COMMONWEALTH OF PUERTO RICO
DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH DIVISION

5108

AMENDMENTS ADOPTED TO REGULATION OF THE SECRETARY OF HEALTH NUMBER 50 "Phase II, IIB and V"

5108

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Núm. 5108
Fecha August 3/1994 10:32 A.M.
Aprobado: Baltasar Corrada del Río
Secretario de Estado
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Secretaria Auxiliar de Estado

COMMONWEALTH OF PUERTO RICO
DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH DIVISION
SAN JUAN, PUERTO RICO

REGULATION NO. 82

AMENDMENTS ADOPTED TO REGULATION OF THE SECRETARY OF HEALTH NUMBER 50 APPROVED ON JUNE 20, 1983 AND FILED WITHIN THE DEPARTMENT OF STATE ON JUNE 21, 1983 FILE NO. 3,000

INTRODUCTION

This document contains the amendments adopted to Regulation of the Secretary of Health Number 50, June 20, 1983, related to the 1986 amendments to the "Safe Drinking Water Act of 1974", Public Law 93-523 as amended on December 16, 1974, Amendments of 1986, Public Law 99-939, 100 Stat. 642.

Said amendments include:

* National Primary Drinking Water Standards for Synthetic Organic Chemicals (SOCs) and Inorganic Chemicals (IOCs).
* Maximum Contaminant Level Goals (MCLGs).
* Requirements for monitoring reporting and public notification.
* Best Available Technologies (BATs) for compliance with the MCL.
* Analytical methods and laboratory performance requirements.
* Secondary Standards.
* Mandatory health effects Language.
* State reporting, record keeping and primary requirements.

Article II **DEFINITIONS**

1. **Compliance Cycle** - means the nine-year calendar year cycle during which public water systems must monitor. Each compliance cycle consists of three three-years compliance periods. The first calendar year cycle begins January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.
2. **Compliance Period** - means a three-year calendar year period within a compliance cycle. Each compliance cycle has three three-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.
3. **Initial Compliance Period** - Initial compliance period means the first full three-year compliance period which begins at least 18 months after promulgation, except for contaminants listed at Article VI 4)(d) 1. (xix) - (xxi), 3. (xix) - (xxxiii), and Article VI 3)(b) 11.-15., initial compliance period means the first full three-year compliance period after promulgation for systems with 150 or more service connections (January 1993-December 1995), and first full three-year compliance period after the effective date of the regulation (January 1996-December 1998) for systems having fewer than 150 service connections.
4. **Repeat Compliance Period** - means any subsequent compliance period after the initial compliance period.

Article VI 3) **MAXIMUM CONTAMINANT LEVELS (MCLs) FOR INORGANIC CHEMICALS**

Paragraph (b) is amended and revised to read as follows:

(b) **MCLs for IOCs**: The maximum contaminant levels for cadmium, chromium, mercury, nitrate and selenium shall remain effective until July 30, 1992; the maximum contaminant level for lead shall remain effective until December 7, 1992; the maximum contaminant level for barium shall remain effective until January 1, 1993. The maximum contaminant levels for inorganic contaminants specified in paragraphs (b) 2. through 6., (b) 10. and (b) 11. through 16. of this section apply to community water systems and non-transient, non-community water systems. The Maximum Contaminant Level specified in paragraph (b) 1. of this section only applies to community water systems. The Maximum Contaminant Levels specified in paragraphs (b) 7., (b) 8., and (b) 9. of this section apply to community water systems; non-transient, non-community water systems; and transient non-community water systems.

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

(c) **BATs for IOCs**: The Administrator, pursuant to Section 1412 of the Act, hereby identifies the following as the best technology, treatment

technique, or other means available for achieving compliance with the maximum contaminant levels for inorganic contaminants identified in paragraph (b) of this section, except fluoride:

BAT FOR INORGANIC CONTAMINANTS LISTED IN Article VI 3)(b)

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

* BAT only if influent Hg concentrations ≤10 µg/l.
** BAT for Chromium III only
***BAT for Selenium IV only

Key to BATs in Table

1 = Activated Alumina
2 = Coagulation/Filtration
3 = Direct and Diatomite Filtration
4 = Granular Activated Carbon
5 = Ion Exchange
6 = Lime Softening
7 = Reverse Osmosis
8 = Corrosion Control
9 = Electrodialysis
10 = Chlorine
11 = Ultraviolet

Article VI 4) is revised to red as follows:

Article VI 4) **MCLs for ORGANIC CHEMICALS**

The following are the maximum contaminant levels for organic chemicals. The maximum contaminant levels for organic chemicals in paragraph (a) of this section apply to all community water systems. Compliance with the maximum contaminant level in paragraph (a) of this section is calculated pursuant to Article VI 10). The maximum contaminant level for total trihalomethanes in paragraph (c) of this section applies only to community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process. Compliance with the maximum contaminant level for total trihalomethanes is calculated pursuant to Article VI 16).

Contaminant	Level (mg/l)
(a) Chlorinated Hydrocarbons: Endrin(1,2,3,4,10, 10-hexachloro-6,7-epoxy-1,4, 4a,5,6,7,8,81-octahydro-1,4-endo, endo-5,8-dimethano naphthalene)	0.0002
(b) [Reserved]	
(c) Total trihalomethanes (the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform))	0.10

(d) **MAXIMUM CONTAMINANT LEVELS (MCLs) FOR ORGANIC COMPOUNDS**

1. **Volatile Organic MCLs:** The following maximum contaminant level for organic contaminants apply to community and non-transient non-community water systems. The effective date for paragraphs 1. (i) through 1.(viii) is January 9, 1989. The effective date for 1. (ix) through 1.(xviii) is July 30, 1992. The effective date for paragraph 1. (xix) through 1. (xxi) and 3. (xix) through 3. (xxxiii) is January 17, 1994.

	Contaminant	MCL (mg/l)
(i)	Vinyl chloride	0.002
(ii)	Benzene	0.005
(iii)	Carbon tetrachloride	0.005
(iv)	1,2-Dichloroethane	0.005
(v)	Trichloroethylene	0.005
(vi)	para-Dichlorobenzene	0.075
(vii)	1,1-Dichloroethylene	0.007
(viii)	1,1,1-Trichloroethane	0.2
(ix)	cis-1,2-Dichloroethylene	0.07
(x)	1,2-Dichloropropane	0.005
(xi)	Ethylbenzene	0.7
(xii)	Monochlorobenzene	0.1
(xiii)	o-Dichlorobenzene	0.6
(xiv)	Styrene	0.1
(xv)	Tetrachloroethylene	0.005
(xvi)	Toluene	1

Contaminant		MCL (mg/l)
(xvii)	trans-1,2-Dichloroethylene	0.1
(xviii)	Xylenes (total)	10
(xix)	Dichloromethane	0.005
(xx)	1,2,4-Trichlorobenzene	0.07
(xxi)	1,1,2-Trichloroethane	0.005

2. **Organic BATs**: The Administrator, pursuant to Section 1412 of the Act, hereby identifies as indicated in the Table below either granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology treatment technique, or other means available for achieving compliance with the maximum contaminant level for synthetic organic contaminants identified in paragraphs 1. and 3. of this section:

BAT FOR ORGANIC CONTAMINANTS LISTED IN SECTION Article VI 4) (d) 1. and 3.

Chemical	**GAC**	**PTA**	**OX**
Alachlor	X		
Aldicarb	X		
Aldicarb sulfone	X		
Aldicarb sulfoxide	X		
Atrazine	X		
Benzene	X	X	
Carbofuran	X		
Carbon tetrachloride	X	X	
Chlordane	X		
2,4-D	X		
Dibromochloropropane (DBCP)	X	X	
o-Dichlorobenzene	X	X	
1,2-Dichloroethane	X	X	
cis-1,2-Dichloroethylene	X	X	
trans-1,2-Dichloroethylene	X	X	
1,1-Dichloroethylene	X	X	
1,2-Dichloropropane	X	X	
Ethylene Dibromide (EDB)	X	X	
Ethylbenzene	X	X	
Heptachlor	X		
Heptachlor epoxide	X		
Lindane	X		
Methoxychlor	X		
Monochlorobenzene	X	X	
para-Dichlorobenzene	X	X	
Polychlorinated biphenyls(PCB)	X		
Pentachlorophenol	X		
Styrene	X	X	
2,4,5-TP (Silvex)	X		
Tetrachloroethylene	X	X	
1,1,1-Trichloroethane	X	X	
Trichloroethylene	X	X	
Toluene	X		

Chemical	GAC	PTA	OX
Toxaphene	X	X	
Vinyl chloride		X	
Xylene	X	X	
Benzo(a)pyrene	X		
Dalapon	X		
Dichloromethane		X	
Di (2-ethylhexyl) adipate	X	X	
Di (2-ethylhexyl) phthalate	X		
Dinoseb	X		
Diquat	X		
Endothall	X		
Endrin	X		
Glyphosate			X
Hexachlorobenzene	X		
Hexachlorocyclopentadiene	X	X	
Oxamyl (Vydate)	X		
Picloram	X		
Simazine	X		
1,2,4-Trichlorobenzene	X	X	
1,1,2-Trichloroethane	X	X	
2,3,7,8 TCDD (Dioxin)	X		

3. **Synthetic Organic MCLs:** The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient, non-community water systems:

Contaminant		MCL (mg/l)
(i)	Alachlor	0.002
(ii)	Aldicarb	0.003
(iii)	Aldicarb sulfoxide	0.004
(iv)	Aldicarb sulfone	0.002
(v)	Atrazine	0.003
(vi)	Carbofuran	0.04
(vii)	Chlordane	0.002
(viii)	Dibromochloropropane	0.0002
(ix)	2,4-D	0.07
(x)	Ethylene dibromide	0.00005
(xi)	Heptachlor	0.0004
(xii)	Heptachlor epoxide	0.0002
(xiii)	Lindane	0.0002
(xiv)	Methoxychlor	0.04
(xv)	Polychlorinated biphenyls	0.0005
(xvi)	Pentachlorophenol	0.001
(xvii)	Toxaphene	0.003
(xviii)	2,4,5-TP	0.05
(xix)	Benzo(a)pyrene	0.0002
(xx)	Dalapon	0.2
(xxi)	Di(2-ethylhexyl) adipate	0.4
(xxii)	Di(2-ethylhexyl) phthalate	0.006
(xxiii)	Dinoseb	0.007
(xxiv)	Diquat	0.02
(xxv)	Endothall	0.1
(xxvi)	Endrin	0.002
(xxvii)	Glyphosate	0.7
(xxviii)	Hexachlorobenzene	0.001
(xxix)	Hexachlorocyclopentadiene	0.05
(xxx)	Oxamyl (Vydate)	0.2

Contaminant	MCL (mg/l)
(xxxi) Picloram	0.5
(xxxii) Simazine	0.004
(xxxiii) 2,3,7,8-TCDD (Dioxin)	3×10^{-8}

The January 1, 1993 effective date for the regulation for the compounds ii, iii and iv is postponed pending EPA's reconsideration of there rules.

Article VI 9) is revised to read as follows:

Article VI 9) **INORGANIC CHEMICALS (IOCs) : SAMPLING & ANALYTICAL REQUIREMENTS**

Community water systems and non-transient, non-community water systems shall conduct monitoring to determine compliance with the maximum contaminant levels specified in Article VI 3)(b) in accordance with this section. Transient, non-community water systems shall conduct monitoring to determine compliance with the nitrate and nitrite maximum contaminant levels in Article VI 3)(b)(as appropriate) in accordance with this section.

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

1. **GW Sampling Points** : 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 compliance period starting January 1, 1993. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

2. **SW Sampling Points** : Surface water systems [Note: For purposes of this paragraph, surface water systems include systems with a

combination of surface and ground sources.] 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 compliance period beginning January 1, 1993. 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.

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

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

   (i) If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the

composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample. Detection limits for each analytical method and MCLs for each inorganic contaminant are the following:

DETECTION LIMITS FOR INORGANIC CONTAMINANTS

Contaminant	MCL (mg/l)	Methodology	Detection limit (mg/l)
Antimony	0.006	Atomic Absorption; Furnace	0.003
			0.0008{6}
		ICP-Mass Spectrometry	0.0004
		Hydride-Atomic Absorption.	0.001
Asbestos	7 MFL{2}	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){1}
Beryllium	0.004	Atomic Absorption; Furnace	0.0002
		xl	0.00002{6}
		Inductively Coupled Plasma {3}	0.0003
		ICP-Mass Spectrometry	0.0003
Cadmium	0.005	Atomic Absorption; furnace technique	0.0001
		Inductively Coupled Plasma	0.001{1}
Chromium	0.1	Atomic Absorption; furnace technique	0.001
		Inductively Coupled Plasma	0.007
			(0.001){1}
Cyanide	0.2	Distillation, Spectrophotometric{4}	0.02
		Distillation, Automated, Spectrophotometric{4}	0.005
		Distillation, Selective Electrode{4}	0.05
		Distillation, Amenable, Spectrophotometric{5}	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
			0.0006{6}
		Inductively Coupled Plasma {3}	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
			0.0007{6}
		ICP-Mass Spectrometry	0.0003

{1}Using concentration technique in Appendix A to EPA Method 200.7.
{2}MFL = million fibers per liter >10 μm.
{3}Using a 2X preconcentration step as noted in Method 200.7. Lower MDLs may be achieved when using a 4X preconcentration.
{4}Screening method for total cyanides.
{5}Measures "free" cyanides.
{6}Lower MDLs are reported using stabilized temperature graphite furnace atomic absorption.

(ii) If the population served by the system is >3,300 persons, then compositing may only be permitted by the Secretary at sampling points within a single system. In systems serving ≤3,300 persons, the Secretary 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 Secretary within 14 days of collection.

