surface water systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and transient non-community water systems 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.

## **R. Secondary Maximum Contaminant Levels.**

- (1) The secondary maximum contaminant levels are applicable to all public water systems.
- (2) The secondary maximum contaminant levels are as follows:

<u>Contaminant</u>	<u>Level</u>
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 color units
Copper	1 mg/L
Corrosivity	Noncorrosive
Fluoride	2.0 mg/L
Foaming agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5 to 8.5 s.u.
Silver	0.1 mg/L
Sulfate	250 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Zinc	5 mg/L

(3) The Department may establish higher or lower levels which may be appropriate depending upon local conditions provided the supplier of water is able to demonstrate that use of the water will not adversely affect the public health and welfare. In evaluating the affect to the public health and welfare, the supplier of water may evaluate the unavailability of alternate water sources; the economic evaluation of necessary treatment or other compelling factors that may prevent compliance.

(4) Community water systems that exceed the secondary MCL for fluoride, as determined by the last single sample taken in accordance with the requirements of these regulations, shall send the notice described in paragraph (5) of this section, to: (1) all existing billing units, (2) all new billing units at the time service begins, and (3) the Department.

(5) The public notice that shall be used by systems which exceed the secondary MCL for fluoride shall contain the specific language outlined in R.61-58.6.E(8), and no additional language except as necessary to complete the notice.

**S. Secondary Maximum Contaminant Levels Sampling and Analytical Requirements.**

(1) This section shall apply only to community and non-community water systems which serve at least fifteen service connections or regularly serve an average of at least twenty-five individuals daily at least sixty (60) days out of the year.

(2) At the discretion of the Department any community or non-community water system may be required to monitor, in whole or in part, for secondary maximum contaminant levels listed in Section R(2) or for any other secondary standard designated by the Department.

(3) For the initial analyses required by paragraph (2) of this section, data for surface waters acquired within one (1) year prior to the effective date and data for groundwaters acquired within three (3) years prior to the effective date of this regulation may be substituted at the discretion of the Department. Analyses conducted to determine compliance with Section R above shall be made using EPA-approved methods listed in 40 CFR 141.

**T. Special Monitoring for Inorganic and Organic Contaminants.**

(1) All community and non-transient non-community water supply systems shall conduct special monitoring for the following contaminants. Systems serving 10,000 or fewer persons are not required to monitor for the contaminants in the section after December 31, 1998.

Chloroform	1,3-Dichloropropane
Bromodichloromethane	Chloromethane
Chlorodibromomethane	Bromomethane
Bromoform	1,2,3-
Trichloropropane	
Chlorobenzene	1,1,1,2-Tetrachloroethane
m-Dichlorobenzene	Chloroethane
2,2-Dichloropropane	1,1-Dichloropropene
o-Chlorotoluene	1,1-Dichloroethane
Bromobenzene	1,1,2,2-Tetrachloroethane
1,3-Dichloropropene	p-Chlorotoluene

(2) Monitoring for the organic compounds listed in paragraph (1) of this section, shall begin no later than the date specified below:

<u>Population Served</u>	<u>Initial Monitoring Date</u>
>10,000	No later than January 1, 1988
3,300 - 10,000	No later than January 1, 1989
<3,300	No later than January 1, 1991

(3) Surface water systems shall sample at points in the distribution system representative of each water source or at entry points to the distribution system after any application of treatment. The minimum number of samples is one year of quarterly samples per water source.

(4) Ground water systems shall sample at points of entry to the distribution system representative of each well after any application of treatment. The minimum number of samples is one (1) sample per entry point to the distribution system.

(5) The Department may require confirmation samples for positive or negative results.

(6) (Reserved)

(7) Analysis under this section shall be conducted using EPA-approved methods listed in 40 CFR 141.

(8) Analysis under this section shall only be performed by laboratories which are certified by the Department.

(9) Public water systems may use monitoring data collected any time after January 1, 1983, to meet the requirements of paragraph (1) of this section, provided that the monitoring program was consistent with the requirements of this section. In addition, the results of EPA's Ground Water Supply Survey may be used in a similar manner for systems supplied by a single well.

