

State of California
The Resources Agency
Department of Water Resources
Division of Local Assistance

Compilation of Federal and State Drinking Water Standards and Criteria

June 1997



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Table of Contents

Acknowledgments	v
Organization	vi
Introduction/Purpose	1
Terminology Defined	3
Chapter 1	
Federal and State Drinking Water Standards	5
Chapter 2	
Proposition 65 Regulatory Levels	17
Chapter 3	
Federal Lead and Copper Rule	27
Chapter 4	
Federal Surface Water Treatment Rule	29
Chapter 5	
California State Surface Water Treatment Regulations	31
Chapter 6	
Proposed Federal Disinfectants and Disinfection By-Products Rule	33
Chapter 7	
Federal Total Coliform Rule	35
Chapter 8	
California State Total Coliform Regulations	37
Chapter 9	
Federal Information Collection Rule	39
Chapter 10	
Proposed Federal Radionuclides Rule	43
Chapter 11	
Phase I Rule	45
Chapter 12	
Phase II and IIB Rules	47

Table of Contents

Chapter 13

Phase V Rule 49

Chapter 14

Status of Phase VIB 51

Chapter 15

Proposed Federal Sulfate Regulations 53

Chapter 16

Schedule of Federal Drinking Water Regulations 55

References

Table I

Federal and State Drinking Water Standards 6

Table II-a

Proposition 65 Regulatory Levels (Adjusted for Daily Water Intake) 18

Table II-b

Proposition 65 Regulatory Levels (Adjusted for Daily Water Intake) 26

Table III

General Monitoring Requirements for Public Water Systems Serving 100,000 People or More Using Surface Water 41

Table IV

Schedule of Federal Drinking Water Regulations 56

Acknowledgments

The Department of Water Resources gratefully acknowledges the helpful suggestions and material provided by the following peer reviewers:

Bruce Macler

U.S. Environmental Protection Agency
Region IX

Alexis Milea

Department of Health Services
Division of Drinking Water and
Environmental Management

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Introduction

Purpose

This document is a compilation of federal and State drinking water standards, criteria, rules, and regulations. It is an update of the July 1995 report and will be updated periodically to reflect rapidly changing regulations.

The purpose of this report is to provide information to effectively:

- *Plan monitoring activities,*
- *Evaluate potential impacts to human health and drinking water supply, and*
- *Plan for water treatment measures.*

The federal Environmental Protection Agency is mandated to develop primary drinking water standards, or Maximum Contaminant Levels under the Safe Drinking Water Act of 1974. The State of California, Department of Health Services, has been delegated the responsibility for California's drinking water program and is accountable to EPA for program implementation and for adoption of standards and regulations at least as stringent as that of EPA. Since California conducts independent risk assessments, the State occasionally adopts more stringent standards than the federal government.

Chapters 1 and 2 present tabulations of current drinking water standards and regulatory levels. Chapters 3 through 15 summarize the important rules which have recently impacted drinking water regulations. Chapter 16 gives a comprehensive schedule of past, present, and future drinking water regulations under the federal Safe Drinking Water Act. Due to the rapidly changing regulations, we suggest that users of these data check with the federal EPA or DHS before using any of the drinking water standards or criteria.

This document is one of several Department of Water Resources Quality Assurance/Quality Control Program technical reports. Others include:

- *Quality Assurance Guidelines for Analytical Laboratories - Quality Assurance Technical Document 1*
- *Sampling Manual for Environmental Measurement Projects - Quality Assurance Technical Document 2*
- *Compendium of Water Quality Investigations - Quality Assurance Technical Document 4*
- *Guidelines for Developing Quality Assurance Project Plans - Quality Assurance Technical Document 6*
- *Compilation of Sediment and Soils Standards, Criteria and Guidelines - Quality Assurance Technical Document 7*

Copies of this report or any of the other technical reports are available from DWR's Bulletins and Reports, P. O. Box 942836, Sacramento, CA 94236-0001; phone: (916) 653-1097. ■

Terminology Defined

The following describes the federal and State drinking water standards and criteria terminology. It is important to understand the terminology so that the reader can appropriately use the standards and criteria.

1. **Maximum Contaminant Levels (MCLs) or Primary Drinking Water Standards**

MCLs are the maximum permissible levels of contaminants in water which enter the distribution system of a public water system, except in the case of bacteriological quality and trihalomethanes where MCLs are measured within the distribution system. Federal and State MCLs are enforceable and must be met by public drinking water systems, as applicable pursuant to the regulations.

Health effects information is developed in the risk assessment process as part of the derivation of MCLs. MCLs are subsequently derived by balancing the health risks with technological and economic impact.

2. **Maximum Contaminant Level Goals (MCLGs)**

The federal MCLG means the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MCLGs are nonenforceable health goals and are strictly health based. The August 1996 Safe Drinking Water Act Amendments modified the derivation of MCLGs to apply to contaminants that may adversely affect human health, and for which regulation presents a meaningful opportunity to reduce health risks to public water system users.

3. Secondary Maximum Contaminant Levels

Secondary MCLs are intended to protect public welfare and to assure a supply of pure, wholesome, and potable water. They are applied at the entry point to the distribution system and generally address the taste, odor, or appearance of drinking water. Federal secondary MCLs are nonenforceable. However, State secondary MCLs are enforceable for all new water systems and new sources developed by existing systems.

4. Action Levels (ALs)

ALs are health-based numbers which take into account analytical detection levels. They are interim guidance levels which may trigger mitigation action on the part of a water purveyor. Public notification is not required when an AL is exceeded, but may be recommended by Department of Health Services. An AL is dropped once an MCL is promulgated and final.

5. No Significant Risk Levels (NSRLs) and No Observable Effect Levels (NOELs)

NSRLs for carcinogens and NOELs for reproductive toxicants are established by the State for a select list of chemicals for purposes of implementing the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). These levels are established as safe harbors, in that discharges below these levels are not subject to the warning requirement or discharge prohibition. The Act is not applicable to businesses with fewer than 10 employees, government agencies, and drinking water utilities.