5. **Location of IOC Monitoring Requirements :** The frequency of monitoring for asbestos shall be in accordance with paragraph (b) of this section; the frequency of monitoring for barium, cadmium, chromium, fluoride, mercury, and selenium shall be in accordance with paragraph (c) of this section; the frequency of monitoring for nitrate shall be in accordance with paragraph (d) of this section; and the frequency of monitoring for nitrite shall be in accordance with paragraph (e) of this section.

(b) **ASBESTOS SAMPLING FREQUENCY :** The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos specified in Article VI 3)(b) shall be conducted as follows:

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

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

3. **Bases of an Asbestos Waiver** : The Secretary may grant a waiver based on a consideration of the following factors:

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

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

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

5. **Distribution System Vulnerability for Asbestos** : A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and

under conditions where asbestos contamination is most likely to occur.

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

7. **Combined Asbestos Vulnerability** : A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

8. **Exceedance of the Asbestos MCL** : A system which exceeds the maximum contaminant levels as determined in Article VI 9)(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

9. **Asbestos Reliably & Consistently Below the MCL** : The Secretary may decrease the quarterly monitoring requirement to the frequency specified in paragraph (b) 1. of this section provided the Secretary has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Secretary make this determination unless a groundwater system takes a minimum of two (2) quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four (4) quarterly samples.

10. **Granfathered Asbestos Data** : If monitoring data collected after January 1, 1990 are

generally consistent with the requirements of Article VI 9)(b), then the Secretary may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(c) **SAMPLING FREQUENCY FOR IOCs :** The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in Article VI 3)(b) for antimony, arsenic, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be as follows:

1. **IOCs Sampling Frequency :** Groundwater systems shall take one sample at each sampling point once every three years. Surface water systems (or combined surface/ground) shall take one sample annually at each sampling point.

2. **IOCs Sampling Waiver :** The system may apply to the Secretary for a waiver from the monitoring frequencies specified in paragraph (c) 1. of this section.

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

4. **Bases of an IOC Waiver & Grandfathered Data :** The Secretary may grant a waiver provided surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990.) Both surface and groundwater systems shall

demonstrate that all previous analytical results were less than the maximum contaminant level. Systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

5. **Bases of the IOC Sampling Frequency During a Waiver** : In determining the appropriate reduced monitoring frequency, the Secretary shall consider:

   (i) Reported concentrations from all previous monitoring;

   (ii) The degree of variation in reported concentrations; and

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

6. **Effect of an IOC Waiver** : A decision by the Secretary 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 Secretary or upon an application by the public water system. The public water system shall specify the basis for its request. The Secretary shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant

to the system's appropriate monitoring frequency become available.

7. **Exceedance of an IOC MCL :** Systems which exceed the maximum contaminant levels as calculated in Article VI 9)(i) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

8. **IOCs Reliably & Consistently Below the MCL :** The Secretary may decrease the quarterly monitoring requirement to the frequencies specified in paragraphs (c) 1. and (c) 2. of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Secretary 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.

(d) **SAMPLING FREQUENCY FOR NITRATE :** All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in Article VI 3)(b).

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

2. **GW Repeat Nitrate Sampling Frequency :** 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 of the MCL. The Secretary may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.

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

4. **TWS Nitrate Sampling Frequency** : Each transient non-community water system shall monitor annually beginning January 1, 1993.

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

(e) **SAMPLING FREQUENCY FOR NITRITE** : 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 Article VI 3)(b).

1. **Initial Nitrite Sampling** : All public water systems shall take one sample at each sampling point in the compliance period

beginning January 1, 1993 and ending December 31, 1995.

2. **Under the Nitrite Trigger Level** : After the initial sample, systems where an analytical result for nitrite is <50 percent of the MCL shall monitor at the frequency specified by the Secretary.

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

4. **Scheduling of Annual Nitrite Repeat Samples** : Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

(f) **CONFIRMATION SAMPLING:**

1. **Deadline for IOCs Confirmation Samples** : Where the results of sampling for asbestos, barium, cadmium, chromium, fluoride, mercury, or selenium indicate an exceedance of the maximum contaminant level, the Secretary may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

2. **Deadline for Nitrate & Nitrite Confirmation Samples** : Where nitrate or nitrite sampling

results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample. Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers served by the area served by the public water system in accordance with Article IX - B. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

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

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

(h) **PWS Request for Increased Sampling Frequency** : Systems may apply to the Secretary to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

(i) **COMPLIANCE CALCULATIONS:** Compliance with Article VI 3) (as appropriate) shall be determined based

on the analytical result(s) obtained at each sampling point.

1. **Sampling Frequencies Greater Than Annual :** 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 and 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.

2. **Sampling Frequencies of Annual or Less :** For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for asbestos, barium, cadmium, chromium, fluoride, mercury and selenium if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Secretary, the determination of compliance will be based on the average of the two samples.

3. **Compliance Calculations for Nitrate & Nitrite:** 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 (f) 2. of this section, and compliance shall be determined based on the average of the initial and confirmation samples.

4. **Separable Distribution Systems** : If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Secretary may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

(j) **Secretary Designated Sampling Schedules** : Each public water system shall monitor at the time designated by the Secretary during each compliance period.

(k) **INORGANIC ANALYSIS**

1. **Analytical Methods for IOCs :** Analysis for asbestos, barium, cadmium, chromium, mercury, nitrate, nitrite, and selenium shall be conducted using the following methods:

INORGANIC CONTAMINANTS ANALYTICAL METHODS

Contaminant	Methodology[11]	Reference (Method Number) EPA[1]	ASTM[2]	SM[3]	Other
Asbestos	Transmission Electron Microscopy	EPA[9]	--	--	--
Barium	Atomic absorption; furnace technique	208.2	--	304	--
	Atomic absorption; direct aspiration	208.1	--	303C	--
	Inductively-coupled plasma	200.71,[1,4]	--	--	--
Cadmium	Atomic absorption; furnace technique	213.2	--	304	--
	Inductively-coupled plasma	200.7A[5]	--	--	--
Chromium	Atomic absorption; furnace technique	218.2	--	304[7]	--
	Inductively-coupled plasma	200.7[1,6]	--	--	--
Mercury	Manual cold vapor technique	245.1	D3223-86	303F	--
	Automated cold vapor technique	245.2	--	--	--
Nitrate	Manual cadmium reduction	353.3	D3867-90	418C	--
	Automated hydrazine reduction	353.1	--	--	--
	Automated cadmium reduction	353.2	D3867-90	418F	--
	Ion selective electrode	--	--	--	WeWWG/5880[8]
	Ion chromatography	300.0	--	--	B-1011[10]
Nitrite	Spectrophotometric	354.1	--	--	--
	Automated cadmium reduction	353.2	D3867-90	418F	--
	Manual cadmium reduction	353.3	D3867-90	418C	--
	Ion chromatography	300.0	--	--	B-1011[10]
Selenium	Atomic absorption; gaseous hydride	--	--	--	--
	Atomic absorption; furnace technique	270.2	D3859-88	304[8]	--

1 - Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268 (EPA-600/4-79-020), March 1983. Available from ORD Publications, CERI, EPA, Cincinnati, OH 45268.
2 - Annual Book of ASTM Standards, Vol. 11.01 American Society for testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
3 - "Standard Methods for the Examination of Water and Wastewater," 16th edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.
4 - "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the U.S. Geological Survey Books, Chapter A1, 1989, Open-File Report 85-495. Available from Open-File Services Section, Western Distribution Branch, U.S. Geological Survey, MS 306 Box 24525, Denver Federal Center, Denver, CO 80225.
5 - "Orion Guide to Water and Wastewater Analysis." Form WeWWG/5880, pp. 5, 1985. Orion Research, Inc., Cambridge, MA.
6 - 200.7A "Inductively-Coupled Plasma Atomic Emission Analysis of Drinking Water," Appendix to Method 200.7, March, 1987, U.S. EPA, Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268.
7 - The addition of 1 mL of 30% H_2O_2 to each 100 mL of standards and samples is required before analysis.
8 - Prior to dilution of the Se calibration standard, add 2 mL of 30% H_2O_2 for each 100 mL of standard.
9 - "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.
10 - "Waters Test Method for the Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography, Method B-1011, Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.
11 - For approved analytical procedures for metals, the technique applicable to total metals must be used.

2. **Analytical Methods for Arsenic** : Analyses for arsenic shall be conducted using the following methods: Method 206.2[1], Atomic Absorption Furnace Technique; or Method 206.3[1], or Method D2972-88B[4], or Method 307A[2], or Method I-1062-85[3], Atomic Absorption--Gaseous Hydride; or Method 206.4[1], or Method D-2972-88A[4], or Method 307B[2], Spectrophotometric, Silver Diethyl-dithiocarbamate; or Method 200.7A, Inductively Coupled Plasma Technique[5].

1 - "Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-600/4-79-020), March 1979. Available from ORD Publications, CERI, EPA, Cincinnati, Ohio 45268. For approved analytical procedures for metals, the technique applicable to total metals must be used.
2 - "Standard Methods for the Examination of Water and Wastewater," 16th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.
3 - Techniques of Water-Resources Investigation of the United States Geological Survey, Chapter A-1, "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Book 5, 1979, Stock #014-001-03177-9. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
4 - Annual Book of ASTM Standards, part 31 Water, American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
5 - Appendix to Method 200.7, March 1987, U.S. EPA, Environmental Monitoring Systems Laboratory, Cincinnati, OH 45268.

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3. **Analytical Methods for Fluoride:** Analyses for fluoride shall be conducted using the following methods:

Methodology	Reference (Method Number)[1] EPA[1]	ASTM[4]	SM[5]	Other
Colorimetric SPADNS, with distillation	340.1	D1179-72A	43 A and C	--
Potentiometric ion selective electrode	340.2	D1179-72B	413 B	--
Automated Alizarin fluoride blue, with distillation (complexone)	340.3		413 E	129-71W[6]
Automated ion selective electrode	--	--	--	380-75WE[7]

1 - "Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-600/4-79-020), March 1983. Available from ORD Publications, CERI, EPA, Cincinnati, Ohio 45268. For approved analytical procedures for metals, the technique applicable to total metals must be used.
2 - [Reserved]
3 - [Reserved]

4 - Annual Book of ASTM Standards, part 31 Water. American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
5 - "Standard Methods for the Examination of Water and Wastewater," 16th Edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1985.
6 - "Fluoride in Water and Wastewater, Industrial Method = 129-71W." Technicon Industrial Systems, Tarrytown, New York, 10591. December 1972.
7 - "Fluoride in Water and Wastewater," Technicon Industrial Systems, Tarrytown, New York, 10591. February 1976.

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4. Analysis for the listed inorganic contaminants shall be conducted using the following methods:

Contaminant	Methodology	EPA{1,5,12}	ASTM{2}	SM{3}	USGS{4}	Other
Antimony	Atomic Absorption; Furnace{6}	{1}204.2		3113		
	Atomic Absorption; Platform{6}	{5}220.9				
	ICP-Mass Spectrometry{6}	{5}200.8				
	Hydride-Atomic Absorption{9}		D-3697-87			
Asbestos	Transmission Electron Microscopy	{12}EPA				
Barium	Atomic Absorption; Furnace{6}	{1}208.2		3113B		
	Atomic Absorption; Direct{6}	{1}208.1		3111D		
	Inductively Coupled Plasma{6}	{5}200.7		3120		
Beryllium	Atomic Absorption; Furnace{6}	{1}210.2	D-3645-84B	3113		
	Atomic Absorption; Platform{6}	{5}200.9				
	Inductively Coupled Plasma{6}	{5}200.7		3120		
	ICP-Mass Spectrometry{6}	{5}200.8				
Cadmium	Atomic Absorption; Furnace{6}	{1}213.2		3113B		
	Inductively Coupled Plasma{6}	{5}200.7				
Chromium	Atomic Absorption; Furnace{6}	{1}218.2		3113B		
	Inductively Coupled Plasma{6}	{5}200.7		3120		
Cyanide	Distillation, Spec.	{1}335.2	D-2036-89A	4500-CN-D		I330085
	Distillation, Automated, Spec.	{1}335.3		4500-CN-E		
	Distillation, Selective Electrode		D-2036-89A	4500-CN-F		
	Distillation, Amenable, Spec.	{1}335.1	D-2036-89B	4500-CN-G		
Mercury	Manual Cold Vapor Technique{9}	{1}245.1	D3223-86	3112B		
	Automated Cold Vapor Technique{9}	{1}245.2				
Nickel	Atomic Absorption; Furnace{6}	{1}249.2		3113		
	Atomic Absorption; Platform{6}	{5}200.9				
	Atomic Absorption; Direct{6}	{1}249.1		3111B		
	Inductively Coupled Plasma{6}	{5}200.7		3120		
	ICP-Mass Spectrometry{6}	{5}200.8				
Nitrate	Manual Cadmium Reduction	{1}353.3	D3867-90	4500-NO3-E		
	Automated Hydrazine Reduction	{1}353.1				
	Automated Cadmium Reduction	{1}353.2	D3867-90	4500-NO3-F		
	Ion Selective Electrode					WeWWG/ 5880{7}
	Ion Chromatography	{11}300.0				B-1011{8}
Nitrite	Spectophometric	{1}354.1				
	Automated Cadmium Reduction	{1}353.2	D3867-90	4500-NO3-F		
	Manual Cadmium Reduction	{1}353.3	D3867-90	4500-NO3-E		
	Ion Chromatography	{11}300.0				B-1011{8}
Selenium	Hydride-Atomic Absorption{9}		D3859-84A	3114B		
	Atomic Absorption; Furnace{6,10}	{1}270.2	D3859-88	3113B		
Thallium	Atomic Absorption; Furnace{6}	{1}279.2		3113		
	Atomic Absorption; Platform{6}	{5}200.9				
	ICP-Mass Spectrometry {6}	{5}200.8				

{1} "Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring Systems Laboratory, Cincinnati, OH 45268 March 1983. EPA-600/4-79-020.
{2} Annual Book of ASTM Standards, Vols. 11.01 and 11.02, 1991, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
{3} "Standard Methods for the Examination of Water and Wastewater," 17th edition, American Public Health Association, American Water Works Association, Water Pollution Control Federation, 1989.
{4} 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.
{5} "Methods for the Determination of Metals in Environmental Samples." Available at NTIS, PB 91-231498.
{6} Samples that contain less than 1 NTU (nephelometric turbidity unit) and are properly preserved (conc HNO3 to pH <2) may be analyzed directly (without digestion) for total metals, otherwise, digestion is required. Turbidity must be measured on the preserved samples just prior to the initiation of metal analysis. When digestion is required, the total recoverable technique as defined in the method must be used.
{7} "Orion Guide to Water and Wastewater Analysis." Form WeWWG/5880, p. 5, 1985. Orion Research, Inc., Cambridge, MA.
{8} "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.
{9} 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.
{10} Add 2 ml of 30% H_2O_2 and an appropriate concentration of matrix modifier $Ni(NO_2)+6H_2O$ (nickel nitrate) to samples.
{11} "Method 300. Determination of Inorganic Anions in Water by Ion Chromatography." Inorganic Chemistry Branch, Environmental Monitoring Systems Laboratory. August 1991.
{12} "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.