(10) At the Department's discretion, community water systems and non-transient non-community water systems may be required to conduct special monitoring for the following contaminants:

1,2,4-Trimethylbenzene	p-Isopropyltoluene
1,2,4-Trichlorobenzene	Isopropylbenzene
1,2,3-Trichlorobenzene	Tert-butylbenzene
n-Propylbenzene	Sec-butylbenzene
n-Butylbenzene	Fluorotrichloromethane
Naphthalene	Dichlorodifluoromethane
Hexachlorobutadiene	Bromochloromethane
1,3,5-Trimethylbenzene	

(11) All community and non-transient non-community water systems shall repeat the monitoring required by this Section no less frequently than every five (5) years from the dates specified in paragraph (2) of this section.

(12) The Department or public water systems may composite up to five samples when monitoring for the organic contaminants in paragraphs (1) and (10) of this section.

(13) Monitoring of the contaminants listed in paragraphs (13)(k) and (l) of this section, shall be conducted as follows:

(a) Each community and non-transient, non-community water system shall take four consecutive quarterly samples at each sampling point for each contaminant listed in paragraph (13)(k) of this section and report the results to the Department. Monitoring must be completed by December 31, 1995.

(b) Each community and non-transient non-community water system shall take one sample at each sampling point for each contaminant listed in paragraph (13)(l) of this section and report the results to the Department. Monitoring must be completed by December 31, 1995.

(c) Each community and non-transient non-community water system may apply to the Department for a waiver from the requirements of paragraph (13)(a) and (b) of this section.

(d) The Department may grant a waiver for the requirement of paragraph (13)(a) of this section based on the criteria specified in Section E(7)(f) above. The Department may grant a waiver from the requirement

of paragraph (13)(b) of this section if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

(e) Groundwater systems shall take a minimum of one (1) 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.

(f) Surface water systems shall take a minimum of one (1) 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.]

(g) If the system draws water from more than one (1) 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).

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

(i) The Department may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five (5) sampling points are allowed. Compositing of samples must be done in the laboratory and the composite sample must be analyzed within fourteen (14) days of collection. If the population served by the system is greater than 3,300 persons, then compositing may only be permitted by the Department at sampling points within a single system. In systems serving 3,300 persons or less, the Department may permit compositing among different systems provided the 5-sample limit is maintained.

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

(k) List of Unregulated Organic Contaminants:

<u>Organic Contaminants</u>	<u>EPA Analytical Method</u>
Aldicarb	531.1
Aldicarb sulfone	531.1
Aldicarb sulfoxide	531.1
Aldrin	505, 508, 525.1
Butachlor	507, 525.1
Carbaryl	531.1
Dicamba	515.1
Dieldrin	505, 508, 525.1
3-Hydroxycarbofuran	531.1
Methomyl	531.1
Metolachlor	507, 525.1
Metribuzin	507, 525.1
Propachlor	508, 525.1

(l) List of Unregulated Inorganic Contaminants:

<u>Inorganic Contaminant</u>	<u>EPA Analytical Method</u>
Sulfate	Colorimetric

(14) The owner or operator of a community or non-transient non-community water system that is required to monitor in accordance with this section shall send a copy of the results of such monitoring within thirty (30) days of receipt, and a copy of any public notice under paragraph (15) of this section, to the Department.

(15) The owner or operator shall notify the persons served by the system of the availability of the results of sampling conducted in accordance with this section by including a notice in the first set of water bills issued by the system after the receipt of the results or written notice within three (3) months. The notice shall identify a person and supply the telephone number to contact for information on the monitoring results. For surface water systems, public notification is required only after the first quarter's monitoring and must include a statement that additional monitoring will be conducted for three (3) more quarters with the results available upon request.

**U. Special Monitoring for Sodium.**

(1) Suppliers of water for community public water systems shall collect and analyze one (1) 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 (3) 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 the Department's approval, be considered one (1) 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.

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

(3) The supplier of water shall notify the appropriate local public health officials of the sodium levels in the water by written notice by direct mail within three (3) months after receiving the results of analyses. Within ten (10) days after notifying the local public health officials, the supplier of water shall forward a copy of such written notice to the Department. The supplier of water is not required to notify local public health officials where the Department provides such notices.