NSRLs represent the daily level of exposure to a chemical which is calculated to result in no more than one excess case of cancer per

100,000 individuals exposed over a 70-year lifetime. For reproductive toxicants, NOEL must be divided by a mandatory 1,000-fold safety factor. The levels in the regulations represent NOEL/1,000. In determining NSRLs, the regulations provide that State MCLs and ALs, and the regional water quality control board's allowable levels of discharge that are based on considerations of minimizing cancer risk, may be used. ■

Chapter 1

Federal & State Drinking Water Standards

This chapter presents EPA and DHS drinking water standards. The parameters are listed in Table I (pages 6 through 15) and are divided into four categories:

- *Inorganics*
- *Organics*
- *Microbial contaminants*
- *Radionuclides*

Standards and criteria in the current, final, and proposed form are given. All standards and criteria were cross-checked with regulations and peer-reviewed to ensure accuracy and the proper use of significant figures. ■

Table 1—Federal and State Drinking Water Standards

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
<u>Inorganics</u>						
Aluminum		0.05-0.2		1	0.2	
Antimony	0.006		0.006	0.006		
Arsenic	0.05			0.05		
Asbestos	7 MFL ^a		7 MFL ^a	7 MFL ^a		
Barium	2		2	1		
Beryllium	0.004		0.004	0.004		
Boron						1
Cadmium	0.005		0.005	0.005		
Chloride		250			250-500-600 ^j	
Chromium	0.1		0.1	0.05		
Color		15 CU ^b			15 CU ^b	
Copper	TT(1.3) ^c	1	1.3		1.0	
Corrosivity		non-corrosive			non-corrosive	
Cyanide	0.2		0.2	0.2		
Fluoride	4.0	2.0 (proposed)	4.0	1.4-2.4 ^k		
Foaming Agents		0.5			0.5	
Iron		0.3			0.3	
Lead	TT(0.015) ^d		0	removed ^o		
Manganese		0.05			0.05	

9

Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Mercury	0.002		0.002	0.002		
Nickel	0.1		0.1	0.1		
Nitrate	10 (as N)		10 (as N)	45 (as NO ₃)		
Nitrite	1 (as N)		1 (as N)	1 (as N)		
Nitrate + Nitrite	10			10		
Odor		3 OTN ^e			3 OTN ^e	
pH			6.5-8.5		6.5-8.5	
Selenium	0.05		0.05	0.05		
Silver		0.1		removed ^p	0.1	
Specific Conductance					900-1600-2200 ^j µmhos	
Sulfate		250			250-500-600 ^j	
Thallium	0.002		0.0005	0.002		
Total Dissolved Solids (TDS)		500			500-1000-1500 ^j	
Turbidity	0.5-1 ^f NTU					
Zinc		5			5	
Organics						
Acrylamide	TT ^g		0			
Adipates [Di(2-ethylhexyl)adipate]	0.4		0.4			
Alachlor (Alanex)	0.002		0	0.002		

Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Aldicarb (Temik)	0.003 (effective date postponed)		0.001			0.010
Aldicarb sulfone	0.002 (effective date postponed)		0.001			
Aldicarb sulfoxide	0.004 (effective date postponed)		0.001			
Aldrin						0.00005 ¹
Atrazine (AAtrex)	0.003		0.003	0.003		
Baygon						0.090
Bentazon (Basagran)				0.018		
Benz(a)anthracene	0.0001 (proposed)		0 (proposed)			
Benzene	0.005		0	0.001		
a-Benzene Hexachloride (a-BHC)						0.0007
b-Benzene Hexachloride (b-BHC)						0.0003
Benzo(a)pyrene	0.0002		0	0.0002		
Benzo(b)fluoranthene	0.0002 (proposed)		0 (proposed)			
Bromodichloromethane (THM species)	0.10 0.08 (proposed)		0 (proposed)			
Bromoform (Tribromomethane) (THM species)	0.10 0.08 (proposed)		0 (proposed)			
Butyl benzyl-phthalate	0.1 (proposed)		0 (proposed)			

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Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Captan						0.350
Carbaryl						0.060
Carbofuran (Furadan)	0.04		0.04	0.018		
Carbon tetrachloride	0.005		0	0.0005		
Chlordane	0.002		0	0.0001		
Chlorobenzene (Monochlorobenzene)	0.1		0.1	0.07		
Chlorodibromomethane (THM species)	0.10		0.06 (proposed)			
Chloroform (Trichloromethane) (THM species)	0.10 0.80 (proposed)		0 (proposed)			
Chloropicrin						0.050 (0.037) ^m
CICP (chloroprophan)						0.35
Chlorotoluene (o,p)						0.045
Dalapon	0.2		0.2	0.2		
Diazinon						0.014
1,2-Dibromo-3- chloropropane (DBCP)	0.0002		0	0.0002		
1,3-Dichlorobenzene (m-Dichlorobenzene)						0.130 (0.020) ^{m,n}
1,2-Dichlorobenzene (o-Dichlorobenzene)	0.6	0.01 (proposed)	0.6	0.6		0.130 (0.010) ^{m,n}

Table 1—Federal and State Drinking Water Standards
(continued)

1,4-Dichlorobenzene (p-Dichlorobenzene)	0.075	0.005 (proposed)	0.075	0.005		
Dichlorodifluoromethane (Freon 12)						1
1,1-Dichloroethane				0.005		
1,2-Dichloroethane	0.005		0	0.0005		
1,1-Dichloroethylene	0.007		0.007	0.006		
cis-1,2- Dichloroethylene	0.07		0.07	0.006		
trans-1,2-Dichloroethylene	0.1		0.1	0.01		
Dichloromethane (Methylene Chloride)	0.005		0	0.005		
2,4-Dichlorophenoxyacetic acid (2,4-D)	0.07		0.07	0.07		
1,2-Dichloropropane	0.005		0	0.005		
1,3-Dichloropropene				0.0005		
Dieldrin						0.00005 ¹
Di(ethylhexyl)adipate	0.4		0.4	0.4		
Di(2-ethylhexyl)phthalate (Phthalates)	0.006		0	0.004		
Dimethoate (Cygon)						0.140
2,4-Dimethylphenol						0.40 ^m
Dinoseb	0.007		0.007	0.007		
Dioxin (2,3,7,8-TCDD)	3x10 ⁻⁸		0	3x10 ⁻⁸		

Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Diphenamide						0.040
Diquat	0.02		0.02	0.02		
Endothall	0.1		0.1	0.1		
Endrin	0.002		0.002	0.002		
Epichlorohydrin	TT ^s		0			
Ethion						0.035
Ethylbenzene	0.7	0.03 (proposed)	0.7	0.7		
Ethylene Dibromide (EDB) (Dibromoethane)	0.00005		0	0.00005		
Formaldehyde						0.030
Glyphosate	0.7		0.7	0.7		
Heptachlor	0.0004		0	0.00001		
Heptachlor Epoxide	0.0002		0	0.00001		
Hexachlorobenzene	0.001		0	0.001		
Hexachloro- cyclopentadiene	0.05	0.008 (proposed)	0.05	0.05		
Lindane	0.0002		0.0002	0.0002		
Malathion						0.160
Methoxychlor	0.04		0.04	0.04		
Methyl t-butyl ether						0.035
Methylene Chloride (Dichloromethane)	0.005		0			0.040

Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Methyl Parathion						0.030
Monochlorobenzene	0.1	0.1		0.07		
Molinate				0.02		
Oxamyl (Vydate)	0.2		0.2	0.2		
Parathion						0.030
Pentachloro-nitrobenzene (Terrachlor)						0.0009
Pentachlorophenol	0.001		0	0.001		
Phenol						0.0050 ^m
Phthalates [Di(2 - ethylhexyl)phthalate]	0.006		0	0.004		
Picloram	0.5		0.5	0.5		
Polychlorinated biphenyls (PCBs)	0.0005		0	0.0005		
Polynuclear Aromatic Hydrocarbons (PAHs) (Benzo(a)pyrene)	0.0002		0	0.0002		
Simazine	0.004		0.004	0.004		
Styrene	0.1	0.01 (proposed)	0.1	0.1		
2,3,7,8-TCDD (Dioxin)	3x10 ⁻⁸		0	3x10 ⁻⁸		
1,1,2,2-Tetrachloroethane				0.001		
Tetrachloroethylene	0.005		0	0.005		
Thiobencarb				0.07	0.001	

Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Toluene	1	0.04 (proposed)	1	0.15		
Total Trihalomethanes (TTHM)	0.10			0.10		
Toxaphene	0.003		0	0.003		
Tribromomethane (Bromoform) (THM species)	0.10 0.08 (proposed)					
1,2,4-Trichlorobenzene	0.07		0.07	0.07		
1,1,1-Trichloroethane	0.20		0.20	0.2		
1,1,2-Trichloroethane	0.005		0.003	0.005		
Trichloroethylene	0.005		0	0.005		
Trichlorofluoromethane (Freon 11)				0.15		
Trichloromethane (Chloroform) (THM species)	0.10					
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)				1.2		
2,4,5-Trichlorophenoxy propionic acid (Silvex)	0.05		0.05	0.05		
Trithion						0.0070
Vinyl Chloride	0.002		0	0.0005		
Xylenes (all isomers)	10	20 (proposed)	10	1.750		
Microbial Contaminants						
<i>Giardia Lamblia</i>	TT [§]		0			

Table 1—Federal and State Drinking Water Standards
(continued)

Contaminant	EPA Drinking Water Standards (mg/L)			DHS Drinking Water Standards (mg/L)		
	Primary MCL	Secondary MCL	MCLG	Primary MCL	Secondary MCL	Action Levels
Heterotrophic plate count	TT ^h					
<i>Legionella</i>	TT ^h		0			
Total coliforms	P/A ⁱ		0			
Viruses	TT ^h		0			
Radionuclides						
Adjusted gross alpha (excluding uranium and radon)	15 pCi/L		0 (proposed)	15 pCi/L		
Gross beta particle activity	4 mrem/yr		0.11	50 pCi/L		
Radium 226 (+228)	5 pCi/L		0	5 pCi/L		
Radium 226	20 pCi/L (proposed)		0	5 pCi/L		
Radium 228	20 pCi/L (proposed)		0 (proposed)			
Radon	300 pCi/L (proposed)		0 (proposed)			
Strontium-90				8 pCi/L		
Tritium				20000 pCi/L		
Uranium	0.02 (proposed)		0	20 pCi/L		

Explanation to Table 1 Footnotes

Legend:

- a MFL = million fibers per liter, with fiber length > 10 microns
- b CU = color units
- c Treatment technique (TT) triggered at Action Level of 1300 parts per billion
- d Treatment technique (TT) and public notification triggered at Action Level of 15 parts per billion
- e Odor Threshold Numbers
- f 0.5 NTU (Nephelometric Turbidity Unit) conventional or direct filtration; 1 NTU, DE or slow sand filtration
- g Treatment Technique in lieu of numeric MCL
- h Surface waters and groundwater under the direct influence of surface water only
- i MCL is based on the presence/absence of total coliforms. MCLG (mg/L):zero. MCL: No more than 5 percent of the samples per month may be positive. For systems collecting fewer than 40 samples per month, no more than 1 sample per month may be positive.
- j Recommended Upper Short Term
- k Depends on annual average of maximum daily air temperatures
- l Limit of Quantification
- m Taste and Odor Threshold (in parenthesis)
- n For single or sum of isomers
- o Lead is regulated under the Federal Lead and Copper Rule
- p Silver is now regulated as a secondary contaminant

Abbreviations

EPA=Environmental Protection Agency
DHS=Department of Health Services
MCL=Maximum Contaminant Level
MCLG=Maximum Contaminant Level Goal
AL=Action Level

Chapter 2

Proposition 65 Regulatory Levels

This chapter presents Proposition 65 regulatory levels which DWR adjusted to correspond to an estimated daily water intake. Proposition 65 has been codified in the Safe Drinking Water and Toxic Enforcement Act of 1986.

Table II (pages 18 through 26) represents the No Significant Risk Levels (NSRLs) for carcinogens and the values equal to 1/1000 of the No Observable Effect Levels (NOELs) for reproductive toxicants. The NOEL/1000 is used as a mandatory safety factor. Regulatory levels are established in Title 22, California Code of Regulations, Sections 12705 and 12709 for carcinogens and in Section 12805 for reproductive toxicants.

For information about Proposition 65, contact Shirley Williams, California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, 601 North 7th Street, P.O. Box 942732, Sacramento, CA 94234-7320, (916) 445-6900. ■

Table II-a
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
A-alpha-C (2-Amino-9H-pyrido[2,3-b]indole)	0.001
Acetamide	0.005
2-Acetylaminoflourene	0.0001
Acrylamide	0.0001
Acrylonitrile	0.00035
Actinomycin D	4×10^{-8}
AF-2;[2-(2-furyl)-3(5-nitro-2 furyl) acrylamide	0.0015
Aldrin	2×10^{-5}
Allyl chloride	0.015
2-Aminoanthraquinone	0.01
o-Aminoazotoluene	0.0001
4-Aminobiphenyl	1.5×10^{-5}
3-Amino-9-ethylcarbazole hydrochloride	0.0045
1-Amino-2-methylantraquinone	0.0025
2-Amino-5-(5-nitro-2-furyl) 1,3,4-thiadizole	2×10^{-5}
Amitrole	0.00035
Aniline	0.05
o-Anisidine	0.0025
o-Anisidine hydrochloride	0.0035
Aramite	0.01
Arsenic	0.005
Asbestos	100 fibers/ day
Auramine	0.0004
Azaserine	3×10^{-5}
Azathioprine	0.0002
Azobenzene	0.003
Benzene	0.0035

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
Benzidine	5×10^{-7}
Benzo(a)pyrene	3×10^{-5}
Benzyl chloride	0.002
Benzyl violet 4B	0.015
Beryllium	5×10^{-5}
Beryllium oxide	5×10^{-5}
Beryllium sulfate	1×10^{-7}
Bis(2-chloroethyl)ether	0.00015
Bis(chloromethyl)ether	1×10^{-5}
Bromodichloromethane	0.0025
1,3-Butadiene	0.0002
Butylated hydroxyanisole	2
beta-Butyrolactone	0.00035
Cadmium	2.5×10^{-6} (inhalation)
Carbon Tetrachloride	0.0025
Captafol	0.0025
Captan	0.15
Chlorambucil	1×10^{-6}
Chlordane	0.00025
Chlodecone (Kepone)	2×10^{-5}
Chlorendic acid	0.004
Chlorinated paraffins	0.004
Chlorodibromomethane	0.0035
Chloroform	0.01
Chloromethyl methyl ether (technical grade)	0.00015
3-Chloro-2-methylpropene	0.0025
4-Chloro-ortho-phenylenediamine	0.02