5. **Analytical Methods for Other IOCs:** Sample collection for antimony, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, nitrate, nitrite, selenium, and thallium under this section

shall be conducted using the sample preservation, container, and maximum holding time procedures specified in the table below:

Contaminant	Preservative{1}	Container{2}	Time{3}
Antimony	Conc HNO3 to pH <2	P or G	6 months.
Asbestos	Cool, 4°C	P or G	
Barium	Conc HNO3 to pH <2	P or G	6 months.
Beryllium	Conc HNO3 to pH <2	P or G	6 months.
Cadmium	Conc HNO3 to pH <2	P or G	6 months.
Chromium	Conc HNO3 to pH <2	P or G	6 months.
Cyanide	Cool, 4°C, NAOH to pH >12{4}	P or G	14 days.
Fluoride	None	P or G	1 month.
Mercury	Conc HNO3 to pH <2	P or G	28 days.
Nickel	Conc HNO3 to pH <2	P or G	6 months.
Nitrate			
Chlorinated	Cool, 4°C	P or G	28 days.
Non-chlorinated	Conc H2SO4 to pH <2	P or G	14 days.
Nitrite	Cool, 4°C	P or G	48 hours.
Selenium	Conc HNO3 to pH <2	P or G	6 months.
Thallium	Conc HNO3 to pH <2	P or G	6 months.

{1} If HNO3 cannot be used because of shipping restrictions, sample may be initially preserved by icing and immediately shipping it to the laboratory. Upon receipt in the laboratory, the sample must be acidified with conc HNO3 to pH <2 and held for 16 hours before analysis.
{2} P=plastic, hard or soft; G=glass, hard or soft.
{3} In all cases, samples should be analyzed as soon after collection as possible.
{4} See method(s) for the information for preservation.

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

(i) Analyze Performance Evaluation samples which include those substances provided by EPA Environmental Monitoring Systems Laboratory or equivalent samples provided by the State.

(ii) Achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance limit
Antimony	6#30 at ≥0.006 mg/1
Asbestos	2 standard deviations based on study statistics.

Contaminant	Acceptance limit
Barium	±15% at ≥0.15 mg/1
Beryllium	±15% at ≥0.001 mg/1
Cadmium	±20% at ≥0.002 mg/1
Chromium	±15% at ≥0.01 mg/1
Cyanide	±25% at ≥0.1 mg/1
Fluoride	±10% at ≥1 to 10 mg/1
Mercury	±30% at ≥0.0005 mg/1
Nickel	±15% at ≥0.01 mg/1
Nitrate	±10% at ≥0.4 mg/1
Nitrite	±15% at ≥0.4 mg/1
Selenium	±20% at ≥0.01 mg/1
Thallium	±30% at ≥0.002 mg/1

(l) **'Old' IOC Sampling Requirements** Analysis for the purpose of determining compliance with Article VI 3) shall be conducted using the requirements specified in paragraphs (l) through (q) of this section.

1. **IOC Surface Water Sampling:** Analysis for all community water systems utilizing surface water sources shall be completed by June 24, 1978. These analyses shall be repeated at yearly intervals.

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

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

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

(m) **Initially Exceeding the MCL:** If the results of an analysis made under paragraph (l) of this section indicates that the level of any contaminant listed in Article VI 3) exceeds the maximum contaminant level, the supplier of the water shall report to the Secretary within 7 days and initiate three additional analyses at the same sampling point within one month.

(n) **MCL Violations:** When the average of four analyses made pursuant to paragraph (m) of this section, rounded to the same number of significant figures as the maximum contaminant level for the substance in question, exceeds the maximum contaminant level, the supplier of water shall notify the Secretary pursuant to Article VII and give notice to the public pursuant to Article IX - B. Monitoring after public notification shall be at a frequency designated by the Secretary and shall continue until the maximum contaminant level has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(o) **Nitrate Violations:** The provisions of paragraphs (m) and (n) of this section notwithstanding, compliance with the maximum contaminant level for nitrate shall be determined on the basis of the mean of the two analyses. When a level exceeding the maximum contaminant level for nitrate is found, a second analysis shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum contaminant level, the supplier of water shall report his findings to the Secretary pursuant to Article VII and shall notify the public pursuant to Article IX - B.

(p) **Grandfathered Data:** For the initial analysis required by paragraph (1) 1., 2. or 3. of this section, data for surface waters acquired within one year prior to the effective date and data for ground waters acquired within three (3) years prior to the effective date of this part maybe substituted at the discretion of the Secretary.

(q) **Analytical Methods:** Analyses conducted to determine compliance with Article VI 3) shall be made in accordance with the following methods, or their equivalent as determined by the Administrator.

1. Arsenic-Method 206.2[1], Atomic Absorption Furnace Technique; or Method 206.3[1], or Method D2972-88B[4] or Method 307A[2], or Method I-1062-85[3], Atomic Absorption-Gaseous Hydride; or Method 206.4[1], or Method D-2972-88A[4], or Method 307B[2], Spectrophotometric, Silver Diethyldithiocarbamate; or Method 200.7[8], Inductively Coupled Plasma Technique.

2. Barium-Method 208.1[1] or Method 308[2], Atomic Absorption-Direct Aspiration; or Method 208.2[1], Atomic Absorption Furnace Technique; or Method 200.7[8], Inductively Coupled Plasma Technique.

3. Cadmium-Method 213.1[1] or Method D[4] 3557-78A or B, or Method 310A[2], Atomic Absorption-Direct Aspiration; or Method 213.2[1] Atomic Absorption Furnace Technique; or Method 200.7[8], Inductively Coupled Plasma Technique.

4. Chromium-Method 218.1[1] or Method D 1687-77D, or Method 312A[2],Atomic Absorption-Direct Aspiration; or Chromium-Method 218.2[1]Atomic Absorption Furnace Technique; or Method 200.7[8], Inductively Coupled Plasma Technique.

5. Mercury-Method 245.1[1], or Method D-3223-69[4], or Method 320A[2], Manual Cold Vapor Technique; or Method 245.2[1], Automated Cold Vapor Technique.

6. Nitrate-Method 352.1[1], or Method D-992-71[4], or Method 353.3[1], or Method D-3867-79B[4], or Method 418-C[2], Spectrometric, Cadmium Reduction; Method 353.1[1], Automated Hydrazine Reduction; or Method 353.2[1], or Method D-3867-79A[4], or Method 418F[2], Automated Cadmium Reduction.

7. Selenium-Method 270.2[1], Atomic Absorption Furnace Technique; or Method 270.3[1], or Method I-1667-85[3], or Method D-3859-79[4], or Method 303F[2], Hydride Generation-Atomic Absorption Spectrophotometry.

8. Lead-Method 239.1[1] or Method[4] D3559-78A or B, or Method[2] 301-A II or III, pp.148-152, Atomic Absorption-Direct Aspiration; or Method 239.2[1], Atomic Absorption Furnace Technique; or Method 200.7[8], Inductively Coupled Plasma Technique.

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1 - "Methods of Chemical Analysis of Water and Wastes," EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268 (EPA-600/4-79-020), March 1983. Available from ORD Publications, CERI, EPA, Cincinnati, Ohio 45268. For approved analytical methods for metals, the technique applicable to total metals must be used.

2 - "Standard Methods for the Examination of Water and Waste Water." 16th Edition, American PUblic Health Association, American Water Works Association, Water Pollution Control Federation, 1985.

3 - Techniques of Water-REsources Investigation of the United States Geological Survey, Chapter A-1, Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," Book 5, 1979, Stock #024-001-03177-9. Available from Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402.

4 - Annual Book of ASTM Standard, part 31 Water, American Society for Testing and Materials, 1976 Race Street, Philadelphia, Pennsylvania 19103.

5-7 [Reserved]

8 - "Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes-Method 200.7" with Appendix to Method 200.7 entitled, "Inductively Coupled Plasma-Atomic Emission Analysis of Drinking Water." March 1987. Available from EPA's Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

In Article VI 10), paragraph (a) the introductory text, paragraph (e) and paragraph (f) are revised, and new paragraph (h) is added to read as follows:

Article VI 10) **ORGANIC CHEMICALS (OTHER THAN TOTAL TRIHALOMETHANES) SAMPLING & ANALYTICAL REQUIREMENTS**

(a) **Endrin Monitoring:** Monitoring of endrin for purposes of determining compliance with the

maximum contaminant level listed in Article VI 4)(a) shall be conducted as follows:

1. * * *

* * * * *

(e) **Endrin Analysis:** Analysis made to determine compliance with the maximum contaminant level for endrin in Article VI 4)(a) shall be made in accordance with EPA Methods 505, "Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl Products (Aroclors) in Water by Microextraction and Gas Chromatography" and 508, "Determination of Chlorinated Pesticides in Water by Gas Chromatography With an Electron Capture Detector." The Methods are contained in "Methods for the Determination of Organic Compounds in Drinking Water," ORD Publications, CERI, EPA/600/4-88/039, December 1988. These methods are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161. The toll-free number is 1-800-336-4700.

* * * * *

(f) **VOC Sampling Requirements:** Beginning with the initial compliance period, analysis of the contaminants listed in Article VI 4)(d) 1. (i) through (xxi) for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:

1. **VOC GW Monitoring Protocols:** Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make

another sampling point more representative of each source, treatment plant, or within the distribution system.

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

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

4. **Initial VOCs Sampling Frequency:** Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in Article VI 4)(d) 1. (ii) through (xxi) during each compliance period, beginning in the initial compliance period.

5. **Grandfathered VOC Data w/ No Detects:** If the initial monitoring for contaminants listed in Article VI 4)(d) 1. (i) through (viii) and the monitoring for the contaminants listed in Article VI 4)(d) 1. (ix) through (xxi) as allowed in paragraph (f) 18. has been

completed by December 31, 1992, and the system did not detect any contaminant listed in Article VI 4)(d) 1. (i) through (xxi), then each ground and surface water system shall take one sample annually beginning with the initial compliance period.

6. **Reduced VOC Sampling for GW Systems:** After a minimum of three years of annual sampling, the Secretary may allow groundwater systems with no previous detection of any contaminant listed in Article VI 4)(d) 1. to take one sample during each compliance period.

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

8. **Bases of a VOC Sampling Waiver:** The Secretary 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 Secretary reveals no previous use of the

contaminant within the watershed or zone of influence, a waiver may be granted.

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

(A) Previous analytical results.

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

(C) The environmental persistence and transport of the contaminants.

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

(E) How well the water source is protected against contamination, such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil,

and wellhead protection. Surface water systems must consider watershed protection.

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

10. **VOC Waiver Requirements for SW Systems:** Each community and non-transient surface water system which does not detect a contaminant listed in Article VI 4)(d) 1. (i) through (xxi) may apply to the Secretary for a waiver from the requirements of (f) 5. of this section after completing the initial monitoring. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Systems meeting this criterion must be determined by the Secretary to be non-vulnerable based on a vulnerability assessment during each compliance period.

Each system receiving a waiver shall sample at the frequency specified by the Secretary (if any).

11. **Detection of a VOC:** If a contaminant listed in Article VI 4)(d) 1. (ii) through (xxi) is detected at a level exceeding 0.0005 mg/l in any sample, then:

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

(ii) The Secretary may decrease the quarterly monitoring requirement specified in paragraph (f) 11. (i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Secretary make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

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

(iv) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the

Secretary for a waiver as specified in paragraph (f) 7. of this section.

(v) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two-carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Secretary 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 Secretary.

12. **VOCs Reliably & Consistently Below the MCL:** Systems which violate the requirements of Article VI 4)(d) 1. (i) through (xxi), as determined by paragraph (f) 15. of this section, must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in paragraph (f) 15. of this section the system and the Secretary determines that the system is reliably and consistently below the maximum contaminant

level, the system may monitor at the frequency and times specified in paragraph (f) 11. (iii) of this section.

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

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

    (i) If the concentration in the composite sample is ≥0.0005 mg/l for any contaminant listed in Article VI 4)(d) 1., then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

    (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 Secretary within 14 days of collection.

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

(iv) Compositing samples prior to GC analysis.

(A) Add 5 ml or equal larger amounts of each sample (up to 5 samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.

(B) The samples must be cooled at 4°C during this step to minimize volatilization losses.

(C) Mix well and draw out a 5-ml aliquot for analysis.

(D) Follow sample introduction, purging, and desorption steps described in the method.

(E) If less than five samples are used for compositing, a proportionately small syringe may be used.

(v) Compositing samples prior to GC/MS analysis.

(A) Inject 5-ml or equal larger amounts of each aqueous sample (up to 5 samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.

(B) The total volume of the sample in the purging device must be 25 ml.

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

15. **VOC Compliance Calculations:** Compliance with Article VI 4)(d) 1. (i) through (xxi) shall be determined based on the analytical results obtained at each sampling point.

(i) For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately.

(ii) If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Secretary, the determination of

compliance will be based on the average of two samples.