(4) Analysis for sodium shall be conducted using EPA-approved methods listed in 40 CFR 141.

**V. Special Monitoring for Corrosivity Characteristics.**

(1)-(3) [Reserved]

(4) The supplier of water for applicable community water systems shall identify and report to the Department whether the following construction materials are present in their distribution system:

- (a) Lead from piping, solder, caulking, interior lining of distribution mains, alloys and home plumbing.
- (b) Copper from piping and alloys, service lines and home plumbing.
- (c) Galvanized piping, service lines and home plumbing.
- (d) Ferrous piping materials such as cast iron and steel.
- (e) Vinyl lined asbestos cement pipe.
- (f) Coal tar lined pipes and tanks.
- (g) Asbestos cement pipe.

#### **W. Special Monitoring and Notification Requirements.**

The Department shall perform such monitoring as is necessary to insure the quality and integrity of results of tests, measurements, or analyses reported by the supplier of water. Should such monitoring by the Department indicate a violation of the maximum contaminant levels, or the presence of any contaminant at levels considered to be a real or potential threat to the public's health, the Department at its discretion may notify the public or require the supplier of water to notify the public pursuant to R.61- 58.6.E, or other method deemed appropriate by the Department and initiate the necessary action to eliminate the violation or contaminant.

#### **X. Monitoring of Consecutive Public Water Systems.**

When a public water system supplies water to one or more other public water systems, the Department may modify the monitoring requirements imposed by this regulation 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.

#### **Y. Criteria and Procedures for Public Water Systems using Point-of-Entry Devices.**

(1) Public water systems may use point-of-entry devices to comply with maximum contaminant levels only if they meet the requirements of this section.

(2) It is the responsibility of the public water system to operate and maintain the point-of- entry treatment system.

(3) The public water system must develop and obtain Department approval for a monitoring plan before point-of-entry devices are installed for compliance. Under the plan approved by the Department, point-of-entry devices must provide health protection equivalent to central water treatment. "Equivalent" means that the water would meet all State primary drinking water regulations and would be of acceptable quality similar to water distributed by a well-operated central treatment plant. In addition to the VOCs, monitoring must include physical measurements and observations such as total flow treated and mechanical condition of the treatment equipment.

(4) The public water system must properly apply effective technology under a plan approved by the Department and must maintain the microbiological safety of the water.

(a) The public water system must provide adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-entry devices.

(b) The design and application of the point-of-entry devices must consider the tendency for an increase in heterotrophic bacteria concentrations in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contactor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.

(5) The public water system must protect all consumers. Every building connected to the system must have a point-of-entry device installed, maintained, and adequately monitored. The public water system must assure that every building is subject to treatment and monitoring, and that the rights and responsibilities of the public water system customer convey with title upon sale of property.

#### **Z. Use of Other Non-Centralized Treatment Devices.**

Public water systems shall not use bottled water or point-of-use devices to achieve compliance with an established maximum contaminant level. Bottled water or point-of-use devices may be used on a temporary basis to avoid an unreasonable risk to health.

#### **AA. Treatment Techniques.**

(1) This section establishes criteria and requirements for treatment techniques in lieu of maximum contaminant levels for specified contaminants. This section applies to all public water systems.

(2) Treatment techniques for acrylamide and epichlorohydrin. Each public water system must certify annually in writing to the Department (using third party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

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 Department.

#### **BB. Approved Laboratories.**

For the purpose of determining compliance with R.61-58.5.B through R.61-58.5.V, R.61-58.5.CC, R.61-58.10.F, R.61-58.11.D, and R.61-58.16.E, samples may be considered only if they have been analyzed by a laboratory approved by the Department, except that measurements for turbidity may be performed by a properly certified water treatment plant operator.

#### **CC. Alternative Analytical Techniques.**

With express written permission of the Department, concurred in by the Administrator, an alternative analytical technique may be employed. An alternative 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 alternative analytical technique shall not decrease the frequency of monitoring required by this regulation.