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
Chlorothalonil	0.1
p-Chloro-ortho-toluidine	0.0015
Chlorozotocin	1.5×10^{-6}
Chromium (hexavalent)	5×10^{-7} (inhalation)
C.I.Basic Red 9 monohydrochloride	0.0015
Cinnamyl anthranilate	0.1
Coke oven emissions	0.00015
p-Cresidine	0.0025
Cupferron	0.0015
Cyclophosphamide (anhydrous)	0.0005
Cyclophosphamide (hydrated)	0.0005
D&C Red No. 9	0.05
Dacarbazine	5×10^{-6}
Daminozide	0.02
Dantron (Chrysazin; 1,8-Dihydroxyanthraquinone	0.0045
DDT, DDE, and DDD (in combination)	0.001
DDVP (Dichlorvos)	0.001
2,4-Diaminoanisole	0.015
2,4-Diaminoanisole sulfate	0.025
4,4'-Diaminodiphenyl ether (4,4'-Oxydianiline)	0.0025
2,4-Diaminotoluene	0.0001
Dibenz[a,h]anthracene	0.0001
1,2-Dibromo-3-chloropropane	5×10^{-5}
Dibromochloropropane (DBCP)	5×10^{-5}
para-Dichlorobenzene	0.01
3,3'-Dichlorobenzidine	0.0003
1,1-Dichloroethane	0.05

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
1,2-Dichloroethane (Ethylene dichloride)	0.005
Dichloromethane (Methylene Chloride)	0.025
1,3-Dichloropropene	0.025
Dieldrin	2×10^{-5}
Di(2-ethylhexyl)phthalate	0.04
Diethylstilbesterol	1×10^{-6}
Diglycidyl resorcinol ether (DGRE)	0.0002
Dihydrosafrole	0.01
4-Dimethylaminoazobenzene	0.0001
trans-2-[(Dimethylamino)methylimino]-5-[2-(5-nitro 2-furyl)vinyl]-1,3,4-oxadiazole	0.001
7,12-Dimethylbenz(a)anthracene	1.5×10^{-6}
Dimethylcarbamoyl chloride	2.5×10^{-5}
1,2-Dimethylhydrazine	5×10^{-7}
Dimethylvinylchloride	0.01
2,4-Dinitrotoluene	0.001
1,4-Dioxane	0.015
Direct Black 38 (technical grade)	4.5×10^{-5}
Direct Blue 6 (technical grade)	4.5×10^{-5}
Direct Brown 95 (technical grade)	5×10^{-5}
Disperse Blue 1	0.1
Epichlorohydrin	0.0045
Estradiol 17b	1×10^{-5}
Ethyl-4,4'-dichlorobenzilate (Chlorobenzilate)	0.0035
Ethylene dibromide	0.0001 (oral) 0.0015 (inhalation)
Ethylene dibromide (EDB) (ingestion)	0.0001
Ethylene oxide	0.001

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
Ethylene thiourea	0.01
Ethyleneimine	5×10^{-6}
Folpet	0.1
Formaldehyde (gas)	0.02
2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole	0.00015
Furmecyclox	0.01
Glu-P-1 (2-Amino-6-methyldipyride[1,2-a:3',2'-]-imidazole	5×10^{-5}
Glu-P-2 (2-Aminodipyride[1,2-a:3',2'-d]-imidazole	0.00025
Gyromitrin (Acetaldehyde methylformylhydrazone)	3.5×10^{-5}
HC Blue 1	0.005
Heptachlor	0.0001
Heptachlor epoxide	4×10^{-5}
Hexachlorobenzene	0.0002
Hexachlorocyclohexane:	
alpha isomer	0.00015
beta isomer	0.00025
gamma isomer	0.0003
technical grade	0.0001
Hexachlorodibenzodioxin	1×10^{-7}
Hexachloroethane	0.01
Hydrazine	2×10^{-5}
Hydrazine sulfate	0.0001
Hydrazobenzene (1,2-Diphenylhydrazine)	0.0004
IQ (2-Amino-3-methylimidazo[4,5-f]quinoline	0.00025
Lasiocarpine	4.5×10^{-5}
Lead acetate	0.0015

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
Lead subacetate	0.01
Me-A-alpha-C (2-Amino-3-methyl-9H-pyrido[2,3 b]indole)	0.0003
Melphalan	2.5×10^{-6}
3-Methylcholanthrene	1.5×10^{-5}
4,4'-Methylene bis(2-chloroaniline)	0.00025
4,4'-Methylene bis(N,N-dimethyl)benzeneamine	0.01
4,4'-Methylene bis(2-methylaniline)	0.0004
4,4'-Methylenedianiline	0.0002
4,4'-Methylenedianiline dihydrochloride	0.0003
Methyl methanesulfonate	0.0035
2-Methyl-1-nitroanthraquinone (of uncertain purity)	0.0001
N-Methyl-N'-nitro-N-nitrosoguanidine	4×10^{-5}
Methylthiouracil	0.001
Michler's ketone	0.0004
Mirex	2×10^{-5}
Mitomycin C	4.5×10^{-8}
Monocrotaline	3.5×10^{-5}
2-Naphthylamine	0.0002
Nickel refinery dust	0.0004
Nickel Substitute	0.0002
Nitrilotriacetic acid	0.05
Nitrilotriacetic acid, trisodium samt monohydrate	0.035
5-Nitroacenaphthene	0.003
5-Nitro-o-anisidine	0.005
Nitrofen (technical grade)	0.0045
Nitrofurazone	0.00025

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
1-[(5-Nitrofurfurylidene)-amino]-2-imidazolidinone	0.0002
N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide	0.00025
N-Nitroso-n-dibutylamine	3×10^{-5}
p-Nitrosodiphenylamine	0.015
N-Nitrosodiethanolamine	0.00015
N-Nitrosodiethylamine	1×10^{-5}
N-Nitroso-N-ethylurea	1.5×10^{-5}
N-Nitrosodimethylamine	2×10^{-5}
N-Nitrosodiphenylamine	0.04
N-Nitrosodipropylamine	5×10^{-5}
N-Nitrosomethylethylamine	1.5×10^{-5}
N-Nitroso-N-methylurea	3×10^{-6}
N-Nitroso-Nmethylurethane	3×10^{-6}
N-Nitrosomorpholine	5×10^{-5}
N-Nitrosornicotine	0.00025
N-Nitrosopiperidine	3.5×10^{-5}
N-Nitrosopyrrolidine	0.00015
Pentachlorophenol	0.02
Phenacetin	0.15
Phenazopyridine	0.002
Phenazopyridine hydrochloride	0.0025
Phenesterin	2.5×10^{-6}
Phenobarbital	0.001
Phenoxybenzamine	0.0001
Phenoxybenzamine hydrochloride	0.00015
o-Phenylphenate, sodium	0.1
Polybrominated biphenyls	1×10^{-5}