(iii) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Secretary may allow the system to give public notice to only that area served by that portion of the system which is out of compliance.

16. **VOC Analytical Methods:** Analysis for the contaminants listed in Article VI 4)(d) 1. (i) through (xxi) shall be conducted using the following EPA methods or their equivalent as approved by EPA. These methods are contained in Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, and are available from the National Technical Information Service (NTIS) NTIS PB91-231480 and PB91-146027, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-336-4700.

(i) Method 502.1, "Volatile Halogenated Organic Chemicals in Water by Purge and Trap Gas Chromatography."

(ii) Method 502.2, "Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series."

(iii) Method 503.1, "Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography."

(iv) Method 524.1, "Measurement of Purgeable Organic Compounds in Water by Purged Column Gas Chromatography/Mass Spectrometry."

(v) Method 524.2, "Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry."

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

(i) To receive certification to conduct analyses for the contaminants in Article VI 4)(d) 1. (ii) through (xxi) the laboratory must:

(A) Analyze Performance Evaluation samples which include these substances provided by EPA Environmental Monitoring Systems Laboratory or equivalent samples provided by the Secretary.

(B) Achieve the quantitative acceptance limits under paragraphs (f) 17. (i) (C) and (D) of this section for at least 80 percent of the regulated organic chemicals listed in Article VI 4)(d) 1. (ii) through (xxi) .

(C) Achieve quantitative results on the analyses performed under paragraph (f) 17. (i)(A) of this

section that are within ±20 percent of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/l.

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

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

(ii) To receive certification for vinyl chloride, the laboratory must:

(A) Analyze Performance Evaluation samples provided by EPA Environmental Monitoring Systems Laboratory or equivalent samples provided by the Secretary.

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

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

(D) Obtain certification for the contaminants listed in Article VI 4)(d) 1. (ii) through (xxi) .

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

19. **Increased VOC Sampling:** The Secretary may increase required monitoring where necessary to detect variations within the system.

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

21. **Secretary Designated VOC Sampling Schedules:** Each public water system shall monitor at the time designated by the Secretary within each compliance period.

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(g) **Systems in Operation Before January 1, 1993:** For systems in operation before January 1, 1993, for purposes of initial monitoring, analysis of the contaminants listed in Article VI 4)(d) 1. (i) through (viii) for purposes of determining compliance with the maximum contaminant levels shall be conducted as follows:

* * *

8. **Secretary Reduction of VOC Sampling Requirements:** Until January 1, 1993, the Secretary may reduce the monitoring frequency in paragraphs (g) 1. and (g) 2. of this section, as explained in this paragraph.

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(h) **SOC Sampling Requirements:** Analysis of the contaminants listed in Article VI 4)(d) 3. for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows:

1. **SOC GW Monitoring Protocols:** Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

2. **SOC SW Monitoring Protocols:** 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.

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

4. **SOC Monitoring Frequency:**

   (i) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in Article VI 4)(d) 3. during each compliance period beginning with the compliance period starting January 1, 1993.

   (ii) Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period, may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period.

   (iii) Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling

frequency to a minimum of one sample during each repeat compliance period.

5. **SOC Sampling Waivers:** Each community and non-transient water system may apply to the Secretary for a waiver from the requirement of paragraph (h) 4. of this section. A system must reapply for a waiver for each compliance period.

6. **Bases of an SOC Sampling Waiver:** The Secretary 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 Secretary reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

   (i) Previous analytical results.

   (ii) The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural

areas, forest lands, home and gardens, and other land application uses.

(iii) The environmental persistence and transport of the pesticide or PCBs.

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

(v) Elevated nitrate levels at the water supply source.

(vi) Use of PCBs in equipment used in the production, storage, or distribution of water (i.e., PCBs used in pumps, transformers, etc.).

7. **Detection of an SOC:** If an organic contaminant listed in Article VI 4)(d) 3. is detected (as defined by paragraph (h) 18. of this section) in any sample, then:

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

(ii) The Secretary may decrease the quarterly monitoring requirement specified in paragraph (h) 7. (i) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Secretary 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 Secretary determines the system is reliably and consistently below the maximum contaminant level the Secretary 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 Secretary for a waiver as specified in paragraph (h) 6. of this section.

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

8. **MCL Violation & Reliably/Consistently Below the MCL:** Systems which violate the requirements of Article VI 4)(d) 3. as determined by paragraph (h) 11. of this section must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Secretary determines the system is reliably and consistently below the MCL, as specified in paragraph (h) 11. of this section, the system shall monitor at the frequency specified in paragraph (h) 7. (iii) of this section.

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

10. **Composite SOC Sampling:** The Secretary 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 Article VI 4)(d) 3., then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite.

    (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 Secretary within 14 days of collection.

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

11. **SOC Compliance Calculations:** Compliance with Article VI 4)(d) 3. shall be determined based on the analytical results obtained at each sampling point.

(i) For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.

(ii) If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by

the Secretary, the determination of compliance will be based on the average of two samples.

(iii) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Secretary may allow the system to give public notice to only that portion of the system which is out of compliance.

12. **SOC Analytical Methods:** Analysis for the contaminants listed in Article VI 4)(d) 3. shall be conducted using the following EPA methods or their equivalent as approved by EPA. These methods are contained in Methods for the Determination of Organic Compounds in Drinking Water, ORD Publications, CERI, EPA/600/4-88/039, December 1988. These documents are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia, 22161.

(i) Method 504, "1,2-Dibromoethane (EDB) and 1,2-Dibromo-3-chloropropane (DBCP) in Water by Microextraction and Gas Chromatography." Method 504 can be used to measure dibromochloropropane (DBCP) and ethylene dibromide (EDB).

(ii) Method 505, "Analysis of Organohalide Pesticides and Commercial Polychlorinated Biphenyl Products (Aroclors) in Water by Microextraction and Gas

Chromatography." Method 505 can be used to measure alachlor, atrazine, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, toxaphene and simazine. Method 505 can be used as a screen for PCBs.

(iii) Method 507, "Determination of Nitrogen- and Phosphorus-Containing Pesticides in Ground Water by Gas Chromatography with a Nitrogen-Phosphorus Detector." Method 507 can be used to measure alachlor, atrazine and simazine.

(iv) Method 508, "Determination of Chlorinated Pesticides in Water by Gas Chromatography with an Electron Capture Detector." Method 508 can be used to measure chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, lindane, methoxychlor and toxaphene. Method 508 can be used as a screen for PCBs.

(v) Method 508A, ''Screening for Polychlorinated Biphenyls by Perchlorination and Gas Chromatography.'' Method 508A is used to quantitate PCBs as decachlorobiphenyl if detected in Methods 505 or 508.

(vi) Method 515.1, "Determination of Chlorinated Acids in Water by Gas Chromatography with an Electron

Capture Detector." Method 515.1 can be used to measure 2,4-D, dalapon, dinoseb, pentachlorophenol, picloram and 2,4,5-TP (Silvex).

(vii) Method 525.1, "Determination of Organic Compounds in Drinking Water by Liquid-Solid Extraction and Capillary Column Gas Chromatography/Mass Spectrometry." Method 525.1 can be used to measure alachlor, atrazine, chlordane, di(2-ethylhexyl)adipate, di(2-ethylhexyl) phthalate, endrin, heptachlor, heptachlor epoxide, hexachlorobenzene, hexachlorocyclopentadiene, lindane, methoxychlor, pentachlorophenol, polynuclear aromatic hydrocarbons, simazine, and toxaphene.

(viii) Method 531.1, "Measurement of N-Methyl Carbamoyloximes and N-Methyl Carbamates in Water by Direct Aqueous Injection HPLC with Post-Column Derivatization." Method 531.1 can be used to measure aldicarb, aldicarb sulfoxide, aldicarb sulfone, carbofuran and oxamyl.

(ix) Method 1613, "Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution." Method 1613 can be used to measure 2,3,7,8-TCDD (dioxin). This method is available from USEPA-OST, Sample Control Center, P.O. Box 1407, Alexandria, VA 22313.

(x) Method 547, "Analysis of Glyphosate in Drinking Water by Direct Aqueous Injection HPLC with Post-Column Derivatization" Method 547 can be used to measure glyphosate.

(xi) Method 548, "Determination of Endothall in Aqueous Samples." Method 548 can be used to measure endothall.

(xii) Method 549, "Determination of Diquat and Paraquat in Drinking Water by High Performance Liquid Chromatography with Ultraviolet Detection." Method 549 can be used to measure diquat.

(xiii) Method 550, "Determination of Polycyclic Aromatic Hydrocarbons in Drinking Water by Liquid-Liquid Extraction and HPLC with Coupled Ultraviolet and Fluorescence Detection". Method 550 can be used to measure benzo(a)pyrene and other polynuclear aromatic hydrocarbons.

(xiv) Method 550.1, "Determination of Polycyclic Aromatic Hydrocarbons in Drinking Water by Liquid-Solid Extraction and HPLC with Coupled Ultraviolet and Fluorescence Detection". Method 550.1 can be used to measure benzo(a)pyrene and other polynuclear aromatic hydrocarbons.

13. **Analysis for PCBs** shall be conducted as follows:

(i) Each system which monitors for PCBs shall analyze each sample using

either Method 505 or Method 508 (see paragraph (h) 12. of this section).

(ii) If PCBs (as one of seven Aroclors) are detected (as designated in this paragraph) in any sample analyzed using Methods 505 or 508, the system shall reanalyze the sample using Method 508A to quantitate PCBs (as decachlorobiphenyl).

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

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

14. **Grandfathered SOC Data:** If monitoring data collected after January 1, 1990, are generally consistent with the requirements of Article VI 10)(h), then the Secretary may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

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

16. **Secretary Enforcement:** The Secretary has the authority to determine compliance or initiate enforcement action based upon analytical

results and other information compiled by their sanctioned representatives and agencies.

17. **Secretary Designated Sampling Schedules:** Each public water system shall monitor at the time designated by the Secretary within each compliance period.

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

Contaminant	Detection limit (mg/l)
Alachlor	.0002
Aldicarb	.0005
Aldicarb sulfoxide	.0005
Aldicarb sulfone	.0008
Atrazine	.0001
Benzo[a]pyrene	.00002
Carbofuran	.0009
Chlordane	.0002
Dalapon	.001
Dibromochloropropane (DBCP)	.00002
Di (2-ethylhexyl) adipate	.0006
Di (2-ethylhexyl) phthalate	.0006
Dinoseb	.0002
Diquat	.0004
2,4-D	.0001
Endothall	.009
Endrin	.00001
Ethylene dibromide (EDB)	.00001
Glyphosate	.006
Heptachlor	.00004
Heptachlor epoxide	.00002
Hexachlorobenzene	.0001
Hexachlorocyclopentadiene	.0001
Lindane	.00002
Methoxychlor	.0001
Oxamyl	.002
Picloram	.0001
Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)	.0001
Pentachlorophenol	.00004
Simazine	.00007
Toxaphene	.001
2,3,7,8-TCDD (Dioxin)	.000000005
2,4,5-TP (Silvex)	.0002

19. **Laboratory Certification:** Analysis under this section shall only be conducted by laboratories that have received certification

by EPA or the States and have met the following conditions:

(i) To receive certification to conduct analyses for the contaminants in Article VI 4)(d) 3. the laboratory must:

(A) Analyze Performance Evaluation samples which include those substances provided by EPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the Secretary.

(B) Achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	Acceptance limits(percent)
DBCP	±40
EDB	±40.
Alachlor	±45.
Atrazine	±45.
Benzo[a]pyrene	2 standard deviations.
Carbofuran	±45.
Chlordane	±45.
Dalapon	2 standard deviations.
Di(2-ethylhexyl)adipate	2 standard deviations.
Di(2-ethylhexyl)phthalate	2 standard deviations.
Dinoseb	2 standard deviations.
Diquat	2 standard deviations.
Endothall	2 standard deviations.
Endrin	±30.
Glyphosate	2 standard deviations.
Heptachlor	±45.
Heptachlor epoxide	±45.
Hexachlorobenzene	2 standard deviations.
Hexachloro-cyclopentadiene	2 standard deviations.
Lindane	±45.
Methoxychlor	±45.
Oxamyl	2 standard deviations.
PCBs (as Decachlorobiphenyl)	0-200.
Picloram	2 standard deviations.
Simazine	2 standard deviations.
Toxaphene	±45.
Aldicarb	2 standard deviations.
Aldicarb sulfoxide	2 standard deviations.
Aldicarb sulfone	2 standard deviations.
Pentachlorophenol	±50.
2,3,7,8-TCDD (Dioxin)	2 standard deviations.
2,4-D	±50.
2,4,5-TP (Silvex)	±50.

Article VI 17) **MAXIMUM CONTAMINANT LEVEL GOALS (MCLGs) FOR ORGANIC CHEMICALS**

This section is amended by adding paragraphs (a) (6) through (a) (23), and adding entries (4) through (33) in the table in paragraph (b) as follows:

(a) * * *

(6) Acrylamide

(7) Alachlor

(8) Chlordane

(9) Dibromochloropropane

(10) 1,2-Dichloropropane

(11) Epichlorohydrin

(12) Ethylene dibromide

(13) Heptachlor

(14) Heptachlor epoxide

(15) Pentachlorophenol

(16) Polychlorinated biphenyls (PCBs)

(17) Tetrachloroethylene

(18) Toxaphene

(19) Benzo(a)pyrene

(20) Dichloromethane(methylene chloride)

(21) Di(2-ethylhexyl)phthalate

(22) Hexachlorobenzene

(23) 2,3,7,8-TCDD (Dioxin)

(b)

Contaminant	**MCLG (mg/l)**
(4) Aldicarb	0.001
(5) Aldicarb sulfoxide	0.001
(6) Aldicarb sulfone	0.001
(7) Atrazine	0.003
(8) Carbofuran	0.04
(9) o-Dichlorobenzene	0.6
(10) cis-1,2-Dichloroethylene	0.07
(11) trans-1,2-Dichloroethylene	0.1
(12) 2,4-D	0.07
(13) Ethylbenzene	0.7
(14) Lindane	0.0002
(15) Methoxychlor	0.04
(16) Monochlorobenzene	0.1
(17) Styrene	0.1
(18) Toluene	1
(19) 2,4,5-TP	0.05
(20) Xylenes (total)	10
(21) Dalapon	0.2

Contaminant	MCLG (mg/l)
(22) Di(2-ethylhexyl)adipate	0.4
(23) Dinoseb	0.007
(24) Diquat	0.02
(25) Endothall	0.1
(26) Endrin	0.002
(27) Glyphosate	0.7
(28) Hexachlorocyclopentadiene	0.05
(29) Oxamyl (Vydate)	0.2
(30) Picloram	0.5
(31) Simazine	0.004
(32) 1,2,4-Trichlorobenzene	0.07
(33) 1,1,2-Trichloroethane	0.003

Article VI 22) **MAXIMUM CONTAMINANT LEVEL GOALS (MCLGs) FOR INORGANIC CHEMICALS**

In Article VI a new 22) is added to read as follows:

(b)

Contaminant	MCLG (mg/l)
(2) Asbestos	7 Million fibers/liter (longer than 10 μm)
(3) Barium	2
(4) Cadmium	0.005
(5) Chromium	0.1
(6) Mercury	0.002
(7) Nitrate	10 (as Nitrogen)
(8) Nitrite	1 (as Nitrogen)
(9) Total Nitrate + Nitrite	10 (as Nitrogen)
(10) Selenium	0.05
(11) Antimony	0.006
(12) Beryllium	0.004
(13) Cyanide (as free Cyanide)	0.2
(14) Nickel	0.1
(15) Thallium	0.0005

Article VI - C -- TREATMENT TECHNIQUES

1) **GENERAL REQUIREMENTS**

The requirements of Article VI - C) constitute national primary drinking water regulations. These regulations establish treatment techniques in lieu of maximum contaminant levels for specified contaminants.

2) **TREATMENT TECHNIQUES FOR ACRYLAMIDE & EPICHLOROHYDRIN**

Each public water system must certify annually in writing to the Secretary (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 Secretary.

ARTICLE VI - D -- NATIONAL SECONDARY DRINKING WATER REGULATIONS

SECONDARY MAXIMUM CONTAMINANT LEVELS means SMCLs which apply to public water systems and which, in the judgement of the Administrator, are requisite to protect the public welfare. The SMCL means the maximum permissible level of a delivered to the free flowing outlet of the ultimate user of public water system. Contaminants added to the water under circumstances controlled by the user, except those resulting from corrosion of piping and plumbing caused by water quality, are excluded from this definition.

1) **SECONDARY MCLs**

The Secondary Maximum Contaminant Levels for public water systems are as follows:

Contaminant	Level
Aluminum	0.05 to 0.2 mg/l
Chloride	250 mg/l
Color	15 color units
Copper	1.0 mg/l
Corrosivity	Non-corrosive
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	6.5-8.5
Silver	0.1 mg/l
Sulfate	250 mg/l
Total dissolved solids (TDS)	500 mg/l
Zinc	5 mg/l

2) **Monitoring**

(a) It is recommended that the parameters in these regulations should be monitored at intervals no less frequent that the monitoring performed for

inorganic chemical contaminants listed in the National Interim Primary Drinking Water Regulations as applicable to community water systems. More frequent monitoring would be appropriate for specific parameters such as pH, color, odor or other under certain circumstances as directed by the State.

(b) Analyses conducted to determine compliance with 143.3 should be made in accordance with the following methods:

1. **Chloride** -- Potentiometric Method, "Standard Methods for the Examination of Water and Wastewater", 14th Edition,p.306.
2. **Color** -- Platinum-Cobalt Method, "Methods for Chemical Analysis of Water and Wastes", p. 36-38, EPA, Office of Technology Transfer, Washington, DC, 20460, 1974 or "Standard Methods for the Examination of Water and Wastewater", 13th Edition, pp.160-162, 14th Edition, p. 64-66.
3. **Cooper** -- Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes", pp. 108-109, EPA, Office of Technology Transfer, Washington, DC 20460, or "Standard Methods for the Examination of Water and Wastewater, "13th Edition, pp. 210-215, 14th Edition, pp.144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes-Method 200.7", available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.
4. **Foaming Agents** -- Methylene Blue Method, "Methods for Chemical Analysis of Water and

Wastes", pp.157-178, EPA, Office of Technology Transfer, Washington, DC, 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater", 13th Edition, pp. 339-342, 14th Edition, p.600.

5. **Iron** -- Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes", pp. 110-111, EPA, Office of Technology Transfer, Washington, DC 20460, 1974 or "Standard Methods for the Examination of Water and Wastewater", 13th Edition, pp.210-215, 14th Edition, pp.144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes-Method 200.7", available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

6. **Manganese** -- Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes", pp. 116-117, EPA, Office of Technology Transfer, Washington, DC 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater", 13th Edition, pp. 210-215, 14th Edition, pp. 144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma-Atomic Emission Spectrometric Method for Trace Element Analysis of Water and Wastes- Method 200.7" available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

7. **Odor** -- Consistent Series Method, "Methods for Chemical Analysis of Water and Wastes",

pp. 287-294, EPA, Office of Technology Transfer, Washington, DC 20460, 1974, or "Standard Methods for Examination of Water and Wastewater", 13th Edition, pp. 248-254, 14th Edition, p. 75-82.

8. **pH** -- Glass Electrode Method, "Methods for Chemical Analysis of Water and Wastes", pp. 239-240, EPA, Office of Technology Transfer, Washington, DC, 20460, 1974, or "Standard Methods for Examination of Water and Wastewater", 13th Edition, pp. 276-281, 14th Edition, pp. 460-465.

9. **Sulfate** -- Turbidimetric Method, "Methods for Chemical Analysis of Water and Wastes", pp. 277-278, EPA, Office of Technology Transfer, Washington, DC, 20460, 1974, or "Standard Methods for Examination of Water and Wastewater", 13th Edition, pp. 334-335, 14th Edition, p. 496-498.

10. **Total Dissolved Solids** -- Total Residue Methods, "Methods for Chemical Analysis of Water and Wastes", pp. 270-271, EPA, Office of Technology Transfer, Washington, DC, 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater", 13th Edition, pp. 288-290, 14th Edition, p. 91-92.

11. **Zinc** -- Atomic Absorption Method, "Methods for Chemical Analysis of Water and Wastes", pp. 155-156, EPA, Office of Technology Transfer, Washington, DC, 20460, 1974, or "Standard Methods for the Examination of Water and Wastewater", 13th Edition, pp. 210-215, 14th Edition, pp. 144-147; or Inductively Coupled Plasma Method, "Inductively Coupled Plasma-Atomic Emission

Spectrometric Method for Trace Element Analysis of Water and Wastes-Method 200.7", available from EPA Environmental Monitoring and Support Laboratory, Cincinnati, Ohio 45268.

12. **Aluminum** -- Method 202.1[1] Atomic Absorption Technique-Direct Aspiration; or Method 306A[2]; or Method I-305i-85[3]; or Method 202.2[1] Atomic Absorption-Graphite Furnace Technique; or Method 304[2]; or Method 200.7[4] Inductively-Coupled Plasma Technique; or Method 200.8[6] Inductively Coupled Plasma-Mass Spectrometry or Method 200.9[6] Platform Technique; or Method 3120B[7] Inductively-Coupled Plasma Technique.

13. **Silver** -- Method 272.1[1] Atomic Absorption Technique-Direct Aspiration; or Method 324A[2]; or Method I-3720-85[3]; or Method 272.2[1] Atomic Absorption-Graphite Furnace Technique; or Method 304[2]; or Method 200.7[4] Inductively-Coupled Plasma-Technique; or Method 200.8[5] Inductively-Coupled Plasma-Mass Spectrometry; or Method 200.9[6] Platform Technique; or Method 3120B[7] Inductively-Coupled Plasma-Technique.

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1 - "Methods of Chemical Analysis of Water and Wastes," EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268, EPA 600/4-79-020, March, 1983. Available from ORD Publication, CERI, EPA, Cincinnati, OH 45268.

2 - "Standard Methods for the Examination of Water and Wastewater," 16th Ed., American Public Health Association, American Waterworks Association, Water Pollution Control Federation, 1985.

3 - "Methods for the Determination of Inorganic Substances in Water and Fluvial Sediments," Techniques of Water-Resources Investigations of the United State Geological Survey Books, Chapter A1, 1985, Available from Open File Services Section, Western Distribution Branch, U.S. Geological Survey, Denver Federal Center, Denver, CO 80255.

4 - "Determination of Metals and Trace Elements by Inductively Coupled Plasma-Atomic Emission Spectrometry," Method 200.7, version 3.2, August, 1990, EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268.

5 - "Determination of and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Mass Spectrometry," Method 200.8, version 4.3, August, 1990, EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268. Available from ORD Publication, CERI, EPA, Cincinnati, OH 45268.

6 - "Determination of Metals and Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry," Method 200.9, version 1.1, August, 1990, EPA, Environmental Monitoring and Systems Laboratory, Cincinnati, OH 45268.

7 - "Standard Methods for the Examination of Water and Wastewater," 16th ed., American Public Health Association, American Waterworks Association, Water Pollution Control Federation, 1985.

3) **Compliance with secondary maximum contaminant level and public notification for fluoride.**

(a) Community water systems, as defined in Article II of this title, that exceed the secondary maximum contaminant level for fluoride as determined by the last single sample taken in accordance with the requirements of Article VI 9) of this title or any equivalent state law, but do not exceed the maximum contaminant level for fluoride as specified by Article VI 3) if thid title or any equivalent state law, shall provide the notice described in paragraph (b) of all billing units annually, all new billing units at the time service begins, and state public health officer.

(b) The notice required by paragraph (a) shall contain the following language including the language necessary to replace the superscripts:

Public Notice

Dear User,

The U.S. Environmental Protection Agency requires that we send you this notice on the level of fluoride in your drinking water. The drinking water in your community has a fluoride concentration of **[1]** milligrams per liter (mg/L).

Federal regulations require that fluoride, which occurs naturally in your water supply, not exceed a concentration of 4.0 mg/L in drinking water. This is an enforceable standard called a Maximum Contaminant Level (MCL), and it has been established to protect the public health. Exposure to drinking water levels above 4.0 mg/L for many years may result in some cases of crippling skeletal fluorosis, which is a serious bone disorder.

Federal law also requires that we notify you when monitoring indicates that the fluoride in your drinking water exceeds 2.0 mg/L. This is intended to alert families

about dental problems that might affect children under nine years of age. The fluoride concentration of your water exceeds this federal guideline.

Fluoride in children's drinking water at levels of approximately 1 mg/L reduces the number of dental cavities. However, some children exposed to levels of fluoride greater than about 2.0 mg/L may develop dental fluorosis. Dental fluorosis, in its moderate and severe forms, is a brown staining and/or pitting of the permanent teeth.

Because dental fluorosis occurs only when developing teeth (before they erupt from the gums) are exposed to elevated fluoride levels, household without children are not expected to be affected by this level of fluoride. Families with children under the age of nine are encouraged to seek other sources of drinking water for their children to avoid the possibility of staining and pitting.

Your water supplier can lower the concentration of fluoride in your water so that you will still receive the benefits of cavity prevention while the possibility of stained and pitted teeth is minimized. Removal of fluoride may increase your water costs. Treatment systems are also commercially available for home use. Information on such systems is available at the address given below. Low fluoride bottled drinking water that would meet all standards is also commercially available.

For further information, contact **[2]** at your water system.

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[1]. PWS shall insert the compliance result which triggered notification under this part.

[2]. PWS shall insert the name, address, and telephone number of a contact person at the PWS.

Article VII 3) **RECORDS KEPT BY SECRETARY**

This section is amended by revising paragraph (a) 4. , paragraph (c), the introductory text to paragraph (d), and paragraph (f); and by adding paragraphs (d) 4. through (d) 7. to read as follows:

(a) * * *

4. **12 Year Retention:** Records of analysis for other than microbiological contaminants (including total coliform, fecal coliform, and heterotrophic plate count), residual disinfectant concentration, other parameters necessary to determine disinfection effectiveness (including temperature and pH measurements), and turbidity shall be retained for not less than 12 years and shall include at least the following information:

* * * * *

(c) **12 Year Retention:** The Secretary, which has primary enforcement responsibility, shall maintain current inventory information for every public water system and shall retain inventory records of public water systems for not less than 12 years.

(d) **Record of Most Recent Decision:** The Secretary, which has primary enforcement responsibility shall retain, for not less than 12 years, files which shall include for each such public water system:

* * *

4. A record of the most recent vulnerability determination, including the monitoring results and other data supporting the determination, the Secretary's findings based on the supporting data and any additional bases for such determination; except that it shall be kept in perpetuity or until a more current vulnerability determination has been issued.

5. A record of all current monitoring requirements and the most recent monitoring frequency decision pertaining to each

contaminant, including the monitoring results and other data supporting the decision, the Secretary's findings based on the supporting data and any additional bases for such decision; except that the record shall be kept in perpetuity or until a more recent monitoring frequency decision has been issued.

6. A record of the most recent asbestos repeat monitoring determination, including the monitoring results and other data supporting the determination, the Secretary's findings based on the supporting data and any additional bases for the determination and the repeat monitoring frequency; except that these records shall be maintained in perpetuity or until a more current repeat monitoring determination has been issued.

7. Records of annual certifications received from systems pursuant to Article VI Section C demonstrating the system's compliance with the treatment techniques for acrylamide and/or epichlorohydrin in Article VI C 2)

* * * * *

(f) **Availability of Secretary Records:** Records required to be kept under this section shall be available to the Regional Administrator upon request. The records required to be kept under this section shall be maintained and made available for public inspection by the Secretary, or, the Secretary at its option may require suppliers of water to make available for public inspection those records maintained in accordance with Article VII.