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
Polychlorinated biphenyls (PCBs)	4.5×10^{-5}
Ponceau MX	0.1
Ponceau 3R	0.02
Potassium bromate	0.0005
Procarbazine	2.5×10^{-5}
Procarbazine hydrochloride	3×10^{-5}
1,3-Propane sultone	0.00015
beta-Propiolactone	2.5×10^{-5}
Propylthiouracil	0.00035
Reserpine	3×10^{-5}
Safrole	0.0015
Sterigmatocystin	1×10^{-5}
Streptozotocin	3×10^{-6}
Styrene oxide	0.002
Sulfallate	0.002
Tetrachlorodibenzo-p-dioxin (TCDD)	2.5×10^{-9}
1,1,2,2-Tetrachloroethane	0.0015
Tetrochloroethylene	0.007
Thioacetamide	5×10^{-5}
4,4'-Thiodianiline	2.5×10^{-5}
Thiourea	0.005
Toluene diisocyanate	0.01
ortho-Toluidine	0.002
ortho-Toluidine hydrochloride	0.0025
Toxaphene	0.0003
Trichloroethylene	0.025
2,4,6-Trichlorophenol	0.005

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-a (continued)
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Carcinogen	No Significant Risk Level (mg/L)*
Tris(1-aziridinyl)phosphine sulfide (Thiotepa)	3x10 ⁻⁵
Tris(2,3-dibromopropyl)phosphate	0.00015
Trp-P-1 (Tryptophan-P-1)	1.5x10 ⁻⁵
Trp-P-2 (Tryptophan-P-2)	0.0001
Urethane (Ethyl carbamate)	0.00035
Vinyl chloride	0.0015
Vinyl trichloride (1,1,2-Trichloroethane)	0.005

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Table II-b
Proposition 65 Regulatory Levels
(Adjusted for Daily Water Intake)

Reproductive Toxicant	1/1000 of the No Observable Effect Level (mg/L)*
Ethylene Oxide	0.01
Lead	0.00025
Toluene	3.5

*Levels indicate concentrations of chemical in water that correspond to the intake of 2 liters of water per day.

Chapter 3

Federal Lead & Copper Rule

The final Lead and Copper Rule was promulgated by EPA on June 7, 1991 (56 FR 26460). Corrections to this rule were published on July 15, 1991 and June 29, 1992.

On July 12, 1996, EPA published notice that it was considering making changes to the national drinking water standards and invited comments to be received by July 11, 1996. These revisions did not affect the Rule's basic requirements. Rather, they are intended to reduce the reporting burden of implementing the Rule and to respond to a legal challenge by the Natural Resources Defense Council on the exclusion of Transient NonCommunity Water Systems from coverage under the old rule.

The effective date for monitoring was July 7, 1991. The remaining regulations, including ALs and treatment requirements, became effective on December 7, 1992. Final lead and copper regulations call for treatment techniques consisting of:

- *Optimal corrosion control treatment*
- *Source water treatment*
- *Public education*
- *Lead service line replacement*

The August 1996 Safe Drinking Water Act Amendments made it unlawful to use lead-containing products in installation or repair of any public water system or any facility providing water for human consumption. Manufacturing any plumbing fitting or fixture that is not lead-free will be unlawful after August 1998.

The first flush water samples from consumers' taps will be monitored. If more than 10 percent of these samples contain greater than the AL of 0.015 mg/L for lead, or 1.3 mg/L for copper, three required actions must initially be taken. These actions are corrosion control treatment, source water treatment, and public education. If a system continues to exceed the lead action level, lead service lines will have to be replaced.

The Lead and Copper Rule also eliminated the lead MCL of 0.05 mg/L and the copper secondary MCL of 1.0 mg/L. MCLGs of 0 and 1.3 mg/L have been set for lead and copper, respectively.

For further information or for copies of the federal Lead and Copper Rule, call the Environmental Protection Agency Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 4

Federal Surface Water Treatment Rule

The federal Surface Water Treatment Rule was promulgated on June 29, 1989 (54 FR 124). It became effective on December 31, 1990. This Rule requires all public water systems using surface water supplies, or groundwater supplies under the influence of surface water, to filter and disinfect for protection against *Giardia lamblia*, *Legionella*, viruses, and heterotrophic bacteria. Although the protozoan *Cryptosporidium parvum* currently is not regulated under this Rule, it may eventually be included.

Water systems with clean and protected source waters meeting the source water quality and site specific criteria may not have to filter if they meet the CT (disinfectant contact time) criteria continuously. For those that must filter, June 29, 1993 was the deadline to meet filtration requirements and performance criteria for both turbidity and disinfection. Operators of systems that were unable to meet this deadline may have to sign consent decrees with State enforcement agencies. Systems that must filter may employ a variety of treatment technologies to ensure at least 99.9 percent reduction of *Giardia lamblia* cysts, and 99.99 percent removal of viruses.

States were required to adopt a program for evaluating groundwater under the influence by December 30, 1990. Although the State must decide which wells are influenced by surface water, operators of systems must provide the State with the necessary information. All community groundwater systems were required to

be evaluated by June 29, 1994, and noncommunity systems must be evaluated by June 29, 1999.

EPA proposed an Enhanced Surface Water Treatment Rule (ESWTR) on July 29, 1995, as an amendment to the Federal Surface Water Treatment Rule. The purpose of ESWTR was to provide additional protection against disease-causing organisms such as *Giardia lamblia*, *Cryptosporidium parvum*, and viruses in drinking water. ESWTR outlined several alternatives for treatment requirements based on source water concentrations of these pathogens. With the promulgation of the final Information Collection Rule in May 1996, further development of ESWTR was placed on hold. The purpose of the Information Collection Rule is to obtain the information needed for EPA to assess the risk-risk tradeoff posed by simultaneous control of disinfection by-products and pathogenic organisms in drinking water so that sound regulatory decisions can be made (see Chapter 9).

For further information regarding the federal Surface Water Treatment Rule and the proposed Enhanced Surface Water Treatment Rule, call the Environmental Protection Agency Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 5

California State Surface Water Treatment Regulations

State surface water treatment regulations are the result of a series of amendments to the National Primary Drinking Water Regulations. State regulations, which are found in Title 22, Chapter 17 of the California Code of Regulations, became effective on June 5, 1991. Like the federal rule, the State required multibarrier treatment for microbiological contaminants, effective June 29, 1993. Unlike the federal rule, however, all public water systems in California must filter all their surface water and the part of their groundwater that is under the influence of surface water. Due to high implementation costs, this aspect of the regulation may be amended in the future to allow qualifying systems to avoid filtration. Several California water systems that comply with the federal criteria for avoiding filtration are currently being regulated under federal law.

For further information regarding State surface water treatment regulations, contact Bob Hultquist, Department of Health Services, Criteria and Standards, 2151 Berkeley Way, Berkeley, CA 94704, (510) 540-2149. Copies of the regulations may be obtained by calling (510) 540-2154. ■

Chapter 6

Proposed Federal Disinfectants & Disinfection By-Products Rule

The 1986 amendments to the federal Safe Drinking Water Act require that EPA propose a rule for disinfectant and disinfection by-products. The rule must balance the need for protection from cancer causing chemicals (the by-products) with the need for protection from the microbes (bacteria, viruses, and protozoans) that are killed by disinfection.