Article VII 4) **REPORTS BY SECRETARY**

Paragraph (c) is amended by adding new paragraph (e) to read as follows:

* * * * *

(a) * * *

1. - 11. [Reserved]

(e) Special Reports

* * *

1. - 2. [Reserved]

3. The results of monitoring for unregulated contaminants shall be reported quarterly.

Article VII 5) **SPECIAL PRIMACY REQUIREMENTS**

This section is amended by reserving paragraph (d) and by adding a new paragraph (e) to read as follows:

* * * * *

(d) [Reserved]

(e) An application for approval of a Secretary program revision which adopts the requirements specified in Article VI 3), Article VI 9), Article VI 10), Article IX - B, Article VIII 1) and Article VI 4), must contain the following (in addition to the general primacy requirements enumerated elsewhere in this part, including the requirement that the Secretary regulations be at least as stringent as the federal requirements):

1. **Monitoring Waivers**: If the Secretary chooses to issue waivers from the monitoring requirements in Article VI 9), Article VI 10), and Article VIII 1), the Secretary shall describe the procedures and criteria which it will use to review waiver applications and issue waiver determinations.

(i) The procedures for each contaminant or class of contaminants shall include a description of:

(A) The waiver application requirements;

(B) The Secretary review process for "use" waivers and for "susceptibility" waivers; and

(C) The Secretary decision criteria, including the factors that will be considered in deciding to grant or deny waivers. The decision criteria must include the factors specified in Article VI 10)(f) 8., Article VI 10)(h) 6., and Article VIII 1)(n) 4..

(ii) The Secretary must specify the monitoring data and other documentation required to demonstrate that the contaminant is eligible for a "use" and/or "susceptibility" waiver.

2. **Secretary Monitoring Plan:** A monitoring plan for the initial monitoring period by which the Secretary will assure all systems complete the required initial monitoring within the regulatory deadlines.

Notes: The Secretary may update their monitoring plan submitted under the Phase II Rule or simply note in their application that they will use the same monitoring plan for the Phase V Rule.

(i) The initial monitoring plan must describe how systems will be scheduled during the initial monitoring period and demonstrate that the analytical workload on certified laboratories for each of

the three years has been taken into account, to assure that the Secretary's plan will result in a high degree of monitoring compliance and that as a result there is a high probability of compliance and will be updated as necessary.

(ii) The Secretary must demonstrate that the initial monitoring plan is enforceable under Secretary law.

(f) **EPA Review of Secretary Monitoring Determinations**

A Regional Administrator may annul a Secretary determination, or issue his own requirements, for the types of determinations identified under Article VII 5)(f)(1) and in accordance with the procedures under Article 5)(f)(2) and Article 5)(f)(3).

1. **Applicability**

This subsection applies to Secretary determinations made pursuant to:

(a) Article VI 9). Reductions in monitoring frequency for inorganic chemicals;

(b) Article VI 10). Reductions in monitoring frequency for volatile organic chemicals; and

(c) Article VI 10). Reductions in monitoring frequency for pesticides and other synthetic organic chemicals.

2. **Notice of EPA Findings on Secretary Determinations**

(i) When information available to a Regional Administrator, such as the results of an annual review, indicate a Secretary determination fails to apply the standards of the approved Secretary program, he may propose to

annul the Secretary determination by sending the Secretary and the affected PWS a draft Rescission Order.

(ii) The draft Order shall:

(A) Identify the PWS, the Secretary determination, and the provisions at issue;

(B) Explain why the Secretary determination is not in compliance with the Secretary program and must be changed; and

(C) Describe the actions and terms of operation the PWS will be required to implement.

(iii) The Secretary and PWS shall have 60 days to comment on the draft Rescission Order.

(iv) The Regional Administrator may not issue a Rescission Order to impose conditions less stringent than those imposed by the Secretary.

(v) The Regional Administrator shall provide an opportunity for comment upon the draft Rescission Order, by:

(A) Publishing a notice in a newspaper in general circulation in communities served by the affected system; and

(B) Providing 30 days for public comment on the draft order.

(vi) To successfully defend its determination, the Secretary shall demonstrate that the determination is

reasonable, based on the approved Secretary program.

3. **EPA Rescission of Secretary Determinations**

(i) The Regional Administrator shall decide within 120 days after issuance of the draft Rescission Order to:

(A) Issue the Rescission Order as drafted;

(B) Issue a modified Rescission Order; or

(C) Cancel the Rescission Order.

(ii) The Regional Administrator shall set forth the reasons for his decision, including a responsiveness summary addressing significant comments from the Secretary, the PWS and the public.

(iii) The Regional Administrator shall send a notice of his final decision to the Secretary, the PWS and all parties who commented upon the draft Rescission Order.

(iv) The Rescission Order shall remain in effect until canceled by the Regional Administrator. The Regional Administrator may cancel a Rescission Order at any time, so long as he notifies those who commented on the draft order.

(v) The Regional Administrator may not delegate the signature authority for a final Rescission Order or the cancellation of an order.

(vi) Violation of the actions, or terms of operation, required by a Rescission

Order is a violation of the Safe Drinking Water Act.

Article VIII 1) **SPECIAL MONITORING FOR INORGANIC AND ORGANIC CHEMICALS**

The section heading is revised and a new paragraph (n) is added to read as follows:

* * * * *

(e) Community water systems and non-transient, non-community water systems shall monitor for the following contaminants except as provided in paragraph (f) of this section:

(1) Chloroform;

(2) Bromodichloromethane;

(3) Chlorodibromomethane;

(4) Bromoform;

(5) Chlorobenzene;

(6) m-Dichlorobenzene;

(8) 1,1-Dichloropropene;

(9) 1,1-Dichloroethane;

(10) 1,1,2,2-Tetrachloroethane;

(11) 1,3-Dichloropropane;

(12) Chloromethane;

(13) Bromomethane;

(14) 1,2,3-Trichloropropane;

(15) 1,1,1,2-Tetrachloroethane;

(16) Chloroethane;

(17) 2,2-Dichloropropane;

(18) o-Chlorotoluene;

(19) p-Chlorotoluene;

(20) Bromobenzene;

(21) 1,3-Dichloropropene;

(f) [Reserved]

(g) Analysis under this section shall be conducted using the recommended EPA methods as follows, or their equivalent as determined by EPA: 502.1,

''Volatile Halogenated Organic Compounds in Water by Purge and Trap Gas Chromatography,'' 503.1, ''Volatile Aromatic and Unsaturated Organic Compounds in Water by Purge and Trap Gas Chromatography,'' 524.1, ''Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography/Mass Spectrometry,'' 524.2, ''Volatile Organic Compounds in Water by Purge and Trap Capillary Column Gas Chromatography/Mass Spectrometry, or 502.2, ''Volatile Organic Compounds in Water by Purge and Trap Gas Chromatography with Photoionization and Electrolytic Conductivity Detectors in Series.'' These methods are contained in ''Methods for the Determination of Organic Compounds in Finished Drinking Water and Raw Source Water,'' September 1986, available from the Drinking Water Public Docket or the National Technical Information Service (NTIS), NTIS PB91-231480 AND PB91-146027, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll- free number is 800-336-4700.

(h) Analysis under this section shall only be conducted by laboratories approved under Article VI 10)(g) 11..

(n) **Sampling for Unregulated Contaminants:** Monitoring of the contaminants listed in Article VIII 1)(n) 11. and 12. shall be conducted as follows:

1. **Sampling for Organic Contaminants:** 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 (n) 11. of this section and report the results to the

Secretary. Monitoring must be completed by December 31, 1995.

2. **Sampling for Inorganic Contaminants:** Each community and non-transient non-community water system shall take one sample at each sampling point for each contaminant listed in paragraph (n) 12. of this section and report the results to the Secretary. Monitoring must be completed by December 31, 1995.

3. **Sampling Waivers:** Each community and non-transient non-community water system may apply to the Secretary for a waiver from the requirements of paragraph (n) 1. and 2. of this section.

4. **Bases of Sampling Waivers:** The Secretary may grant a waiver for the requirement of paragraph (n) 1. of this section based on the criteria specified in Article VI 10)(h) 6. . The Secretary may grant a waiver from the requirement of paragraph (n) 2. of this section if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

5. **GW Sampling Protocols:** 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.

6. **SW Sampling Protocols:** Surface water systems [Note: For purposes of this paragraph,

surface water systems include systems with a combination of surface and ground sources.] 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.

7. **Multiple Sources:** 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).

8. **Confirmation Sampling:** The Secretary may require a confirmation sample for positive or negative results.

9. **Composite Sampling:** The Secretary 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. Compositing of samples must be done in the laboratory and the composite sample must be analyzed within 14 days of collection. If the population served by the system is >3,300 persons, then compositing may only be permitted by the Secretary at sampling points within a single system. In systems serving ≤3,300 persons, the Secretary may permit compositing among

different systems provided the 5-sample limit is maintained.

10. **Small System Exemptions:** 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 Secretary stating that the system is available for sampling. This letter must be sent to the Secretary by January 1, 1994. The system shall not send such samples to the Secretary, unless requested to do so by the Secretary.

11. **Analytical Methods for Unregulated Organic Contaminants:**

Organic contaminants	EPA analytical method
Aldrin.....	505, 508, 525
Butachlor.....	507, 525
Carbaryl.....	581.1
Dicamba.....	515.1
Dieldrin.....	505, 508, 525
3-Hydroxycarbofuran.....	581.1
Methomyl.....	531.1
Metolachlor.....	507, 525
Metribuzin.....	507, 508, 525
Propachlor.....	507, 525

12. **Analytical Methods for Unregulated Inorganic Contaminants:**

Contaminant	EPA analytical method
Sulfate.....	Colorimetric.

Article IX - B **GENERAL PUBLIC NOTICE REQUIREMENTS**

Paragraph (a) 1. (iii)(B) is revised, paragraphs (e) 13. and 14. are reserved, and paragraphs (e) 15. through 75. are added to read as follows:

(a) * * *

1. * * *

(iii) * * *

(B) Violation of the MCL for nitrate or nitrite as defined in Article VI 3) and determined according to Article VI 9)(i) 3..

* * * * *

5. * * *

(m) - (n) Reserved

(o) **Asbestos:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that asbestos fibers greater than 10 micrometers in length are a health concern at certain levels of exposure. Asbestos is a naturally occurring mineral. Most asbestos fibers in drinking water are less than 10 micrometers in length and occur in drinking water from natural sources and from corroded asbestos-cement pipes in the distribution system. The major uses of asbestos were in the production of cements, floor tiles, paper products, paint, and caulking; in transportation-related applications; and in the production of textiles and plastics. Asbestos was once a popular insulating and fire retardant material. Inhalation studies have shown that various forms of asbestos have produced lung tumors in laboratory animals. The available information on the risk of developing gastrointestinal tract cancer associated with the ingestion of asbestos from drinking water is limited. Ingestion of intermediate-range chrysotile asbestos fibers greater than 10 micrometers in length is associated with causing benign tumors in male rats. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time.

EPA has set the drinking water standard for asbestos at 7 million long fibers per liter to reduce the potential risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to asbestos.

(p) **Barium:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that barium is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in some aquifers that serve as sources of ground water. It is also used in oil and gas drilling muds, automotive paints, bricks, tiles and jet fuels. It generally gets into drinking water after dissolving from naturally occurring minerals in the ground. This chemical may damage the heart and cardiovascular system, and is associated with high blood pressure in laboratory animals such as rats exposed to high levels during their lifetimes. In humans, EPA believes that effects from barium on blood pressure should not occur below 2 parts per million (ppm) in drinking water. EPA has set the drinking water standard for barium at 2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to barium.

(q) **Cadmium:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that cadmium is a health concern at certain levels of exposure.

Food and the smoking of tobacco are common sources of general exposure. This inorganic metal is a contaminant in the metals used to galvanize pipe. It generally gets into water by corrosion of galvanized pipes or by improper waste disposal. This chemical has been shown to damage the kidney in animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the kidney. EPA has set the drinking water standard for cadmium at 0.005 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to cadmium.

(r) **Chromium:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that chromium is a health concern at certain levels of exposure. This inorganic metal occurs naturally in the ground and is often used in the electroplating of metals. It generally gets into water from runoff from old mining operations and improper waste disposal from plating operations. This chemical has been shown to damage the kidney, nervous system, and the circulatory system of laboratory animals such as rats and mice when the animals are exposed at high levels. Some humans who were exposed to high levels of this chemical suffered liver and kidney damage, dermatitis and respiratory problems. EPA has set the drinking water standard for chromium at 0.1 parts per

million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to chromium.

(s) **Mercury**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that mercury is a health concern at certain levels of exposure. This inorganic metal is used in electrical equipment and some water pumps. It usually gets into water as a result of improper waste disposal. This chemical has been shown to damage the kidney of laboratory animals such as rats when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for mercury at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to mercury.

(t) **Nitrate**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nitrate poses an acute health concern at certain levels of exposure. Nitrate is used in fertilizer and is found in sewage and wastes from human and/or farm animals and generally gets into drinking water from those activities. Excessive levels of nitrate in drinking water have caused serious illness and sometimes death in infants under six months of age. The serious illness in infants is caused because nitrate is converted to nitrite in the body. Nitrite interferes with the oxygen

carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly in infants. In most cases, a health deteriorates over a period of days. Symptoms include shortness of breath and blueness of the skin. Clearly, expert medical advice should be sought immediately if these symptoms occur. The purpose of this notice is to encourage parents and other responsible parties to provide infants with an alternate source of drinking water. Local and State health authorities are the best source for information concerning alternate sources of drinking water for infants. EPA has set the drinking water standard at 10 parts per million (ppm) for nitrate to protect against the risk of these adverse effects. EPA has also set a drinking water standard for nitrite at 1 ppm. To allow for the fact that the toxicity of nitrate and nitrite are additive, EPA has also established a standard for the sum of nitrate and nitrite at 10 ppm. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrate.

(u) **Nitrite:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nitrite poses an acute health concern at certain levels of exposure. This inorganic chemical is used in fertilizers and is found in sewage and wastes from humans and/or farm animals and generally gets into drinking water as a result of those activities. While excessive levels of nitrite in drinking water have not been observed, other sources of nitrite have caused serious illness and sometimes

death in infants under six months of age. The serious illness in infants is caused because nitrite interferes with the oxygen carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly. However, in most cases, health deteriorates over a period of days. Symptoms include shortness of breath and blueness of the skin. Clearly, expert medical advice should be sought immediately if these symptoms occur. The purpose of this notice is to encourage parents and other responsible parties to provide infants with an alternate source of drinking water. Local and State health authorities are the best source for information concerning alternate sources of drinking water for infants. EPA has set the drinking water standard at 1 part per million (ppm) for nitrite to protect against the risk of these adverse effects. EPA has also set a drinking water standard for nitrate (converted to nitrite in humans) at 10 ppm and for the sum of nitrate and nitrite at 10 ppm. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrite.

(v) **Selenium:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that selenium is a health concern at certain high levels of exposure. Selenium is also an essential nutrient at low levels of exposure. This inorganic chemical is found naturally in food and soils and is used in electronics, photocopy operations, the manufacture of glass, chemicals, drugs, and as a fungicide and a feed additive. In humans, exposure to high levels of selenium over a long period of time has

resulted in a number of adverse health effects, including a loss of feeling and control in the arms and legs. EPA has set the drinking water standard for selenium at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to selenium.

(w) **Acrylamide:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that acrylamide is a health concern at certain levels of exposure. Polymers made from acrylamide are sometimes used to treat water supplies to remove particulate contaminants. Acrylamide has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. Sufficiently large doses of acrylamide are known to cause neurological injury. EPA has set the drinking water standard for acrylamide using a treatment technique to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. This treatment technique limits the amount of acrylamide in the polymer and the amount of the polymer which may be added to drinking water to remove particulates. Drinking water systems which comply with this treatment technique have little to no risk and are considered safe with respect to acrylamide.

(x) **Alachlor:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that alachlor is a health concern at certain levels of exposure. This organic chemical is a widely used pesticide. When soil and climatic conditions are favorable, alachlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for alachlor at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to alachlor.

(y) **Aldicarb:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb

at 0.003 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb.

(z) **Aldicarb sulfoxide:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfoxide is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfoxide in ground water is primarily a breakdown product of aldicarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfoxide may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfoxide at 0.004 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfoxide.

(aa) **Aldicarb sulfone:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfone is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfone is formed from the breakdown of aldicarb and is considered for registration as a pesticide under the name aldoxycarb. Under certain soil and

climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfone may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfone at 0.002 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfone.

(ab) **Atrazine:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that atrazine is a health concern at certain levels of exposure. This organic chemical is a herbicide. When soil and climatic conditions are favorable, atrazine may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to affect offspring of rats and the heart of dogs. EPA has set the drinking water standard for atrazine at 0.003 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to atrazine.

(ac) **Carbofuran:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that carbofuran is a health concern at certain levels of exposure. This organic chemical is a pesticide. When soil

and climatic conditions are favorable, carbofuran may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the nervous and reproductive systems of laboratory animals such as rats and mice exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical during their working careers also suffered damage to the nervous system. Effects on the nervous system are generally rapidly reversible. EPA has set the drinking water standard for carbofuran at 0.04 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to carbofuran.

(ad) **Chlordane:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that chlordane is a health concern at certain levels of exposure. This organic chemical is a pesticide used to control termites. Chlordane is not very mobile in soils. It usually gets into drinking water after application near water supply intakes or wells. This chemical has been shown cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for chlordane at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory

animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to chlordane.

(ae) **Dibromochloropropane (DBCP):** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that DBCP is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, dibromochloropropane may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for DBCP at 0.0002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to DBCP.

(af) **o-Dichlorobenzene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that o-dichlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a solvent in the production of pesticides and dyes. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and the blood cells of

laboratory animals such as rats and mice exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the liver, nervous system, and circulatory system. EPA has set the drinking water standard for o-dichlorobenzene at 0.6 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to o-dichlorobenzene.

(ag) **cis-1,2-Dichloroethylene**: The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that cis-1,2-dichloroethylene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and intermediate in chemical production. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and circulatory system of laboratory animals such as rats and mice when exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for cis-1,2-dichloroethylene at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to cis-1,2-dichloroethylene.

(ah) **trans-1,2-Dichloroethylene**: The United States Environmental Protection Agency (EPA) establishes

drinking water standards and has determined that trans-1,2-dichloroethylene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and intermediate in chemical production. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and the circulatory system of laboratory animals such as rats and mice when exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for trans-1,2-dichloroethylene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to trans-1,2-dichloroethylene.

(ai) **1,2-Dichloropropane:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2-dichloropropane is a health concern at certain levels of exposure. This organic chemical is used as a solvent and pesticide. When soil and climatic conditions are favorable, 1,2-dichloropropane may get into drinking water by runoff into surface water or by leaching into ground water. It may also get into drinking water through improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who

are exposed over long periods of time. EPA has set the drinking water standard for 1,2-dichloropropane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 1,2-dichloropropane.

(aj) **2,4-D:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 2,4-D is a health concern at certain levels of exposure. This organic chemical is used as a herbicide and to control algae in reservoirs. When soil and climatic conditions are favorable, 2,4-D may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver and kidney of laboratory animals such as rats exposed at high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for 2,4-D at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 2,4-D.

(ak) **Epichlorohydrin:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that epichlorohydrin is a health concern at certain levels of exposure. Polymers made from epichlorohydrin are sometimes used in the treatment of water supplies as a

flocculent to remove particulates. Epichlorohydrin generally gets into drinking water by improper use of these polymers. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for epichlorohydrin using a treatment technique to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. This treatment technique limits the amount of epichlorohydrin in the polymer and the amount of the polymer which may be added to drinking water as a flocculent to remove particulates. Drinking water systems which comply with this treatment technique have little to no risk and are considered safe with respect to epichlorohydrin.

(al) **Ethylbenzene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined ethylbenzene is a health concern at certain levels of exposure. This organic chemical is a major component of gasoline. It generally gets into water by improper waste disposal or leaking gasoline tanks. This chemical has been shown to damage the kidney, liver, and nervous system of laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for ethylbenzene at 0.7 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA

standard is associated with little to none of this risk and is considered safe with respect to ethylbenzene.

(am) **Ethylene dibromide (EDB):** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that EDB is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, EDB may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for EDB at 0.00005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to EDB.

(an) **Heptachlor:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that heptachlor is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, heptachlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats

and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for heptachlor at 0.0004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to heptachlor.

(ao) **Heptachlor epoxide:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that heptachlor epoxide is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, heptachlor epoxide may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standards for heptachlor epoxide at 0.0002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to heptachlor epoxide.

(ap) **Lindane:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that lindane is a health concern at certain levels of exposure. This organic chemical is used as a pesticide. When soil and climatic conditions are favorable, lindane may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver, kidney, nervous system, and immune system of laboratory animals such as rats, mice and dogs exposed at high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system and circulatory system. EPA has established the drinking water standard for lindane at 0.0002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to lindane.

(aq) **Methoxychlor:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that methoxychlor is a health concern at certain levels of exposure. This organic chemical is used as a pesticide. When soil and climatic conditions are favorable, methoxychlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver, kidney, nervous system, and reproductive system of laboratory animals such as rats exposed at high levels during their lifetimes. It has also been shown to produce growth retardation in

rats. EPA has set the drinking water standard for methoxychlor at 0.04 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to methoxychlor.

(ar) **Monochlorobenzene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that monochlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a solvent. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and nervous system of laboratory animals such as rats and mice exposed to high levels during their lifetimes. EPA has set the drinking water standard for monochlorobenzene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to monochlorobenzene.

(as) **Polychlorinated biphenyls (PCBs):** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that polychlorinated biphenyls (PCBs) are a health concern at certain levels of exposure. These organic chemicals were once widely used in electrical transformers and other industrial equipment. They generally get into drinking water by improper waste disposal or leaking electrical industrial equipment. This chemical has been shown to cause cancer in laboratory animals such

as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for PCBs at 0.0005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to PCBs.

(at) **Pentachlorophenol:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that pentachlorophenol is a health concern at certain levels of exposure. This organic chemical is used as a wood preservative, herbicide, disinfectant, and defoliant. It generally gets into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to produce adverse reproductive effects and to damage the liver and kidneys of laboratory animals such as rats exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the liver and kidneys. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for pentachlorophenol at 0.001 parts per million

(ppm) to protect against the risk of cancer or other adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to pentachlorophenol.

(av) **Styrene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that styrene is a health concern at certain levels of exposure. This organic chemical is commonly used to make plastics and is sometimes a component of resins used for drinking water treatment. Styrene may get into drinking water from improper waste disposal. This chemical has been shown to damage the liver and nervous system in laboratory animals when exposed at high levels during their lifetimes. EPA has set the drinking water standard for styrene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to styrene.

(av) **Tetrachloroethylene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that tetrachloroethylene is a health concern at certain levels of exposure. This organic chemical has been a popular solvent, particularly for dry cleaning. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may

increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for tetrachloroethylene at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to tetrachloroethylene.

(aw) **Toluene**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that toluene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and in the manufacture of gasoline for airplanes. It generally gets into water by improper waste disposal or leaking underground storage tanks. This chemical has been shown to damage the kidney, nervous system, and circulatory system of laboratory animals such as rats and mice exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the liver, kidney and nervous system. EPA has set the drinking water standard for toluene at 1 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to toluene.

(ax) **Toxaphene**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that toxaphene is a

health concern at certain levels of exposure. This organic chemical was once a pesticide widely used on cotton, corn, soybeans, pineapples and other crops. When soil and climatic conditions are favorable, toxaphene may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for toxaphene at 0.003 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to toxaphene.

(ay) **2,4,5-TP:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 2,4,5-TP is a health concern at certain levels of exposure. This organic chemical is used as a herbicide. When soil and climatic conditions are favorable, 2,4,5-TP may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver and kidney of laboratory animals such as rats and dogs exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the nervous system. EPA has set the

drinking water standard for 2,4,5-TP at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 2,4,5-TP.

(az) **Xylenes:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that xylene is a health concern at certain levels of exposure. This organic chemical is used in the manufacture of gasoline for airplanes and as a solvent for pesticides, and as a cleaner and degreaser of metals. It usually gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and nervous system of laboratory animals such as rats and dogs exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for xylene at 10 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to xylene.

(ba) **Antimony:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that antimony is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in soils, ground water and surface waters and is often used in the flame retardant industry. It is also used in ceramics, glass, batteries, fireworks and

explosives. It may get into drinking water through natural weathering of rock, industrial production, municipal waste disposal or manufacturing processes. This chemical has been shown to decrease longevity, and altered blood levels of cholesterol and glucose in laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for antimony at 0.006 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to antimony.

(bb) **Beryllium:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that beryllium is a health concern at certain levels of exposure. This inorganic metal occurs naturally in soils, ground water and surface waters and is often used in electrical equipment and electrical components. It generally gets into water from runoff from mining operations, discharge from processing plants and improper waste disposal. Beryllium compounds have been associated with damage to the bones and lungs and induction of cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. There is limited evidence to suggest that beryllium may pose a cancer risk via drinking water exposure. Therefore, EPA based the health assessment on noncancer effects with an extra uncertainty factor to account for possible carcinogenicity. Chemicals that cause cancer in laboratory animals also may increase the risk of

cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for beryllium at 0.004 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to beryllium.

(bc) **Cyanide**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that cyanide is a health concern at certain levels of exposure. This inorganic chemical is used in electroplating, steel processing, plastics, synthetic fabrics and fertilizer products. It usually gets into water as a result of improper waste disposal. This chemical has been shown to damage the spleen, brain and liver of humans fatally poisoned with cyanide. EPA has set the drinking water standard for cyanide at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to cyanide.

(bd) **Nickel**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nickel poses a health concern at certain levels of exposure. This inorganic metal occurs naturally in soils, ground water and surface waters and is often used in electroplating, stainless steel and alloy products. It generally gets into water from mining and refining operations. This chemical has been shown to damage the heart and liver in

laboratory animals when the animals are exposed to high levels over their lifetimes. EPA has set the drinking water standard at 0.1 parts per million (ppm) for nickel to protect against the risk of these adverse effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to nickel.

(be) **Thallium:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that thallium is a health concern at certain high level of exposure. This inorganic metal is found naturally in soils and is used in electronics, pharmaceuticals, and the manufacture of glass and alloys. This chemical has been shown to damage the kidney, liver, brain and intestines of laboratory animals when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for thallium at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to thallium.

(bf) **Benzo(a)pyrene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that benzo(a)pyrene is a health concern at certain levels of exposure. Cigarette smoke and charbroiled meats are common source of general exposure. The major source of benzo(a)pyrene in drinking water is the leaching from coal tar lining and sealants in water storage tanks. This chemical has been shown to cause cancer in animals such as rats and mice when the

animals are exposed at high levels. EPA has set the drinking water standard for benzo(a)pyrene at 0.0002 parts per million (ppm) to protect against the risk of cancer. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to benzo(a)pyrene.

(bj) **Dalapon:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dalapon is a health concern at certain levels of exposure. This organic chemical is a widely used herbicide. It may get into drinking water after application to control grasses in crops, drainage ditches and along railroads. This chemical has been shown to cause damage to the kidney and liver in laboratory animals when the animals are exposed to high levels over their lifetimes. EPA has set the drinking water standard for dalapon at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to dalapon.

(bh) **Dichloromethane:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dichloromethane (methylene chloride) is a health concern at certain levels of exposure. This organic chemical is a widely used solvent. It is used in the manufacture of paint remover, as a metal degreaser and as an aerosol propellant. It generally gets into drinking water after improper discharge of waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats

and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for dichloromethane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe with respect to dichloromethane.