In 1992, EPA initiated a negotiated rule-making process. The negotiators consisted of State and local health and regulatory agency staff and elected officials, consumer groups, environmental groups, and representatives of public water systems. The process resulted in a two-stage approach for regulation development. The first stage of regulation is the draft Disinfectant/Disinfections By-products Rule (D/DBPR), which was proposed by the EPA on July 29, 1994. The final Stage 1 rule is expected in December 1997; however, this deadline may soon be revised (see Chapter 9).

Stage 1

Compounds affected under the first stage of the D/DBPR are:

- *Total Trihalomethanes (TTHMs)*
- *Total Haloacetic Acids (THAAs)*
- *Total Organic Carbon (TOC)*
- *Bromate*

- *Chlorine*
- *Chloramines*
- *Chlorine Dioxide*
- *Chlorite*

Stage 1 requirements apply to community water systems and nontransient, noncommunity water systems that treat their water with a chemical disinfectant for either primary or residual treatment. The effective dates for compliance with Stage 1 regulations vary based on system size and raw water source. The proposed date for promulgation of Stage 1 regulations is December 1996.

Proposed Maximum Contaminant Levels (MCLs)

THMs and THAAs will have MCLs of 0.080 mg/L and 0.060 mg/L, respectively. The proposed MCLs for bromate and chlorite are 0.010 mg/L and 1.0 mg/L, respectively. These levels are the annual averages of quarterly measurements.

Proposed Maximum Residual Disinfection Levels (MRDLs)

MRDLs for chlorine, chloramines, and chlorine dioxide will be 4.0 mg/L, 4.0 mg/L, and 0.80 mg/L, respectively.

Proposed TOC Removal Requirements

In addition to meeting MCLs and MRDLs, some water suppliers must also meet treatment requirements to control organics. Coagulation or enhanced softening must be used to remove TOC unless one of the following requirements is met:

- The system's treated water TOC levels are less than 2.0 mg/L prior to continuous disinfection.

- The system's source water, prior to any treatment, is less than 4.0 mg/L; the alkalinity is greater than 4.0 mg/L; and annual averages for THM and THAA are no more than 0.04 mg/L and 0.03 mg/L, respectively.
- THM and THAA annual averages are less than 0.04 mg/L and 0.03 mg/L respectively for systems using only chlorine for disinfection.

Stage 2

EPA will collect data on parameters that influence disinfection by-products formation and occurrence of DBPs in drinking water through the Information Collection Rule process (see Chapter 9). Based on this information and new data collected from research, EPA will reevaluate Stage 1 regulations and make changes as necessary.

As part of the plan to develop new standards under the Information Collection Rule, EPA is proposing a total trihalomethane MCL of 0.04 mg/L and a MCL of 0.03 mg/L for five haloacetic acid species (HAA5) to apply only to systems using surface water or groundwater under the direct influence of surface water and serving at least 100,000 persons.

The promulgation date for all community water systems and nontransient, noncommunity water systems is set for December 1998. The Stage 2 compliance date is set for 2004. For further information about development of the proposed regulation, call the Environmental Protection Agency Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 7

Federal Total Coliform Rule

The final Total Coliform Rule was promulgated on June 29, 1990 (54 FR 27544) and became effective on December 31, 1990. The Rule establishes microbiological standards and monitoring requirements which apply to all public water systems. The January 15, 1991 Federal Register (56 FR 1555) allows variances to MCL which meet the criteria for biofilm problems in the distribution system. Compliance is based on the presence or absence of total coliforms in a sample, rather than an estimate of coliform density. For example, to comply with MCL:

For systems analyzing at least 40 samples per month, no more than 5.0 percent of the monthly samples may be total coliform positive.

For systems analyzing less than 40 samples per month, no more than one sample per month may be total coliform positive.

For all systems, if a total coliform-positive routine sample is fecal coliform or *E. coli* positive and is followed by a total coliform-positive repeat sample, or a total coliform-positive routine sample is followed by a repeat sample that is fecal or *E. coli* positive, the acute MCL is violated.

Monitoring requirements for total coliforms are as follows:

- A written sample siting plan is required, subject to State review and revision.

- For both community and noncommunity water systems, monthly sample number requirements are based on population served; however, for noncommunity systems, the number also depends on the type of water source used.
- A system operator must collect a set of repeat samples for each total coliform-positive routine sample and have it analyzed for total coliforms. The system operator must collect all repeat samples within 24 hours of being notified of the original result, except where the State waives this requirement.
- If total coliforms are detected in any repeat sample, the system must collect another set of repeat samples unless the MCL has been violated and the operator has notified the State.
- If a system operator that collects fewer than five routine samples per month detects total coliforms in any routine or repeat sample, the operator must collect five routine samples in the month following a total coliform-positive sample. Under some conditions, the State can waive this requirement.
- Sanitary surveys are required for all systems collecting fewer than five samples per month. The initial surveys were required to be completed by June 29, 1994 for community water systems and June 29, 1999 for noncommunity systems. Subsequent surveys must be conducted every five years. Noncommunity systems using only protected disinfected groundwater must repeat surveys every ten years.
- Operators of unfiltered surface water systems, or systems using unfiltered groundwater under the direct influence of surface water, must collect and analyze one coliform sample each day the turbidity of the source water exceeds 1 nephelometric turbidity unit.
- The State may invalidate the results of some total coliform-positive samples only if it determines the results are due to laboratory error or some other condition which does not reflect the actual water quality within the distribution system.

For further information or copies of the federal Total Coliform Rule, call the Environmental Protection Agency Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 8

California State Total Coliform Regulations

The State of California has analogous total coliform regulations which are found under Title 22, Chapter 15 of the California Code of Regulations. DHS has set an enforceable drinking water standard for total coliforms, identical to that of the federal Total Coliform Rule, to reduce the risk of health effects. According to the regulations, each water supplier must develop and submit to DHS a routine sample siting plan for total coliform analysis. Water suppliers must then begin taking routine bacteriological water samples. Overall, the monitoring, compliance, and sanitary survey requirements of the State total coliform regulations are essentially identical to those of the federal Rule.

For further information regarding the State total coliform regulations, contact Alexis M. Milea, Department of Health Services, Division of Drinking Water and Environmental Management, 2151 Berkeley Way, Room 461b, Berkeley, CA 94704, (510) 540-2177. ■

Chapter 9

Federal Information Collection Rule

The Information Collection Rule is a product of the Negotiating Committee formed in 1992 as part of EPA's negotiated rule-making process. This is a process where EPA acts on an equal basis with outside parties to reach a consensus on the content of a proposed rule. The Committee was created to address concerns of controlling DBPs while controlling exposure to disease-causing pathogens. The Committee decided that there was a need to acquire additional information to better define the problem and identify possible solutions. It recommended that public water systems be required to collect data on DBPs and microorganisms for further development of the ESWTR and Stage 2 of the D/DBPR (see Chapters 4 and 6, respectively). The proposed rule affected surface water systems serving more than 10,000 persons and groundwater systems serving more than 50,000 persons. The proposed Information Collection Rule was published in the February 10, 1994 Federal Register.