(bi) **Di (2-ethylhexyl)adipate:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that di(2-ethylhexyl)adipate is a health concern at certain levels of exposure. Di(2-ethylhexyl)adipate is a widely used plasticizer in a variety of products, including synthetic rubber, food packaging materials and cosmetics. It may get into drinking water after improper waste disposal. This chemical has been shown to damage liver and testes in laboratory animals such as rats and mice exposed to high levels. EPA has set the drinking water standard for di(2-ethylhexyl)adipate at 0.4 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water which meets the EPA standards is associated with little to none of this risk and should be considered safe with respect to di(2-ethylhexyl)adipate.

(bj) **Di(2-ethylhexyl)phthalate:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that di(2-ethylhexyl)phthalate is a health concern at

certain levels of exposure. Di(2-ethylhexyl)phthalate is a widely used plasticizer, which is primarily used in the production of polyvinyl chloride (PVC) resins. It may get into drinking water after improper waste disposal. This chemical has been shown to cause cancer in laboratory animals, such as rats and mice exposed to high levels over their lifetimes. EPA has set the drinking water standard for di(2-ethylhexyl)phthalate at 0.004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to di(2-ethylhexyl)phthalate.

(bk) **Dinoseb:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dinoseb is a health concern at certain levels of exposure. Dinoseb is a widely used pesticide and generally gets into drinking water after application on orchards, vineyards and other crops. This chemical has been shown to damage the thyroid and reproductive organs in laboratory animals such as rats exposed to high levels. EPA has set the drinking water standard for dinoseb at 0.007 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to dinoseb.

(bl) **Diquat:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that diquat is a

health concern at certain levels of exposure. This organic chemical is a herbicide used to control terrestrial and aquatic weeds. It may get into drinking water by runoff into surface water. This chemical has been shown to damage the liver, kidney and gastrointestinal tract and causes cataract formation in laboratory animals such as dogs and rats exposed at high levels over their lifetimes. EPA has set the drinking water standard for diquat at 0.02 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to diquat.

(bm) **Endothall:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that endothall is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control terrestrial and aquatic weeds. It may get into water by runoff into surface water. This chemical has been shown to damage the liver, kidney, gastrointestinal tract and reproductive system of laboratory animals such as rats and mice exposed at high levels over their lifetimes. EPA has set the drinking water standard for endothall at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to endothall.

(bn) **Endrin:** The United States Environmental Protection Agency (EPA) sets drinking water

standards and has determined that endrin is a health concern at certain levels of exposure. This organic chemical is a pesticide no longer registered for use in the United States. However, this chemical is persistent in treated soils and accumulates in sediments and aquatic and terrestrial biota. This chemical has been shown to cause damage to the liver, kidney and heart in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for endrin at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to endrin.

(bo) **Glyphosate:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that glyphosate is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control grasses and weeds. It may get into drinking water by runoff into surface water. This chemical has been shown to cause damage to the liver and kidneys in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for glyphosate at 0.7 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to glyphosate.

(bp) **Hexachlorobenzene**: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that hexachlorobenzene is a health concern at certain levels of exposure. This organic chemical is produced as an impurity in the manufacture of certain solvents and pesticides. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed to high levels during their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for hexachlorobenzene at 0.001 parts per million (ppm) to protect against the risk of cancer and other adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to hexachlorobenzene.

(bq) **Hexachlorocyclopentadiene**: The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that hexachlorocyclopentadiene is a health concern at certain levels of exposure. This organic chemical is used as an intermediate in the manufacture of pesticides and flame retardants. It may get into water by discharge from production facilities. This chemical has been shown to damage the kidney and the stomach of laboratory animals when exposed at high levels over their lifetimes. EPA has set the drinking water standard for hexachlorocyclopentadiene at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which

meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to hexachlorocyclopentadiene.

(br) **Oxamyl:** The Unites States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that oxamyl is a health concern at certain levels of exposure. This organic chemical is used as a pesticide for the control of insects and other pests. It may get into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to damage the kidneys of laboratory animals such as rats when exposed at high levels over their lifetimes. EPA has set the drinking water standard for oxamyl at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to oxamyl.

(bs) **Picloram:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that picloram is a health concern at certain levels of exposure. This organic chemical is used as a pesticide for broadleaf weed control. It may get into drinking water by runoff into surface water or leaching into ground water as a result of pesticide application and improper waste disposal. This chemical has been shown to cause damage to the kidneys and liver in laboratory animals such as rats when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for picloram at 0.5 parts per million (ppm) to protect against the risk of these

adverse health effects. Drinking water which meets the EPA standard is associated with little to none of risk and should be considered safe with respect to picloram.

(bt) **Simazine:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that simazine is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control annual grasses and broadleaf weeds. It may leach into ground water or runs off into surface water after application. This chemical may cause cancer in laboratory animals such as rats and mice exposed at high levels during their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for simazine at 0.004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to simazine.

(bu) **1,2,4-Trichlorobenzene:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2,4-trichlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a dye carrier and as a precursor in herbicide manufacture. It generally gets into drinking water by discharges from industrial activities. This chemical has been shown to cause damage to several organs, including the adrenal glands. EPA has set the drinking water standard

for 1,2,4-trichlorobenzene at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to 1,2,4-trichlorobenzene.

(bv) **1,1,2-Trichloroethane:** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined 1,1,2-trichloroethane is a health concern at certain levels of exposure. This organic chemical is an intermediate in the production of 1,1-dichloroethylene. It generally gets into water by industrial discharge of wastes. This chemical has been shown to damage the kidney and liver of laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for 1,1,2-trichloroethane at 0.005 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to 1,1,2-trichloroethane.

(bw) **2,3,7,8-TCDD (Dioxin):** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dioxin is a health concern at certain levels of exposure. This organic chemical is an impurity in the production of some pesticides. It may get into drinking water by industrial discharge of wastes. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in

laboratory animals also may increase the risk of cancer in human who are exposed over long periods of time. EPA has set the drinking water standard for dioxin at 0.00000003 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe with respect to dioxin.

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Article XI 11) **BOTTLED WATER, POINT-OF-USE, AND POINT-OF-ENTRY DEVICES**

This section is amended to read as follows:

(a) The Secretary may require a public water system to use bottled water, point-of-use devices, or point-of-entry devices as a condition of granting an exemption from the requirements of Article VI 4)(d) 1. and 3., and Article VI 3).

(b) Public water systems using bottled water as a condition of obtaining an exemption from the requirements of Article VI 4)(d) 1. and 3. and Article VI 3) must meet the requirements in Article XI 12)(g).

(c) Public water systems that use point-of-use or point-of-entry devices as a condition for receiving an exemption must meet the requirements in Article VI 3).

Article XI 12) **VARIANCES & EXEMPTION FROM MCLs**

This section is amended to read as follows:

(a) The Administrator, pursuant to section 1415(a) (1)(A) of the Act hereby identifies the technologies listed in paragraphs (a) of this section as the best technology, treatment techniques, or other means available for achieving

compliance with the maximum contaminant levels for organic chemicals as listed in Article VI 4)(d) 1. and 3..

Best Available Technologies

Contaminant	PAT	GAO	OX
Benzene	X	X	
Carbon tetrachloride	X	X	
1,2-Dichloroethane	X	X	
Trichloroethylene	X	X	
para-Dichlorobenzene	X	X	
1,1-Dichloroethylene	X	X	
1,1,1-Trichloroethane	X	X	
Vinyl chloride	X		
cis-1,2-Dichloroethylene	X	X	
1,2-Dichloropropane	X	X	
Ethylbenzene	X	X	
Monochlorobenzene	X	X	
o-Dichlorobenzene	X	X	
Styrene	X	X	
Tetrachloroethylene	X	X	
Toluene	X	X	
trans-1,2-Dichloroethylene	X	X	
Xylenes (total)	X	X	
Alachlor	X	X	
Aldicarb		X	
Aldicarb sulfoxide		X	
Aldicarb sulfone		X	
Atrazine		X	
Carbofuran		X	
Chlordane		X	
Dibromochloropropane	X	X	
2,4-D		X	
Ethylene dibromide	X	X	
Heptachlor		X	
Heptachlor epoxide		X	
Lindane		X	
Methoxychlor		X	
PCBs		X	
Pentachlorophenol		X	
Toxaphene		X	
2,4,5-TP		X	
Benzo(a)pyrene		X	
Dalapon		X	
Dichloromethane	X		
Di(2-ethylhexyl)adipate	X	X	
Di(2-ethylhexyl)phthalate		X	
Dinoseb		X	
Diquat		X	
Endothall		X	
Endrin		X	
Glyphosate			X
Hexachlorobenzene			X
Hexachlorocyclopentadiene	X	X	
Oxamyl (Vydate)		X	
Picloram		X	
1,2,4-Trichlorobenzene	X	X	
1,1,2-Trichloroethane	X	X	
2,3,7,8 TCDD (Dioxin)		X	

PAT = Packed Tower Aeration
GAO = Granular Activated Carbon
OX = Oxidation (Chlorination or Ozonation)

(b) **BATs for Inorganic Compounds Listed in Article VI 3)**

The Administrator, pursuant to section 1415(a)(1)(A) of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant levels for the inorganic contaminants listed in Article VI 3)(b):

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

* BAT only if influent Hg concentrations ≤10 µg/l.
** BAT for Chromium III only
***BAT for Selenium IV only

Key to BATs in Table
1 = Activated Alumina
2 = Coagulation/Filtration
3 = Direct and Diatomite Filtration
4 = Granular Activated Carbon
5 = Ion Exchange
6 = Lime Softening
7 = Reverse Osmosis
8 = Corrosion Control
9 = Electrodialysis
10 = Chlorine
11 = Ultraviolet

(c) **Requirement to Install BAT:** The Secretary shall require community water systems and non-transient, non-community water systems to install and/or use any treatment method identified in Article XI 12)(a) and (b) as a condition for granting a variance except as provided in paragraph (d) of this section. If, after the system's installation of the treatment method, the system cannot meet the MCL, that system shall be eligible for a variance under the provisions of section 1415(a)(1)(A) of the Act.

(d) **Engineering Assessment Option:** If a system can demonstrate through comprehensive engineering assessments, which may include pilot plant studies, that the treatment methods identified in Article XI 12(a) and (b) would only achieve a de minimis reduction in contaminants, the Secretary

may issue a schedule of compliance that requires the system being granted the variance to examine other treatment methods as a condition of obtaining the variance.

(e) **Compliance Schedule:** If the Secretary determines that a treatment method identified in paragraph (d) of this section is technically feasible, the Administrator or the Secretary may require the system to install and/or use that treatment method in connection with a compliance schedule issued under the provisions of section 1415(a)(1)(A) of the Act. The Secretary determination shall be based upon studies by the system and other relevant information.

(f) **Avoidance of URTH:** The Secretary may require a public water system to use bottled water, point-of-use devices, point-of-entry devices or other means as a condition of granting a variance or an exemption from the requirements of Article VI 4)(d) 1. and 3. and Article VI 3)(b) to avoid an unreasonable risk to health.

(g) **Bottled Water:** Public water systems that use bottled water as a condition for receiving a variance or an exemption from the requirements of Article VI 4)(d) 1. and 3. and Article VI 3)(b) must meet the requirements specified in either paragraph (g) 1. or (g) 2. and paragraph (g) 3. of this section:

1. The Administrator or the Secretary must require and approve a monitoring program for bottled water. The public water system must develop and put in place a monitoring program that provides reasonable assurances that the bottled water meets all MCLs. The public water system must monitor a representative

sample of the bottled water for all contaminants regulated under Article VI 4)(d) 1. and 3. and Article VI 3) during the first three-month period that it supplies the bottled water to the public, and annually thereafter. Results of the monitoring program shall be provided to the Secretary annually.

2. The public water system must receive a certification from the bottled water company that the bottled water supplied has been taken from an "approved source" as defined in 21 CFR 129.3(a); the bottled water company has conducted monitoring in accordance with 21 CFR 129.80(g)(1) through (3); and the bottled water does not exceed any MCLs or quality limits as set out in 21 CFR 103.35, 110, and 129. The public water system shall provide the certification to the Secretary the first quarter after it supplies bottled water and annually thereafter. At the Secretary's option a public water system may satisfy the requirements of this subsection if an approved monitoring program is already in place in another State.

3. The public water system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system via door-to-door bottled water delivery.

(h) **POE or POU Devices:** Public water systems that use point-of-use or point-of-entry devices as a condition for obtaining a variance or an exemption from NPDWRs must meet the following requirements:

1. It is the responsibility of the public water system to operate and maintain the point-of-use and/or point-of-entry treatment system.

2. Before point-of-use or point-of-entry devices are installed, the public water system must obtain the approval of a monitoring plan which ensures that the devices provide health protection equivalent to that provided by central water treatment.

3. The public water system must apply effective technology under a Secretary-approved plan. The microbiological safety of the water must be maintained at all times.

4. The Secretary must require adequate certification of performance, field testing, and, if not included in the certification process, a rigorous engineering design review of the point-of-use and/or point-of-entry devices.

5. The design and application of the point-of-use and/or point-of-entry devices must consider the potential for increasing concentrations of heterotrophic bacteria 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.

6. The Secretary must be assured that buildings connected to the system have sufficient point-of-use or point-of-entry devices that are properly installed, maintained, and

monitored such that all consumers will be protected.

The amendments to Regulation of Secretary of Health Number 50, June 20, 1983, when approved by the Secretary under the power granted by Public Law No. 5, of July 21, 1977, shall become effective thirty days (30) after being filed in the Department of State as Law Number 170, August 12, 1988, know as the Regulation Law of Puerto Rico.

Approved in San Juan, Puerto Rico this 1rst day of August , 1994 .

Effective date 2nd day of September, 1994.

Carmen Feliciano Vda. de Melecio, M.D.
Secretary of Health

Filed within the Department of State, this 3 day of August , 1994.