The final Rule was published in the May 14, 1996 Federal Register. The most significant change in the Rule was the removal of public water systems that use surface water and serve less than 10,000 people. A provision was also added requiring all systems monitoring for microorganisms to also collect 18 months of data on viruses beginning early 1997. EPA will use the data to issue an Enhanced Surface Water Treatment Rule and Stage 2 of the D/DBPR between 1998 and 2000.

Public water systems serving greater than or equal to 100,000 people that use surface water or groundwater under the direct influence of surface water will be required to conduct 18 months of microbial monthly monitoring of source water. Microbial monitoring of treated water will be required only if *Giardia* or *Cryptosporidium* in the source water exceeded 10/L or total culturable viruses exceeded 1/L in any month during the first 12 months of monitoring. These public water systems will also be required to conduct 18 months of monthly monitoring for DBPs, DBP precursors, and other chemical parameters as shown in the chart below. Public water systems that use disinfectants other than free chlorine will be required to conduct analyses for parameters associated with those disinfectants. See Table III.

EPA will augment the data collected under the rule with its own three surveys:

1. EPA will survey 50 utilities serving a least 100,000 people for *Cryptosporidium* under more controlled laboratory conditions than the Information Collection Rule. The survey will be completed in 1997.
2. EPA will survey 50 utilities serving 10,000 to 100,000 people to test the validity of extrapolating data developed on large systems to medium systems. The survey will be completed in 1997.
3. EPA will conduct a survey of utilities serving less than 10,000 people to understand differences in systems serving smaller populations. This survey will be completed in 1998.

Following is the implementation schedule of the Information Collection Rule:

- | | |
|-----------------------|--|
| <i>June 1996:</i> | EPA mails notice to utilities expected to be subject to this rule. |
| <i>August 1996:</i> | Utilities initiate TOC monitoring and begin to prepare their sampling plans. |
| <i>November 1996:</i> | Utilities submit sampling plans. |
| <i>December 1996:</i> | EPA issues sampling plan decisions. |
| <i>February 1997:</i> | Sampling begins. |

For more information on the Information Collection Rule, contact the Environmental Protection Agency Safe Drinking Water Hotline at (800) 426-4791. ■

**Table III—General Monitoring Requirements for Public Water Systems
Serving 100,000 People or More Using Surface Water**

Microbial sampling parameters		DBP sampling parameters	
<i>Cryptosporidium</i>	Monthly monitoring of influent water for 18 months. A PWS must also monitor treated water if within the first 12 months of monitoring the concentration in source water is >10/L	Trihalomethanes, disinfectant residuals, haloacetic acids, haloacetonitriles, halo ketones, chloropicrin, chloral hydrate, ammonia, bromide, total organic carbon, total organic halides, pH, alkalinity, hardness	PWSs must monitor monthly for 18 months concurrently with microbial monitoring.
<i>Giardia</i>	Monthly monitoring of influent water for 18 months. A PWS must also monitor treated water if within the first 12 months of monitoring the concentration in source water is >10/L		
Total culturable viruses	Monthly monitoring of influent water for 18 months. A PWS must also monitor treated water if within the first 12 months of monitoring the concentration in source water is >1/L		
Total coliforms Fecal coliforms or <i>E. coli</i>	Monthly monitoring with <i>Giardia</i> and <i>Cryptosporidium</i>		

Chapter 10

Proposed Federal Radionuclides Rule

As a result of the 1986 Safe Drinking Water Act amendments, EPA has proposed a rule for radionuclides which establishes MCLs and National Primary Drinking Water Regulations for the following radionuclides: radium-226, radium-228, uranium, alpha emitters, and beta particle and photon emitters. The proposed rule was published in the July 18, 1991 Federal Register for radionuclides. The court-ordered deadline for the final rule was April 1995. However, EPA asked for and received an eight-month extension.

In the August 1996 Reauthorization of the Safe Drinking Water Act, EPA was directed to publish within 30 months, a new radon health risk reduction and cost/benefit analyses associated with possible mitigation measures. These analyses will be conducted by the National Academy of Sciences. EPA is to promulgate a radon MCL based on the new cost/benefit analysis process within three years. If this MCL is more stringent than necessary to reduce the drinking water contribution to indoor radon to levels lower than the equivalent national average concentration of radon in outdoor air, EPA shall simultaneously promulgate an alternative MCL. This alternative MCL would be at levels that would reduce contribution of drinking water to radon levels in indoor air equivalent to the national average concentration of radon in outdoor air. If an alternative MCL is promulgated, EPA will be required to set guidelines for States to follow.

The regulations in the July 1991 draft Radionuclides Rule apply to all community and all nontransient, noncommunity public water systems. The proposed regulations do not apply to private water suppliers (systems serving fewer than 25 persons).

Proposed MCLs

MCLs for radionuclides are set as follows: Radium-226 at 20 pCi/L; radium-228 at 20 pCi/L; uranium at 20µg/L (30 pCi/L); beta and photon emitters at 4 mrem ede/yr; and alpha emitters at 15 pCi/L.

EPA also identifies the best available technology (BAT) for contaminant removal. Technologies are judged to be BAT based on the following factors: high removal efficiency, general geographic applicability, reasonable cost, reasonable service life, compatibility with other water treatment processes, and the ability to bring all of the water in a system into compliance. BATs are summarized in the July 18, 1991 Federal Register for radionuclides.

EPA has also proposed compliance monitoring requirements for radionuclide contaminants which are also outlined in the July 18, 1991 Federal Register.

For more information about the proposed Radionuclide Rule, contact the Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 11

Phase I Rule

The final Phase I Rule was promulgated in the Federal Register (Vol. 52, No. 130) on July 8, 1987. The rule established MCLs, MCLGs, and BATs for eight Volatile Organic Chemicals (VOCs). The rule also set monitoring, reporting, and public notification requirements for these compounds.

Quarterly samples are required for each ground-water and surface water source. Composite samples can be submitted; however, they may not exceed more than five sources. Monitoring periods are determined by system sizes.

Phase I regulations went into effect on January 9, 1988. Contaminants regulated under the Phase I Rule are listed below. The primary and secondary MCLs for these contaminants are listed in Table I of Chapter 1. ■

VOCs:

- benzene
- carbon tetrachloride
- p-dichlorobenzene
- 1,2-dichloroethane
- 1,1-dichloroethylene
- 1,1,1-trichloroethane
- trichloroethylene
- vinyl chloride

Chapter 12

Phase II & IIB Rules

The final Phase II Rule was promulgated in the Federal Register (Vol. 56, No. 20) on January 30, 1991. The rule regulates 16 Synthetic Organic Chemicals (SOCs), 10 VOCs, and 7 Inorganic Chemicals (IOCs). It contains MCLs, MCLGs, and treatment techniques for these chemicals. The rule also contains monitoring, reporting, and public notification requirements for these compounds.

Phase II regulations went into effect on July 30, 1992. Contaminants regulated under the Phase II Rule are listed below. The primary and secondary MCLs for these contaminants are listed in Table I of Chapter 1.

Contaminants Regulated Under Phase II Rule

SOCs:

Acrylamide
Alachlor
Atrazine
Carbofuran
Chlordane
Polychlorinated biphenyls
1,2-Dibromo-3-chloropropane
2,4,5-TP (Silvex)
2,4-D
Epichlorohydrin
Ethylene dibromide
Heptachlor
Heptachlor epoxide
Lindane
Methoxychlor
Toxaphene

VOCs:

cis-1, 2-Dichloroethylene
1,2-Dichloropropane
Monochlorobenzene
o-Dichlorobenzene
Ethylbenzene
Styrene
Tetrachloroethylene
Toluene
Trans-1, 2-Dichloroethylene
Xylenes (Total)

IOCs:

Asbestos
Cadmium
Chromium
Mercury
Nitrate
Nitrite
Selenium

Five of the original 38 chemicals proposed in Phase II were repropoed in a separate rule known as Phase IIB. These chemicals are aldicarb, aldicarb sulfoxide, aldicarb sulfone, pentachlorophenol, and barium. Changes in the health basis for these chemicals resulted in the reproposal. The final Phase IIB Rule was published in the Federal Register on July 1, 1991, and became effective on January 1, 1993. ■

Chapter 13

Phase V Rule

The final Phase V Rule was promulgated on July 17, 1992. The rule regulates 15 SOCs, 6 IOCs, and 3 VOCs. Although sulfate was included in the proposed regulation, due to its potentially high treatment cost and mild health risk, it was deleted from the final rule. A proposed Sulfate Rule is expected by May 31, 1998.

The Phase V Rule established MCLGs, MCLs, laboratory criteria, and BAT for these 24 contaminants. These regulations apply to all community and nontransient noncommunity systems. Public water systems with 150 or more connections will begin monitoring in the first compliance period from January 1, 1993 to December 31, 1995. Smaller systems will begin monitoring from January 1, 1996 to December 31, 1998.

Initial monitoring waivers are based on vulnerability assessments. Although initial monitoring waivers are only allowable for SOCs and cyanide, reduced monitoring may be possible for many contaminants if sampling results show no detections or concentrations "consistently" below the MCLs. However, monitoring may have to be increased if sampling results are higher than "trigger" levels set for a contaminant.

Contaminants regulated under the Phase V Rule are listed below. The primary and secondary MCLs for these contaminants are listed in Table I of Chapter 1. ■

Contaminants Regulated Under the Phase V Rule

SOCs:

Benzo(a)pyrene
Dalapon
Di(2-ethylhexyl)adipate
Di(2-ethylhexyl)phthalate
Dinoseb
Diquat
Endothall
Endrin
Glyphosate
Hexachlorobenzene
Hexachlorocyclopentadiene
Oxamyl (Vydate)
Picloram
Simazine
2,3,7,8-TCDD (Dioxin)

VOCs:

Dichloromethane
1,2,4-Trichlorobenzene
1,1,2-Trichloroethane

IOCs:

Antimony
Beryllium
Cyanide
Nickel
Sulfate
Thallium

State Adoption of Phase I, IIA & B, and V Rules

The State has adopted Phase I, IIA & B, and V Rules. In some cases, like toluene and monochlorobenzene, the State's MCLs are more stringent than federal MCLs. ■

Chapter 14

Status of Phase VIB

When Congress amended the Safe Drinking Water Act in 1986, it required EPA to regulate 25 new contaminants, every 3 years. Phase VIB was to address the last set of contaminants to be regulated. Many of the contaminants in Phase VIB had relatively little health-based data and could be costly to control in water treatment systems.

The proposed rule was initially due to be published by February 28, 1995; however, EPA requested the deadline be extended to October 21, 1996. The August 1996 Safe Drinking Water Act Amendments suspended developmental work on Phase VIB. The previous law's demand for EPA to develop 25 new standards every 3 years was replaced with a new process based on occurrence, relative risk, and cost-benefit analyses. EPA will select at least five new candidate contaminants to consider for regulation every five years. Regulation must be geared toward contaminants posing the greatest health risks. For more information regarding the new regulations, contact the Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 15

Proposed Federal Sulfate Regulations

A federal rule for sulfate was proposed by EPA in the December 20, 1994 Federal Register. This rule set both MCLGs and MCLs for sulfate at 500 mg/L. The rule was originally proposed in 1990 with a larger group of contaminants, but was deferred because of the significant economic effects on a large number of water systems.

The proposed rule would affect all community water systems and noncommunity water systems, including transient water systems. In addition to compliance with the sulfate MCL, operators of water systems will also be required to provide alternative water and public education/notification to targeted sensitive populations. Alternative water is defined as either bottled water that complies with all EPA MCLs, or water treated by point of use or point of entry devices.

In the August 1996 Safe Drinking Water Act Amendments, EPA and the Center for Disease Control were directed to study the health risk effects of sulfate in drinking water within 30 months. EPA must include sulfate as one of the five contaminants to be considered for regulation in the first five-year cycle of the new regulatory process. For more information, contact the Safe Drinking Water Hotline at (800) 426-4791. ■

Chapter 16

Schedule of Federal Drinking Water Regulations

This chapter presents a federal regulatory schedule of past, present, and future drinking water regulations under the federal Safe Drinking Water Act. The information compiled in this table was obtained from the Environmental Protection Agency Safe Drinking Water Hotline (800) 426-4791. ■

Table IV—Schedule of Federal Drinking Water Regulations

Month/Year	Regulations
Pre-1986	National Interim Primary Drinking Regulations
4/86	Fluoride (revised)
7/87	Final Phase I VOCs
11/87	Proposed Surface Water Treatment Rule
11/87	Proposed Total Coliform Rule
5/89	Proposed Phase II SOCs & IOCs
6/89	Final Surface Water Treatment Rule
6/89	Final Total Coliform Rule
7/90	Proposed Phase V SOCs & IOCs
1/91	Final Phase II SOCs & IOCs
1/91	Reproposed Phase II (Phase IIB)
6/91	Final Lead & Copper Rule
7/91	Proposed Radionuclides Rule (Phase III)
7/91	Final Phase IIB
6/92	Sulfate deleted from Phase V
6/92	Phase IIB postponement by court
7/92	Final Phase V SOCs & IOCs
12/93	Phase IIB reproposal
12/93	Fluoride
2/94	Proposed Information Collection Rule
7/94	Proposed Phase VIA (D\DBP Rules)
7/94	Proposed Enhanced Surface Water Treatment Rule
12/94	Proposed Sulfate Regulations
12/94	Reproposed Sulfate Rule
5/96	Final Information Collection Rule
2000*	Final Radionuclides Rules
1999*	Proposed Arsenic Rule
*	Final Phase IIB
(Indefinite)	Final Sulfate Rule
1999*	Final Phase VIA (D\DBP Rules with Enhanced SWTR)
2000*	Final Groundwater Disinfection Rule
2000*	Final Arsenic Rule

* Expected Dates