

A SUMMARY OF THE 1986 AMENDMENTS TO THE SAFE DRINKING WATER ACT

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The Safe Drinking Water Act (SDWA) of 1974 includes legislation which gives the Environmental Protection Agency (EPA) ultimate authority over all public water supplies. EPA's Office of Drinking Water manages the Public Water System Supervision Program, one of two national programs mandated by the SDWA. The SDWA requires EPA to develop National Primary Drinking Water Regulations for contaminants which may have adverse effects on human health. In addition, the SDWA requires EPA to monitor and enforce the Primary Drinking Water Regulations in order that drinking water supplies comply with maximum contaminant levels (MCLs).

Public water systems are required by the SDWA to conduct monitoring, maintain records, and provide such information as is needed for EPA to carry out its monitoring and enforcement responsibilities under the SDWA. The governments of 54 states and territories have assisted primary enforcement responsibility (primacy) for public water systems, and EPA relies on these governments for implementation of these monitoring requirements. EPA is responsible for these activities in the two non-primacy states and on Indian Lands.

Over the next several years, the public water supply program will be experiencing sweeping changes as a result of implementation of the 1986 Amendments to the SDWA. Congress amended the SDWA in order to strengthen it, particularly the regulation-setting process and groundwater protection. Also, the development of improved analytical techniques and increased awareness of the public made it necessary that a number of additional contaminants be addressed by the regulations.

The 1986 Amendments to the SDWA require that EPA develop numerical standards or a treatment technique for 83 drinking water contaminants based upon the degree to which the contaminants can be removed using best available treatment (BAT) technologies. The 83 contaminants to be regulated are listed in Table 1 and include synthetic organic chemicals, inorganic chemicals, microbiological organisms and radiological substances.

In addition to the 83 contaminants to be regulated, the 1968 Amendments included a number of other responsibilities. EPA must establish criteria by which states must determine which surface water systems must install filtration, and develop a treatment technique regulation which will require all public water systems to use disinfection. Also, requirements must be set for public water systems to monitor for a number of unregulated contaminants.

Additional responsibilities under the

Amendments include initiation of a prohibition on the use of lead pipes, solder, and flux. EPA must establish public notification criteria to which states must adhere when water systems violate standards.

The 1986 Amendments have given EPA new enforcement authorities. EPA can issue administrative orders or begin court action against public water systems in violation when states do not take timely and appropriate enforcement action or when states refer cases for federal enforcement. Also, the maximum civil penalties that may be applied have been increased from \$5,000 to \$25,000 per day.

EPA's standard-setting program for drinking water contaminants has been affected by the 1986 Amendments to the SDWA. EPA is to develop maximum contaminant level goals (MCLGs) and maximum contaminant levels (MCLs) for all contaminants to be regulated. This includes the 83 specific contaminants and any other which may have any adverse effect upon the health of persons and which is known or anticipated to occur in public water systems.

MCLGs, formerly (Recommended Maximum Contaminant Levels - RMCLs) are non-enforceable health goals which are to be set at the level at which no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety. MCLs must be set as close to MCLGs as is feasible. Feasible now means with the use of the best technology, treatment techniques and other means, which the Administrator (of EPA) finds, after examination for efficacy under field conditions, are available (taking costs into consideration). MCLGs and MCLs must be proposed at the same time and also promulgated simultaneously. MCLGs and MCLs as well as monitoring requirements and BAT are to be set for the 83 contaminants listed in the SDWA.

Following is the status of the development of National Primary Drinking Water Regulations as of March 1989.

Final rules for the Volatile Organic Chemicals (VOCs) were published in the **Federal Register** on July 8, 1987 (52 FR 25690). The final MCLGs and MCLs for the VOCs are shown in Table 2. These rules included monitoring for 51 VOCs unregulated VOCs, 36 are specified and are shown in Table 2 and 15 are at the state's discretion.

Rules for fluoride were published on April 2, 1986 (41 FR 11386). The MCLG for fluoride is 4.0 mg/l, the MCL is 4.0 mg/l and the secondary MCL (SMCL) is 2.0 mg/l. The SMCL is non-enforceable and is for aesthetic qualities.

Rules for 38 Synthetic Organic Chemicals

(SOCs) and Inorganic Chemicals (IOCs) are scheduled to be repropose no later than April 30, 1989. Tables 3 and 4 list these contaminants and existing standards and proposed MCLGs.

The lead and copper rule was proposed on August 18, 1989. The MCL for lead is proposed to be changed from 0.050 mg/l at the tap to 0.005 mg/l as water leaves the treatment plant. The MCL for copper is proposed at 1.3 mg/l. In addition, water systems must institute corrosion control when the lead average levels exceeds 0.010 mg/l when measured after water has been standing in pipes for a long period of time (i.e. overnight), or if the pH of more than 5% of samples exceeds 8.0, or if copper in more than 5% of targeted samples exceeds 1.3 mg/l. Public education is required when the lead level average exceeds 0.010 mg/l or lead levels in more than 5% of targeted samples exceed 0.020 mg/l.

Proposed rules for radionuclides should be published later in 1989. The difficulty in proposing this rule is selecting a MCL for radon.

Proposed rules for the Phase V contaminants (25 other SOCs and IOCs) will be published late in 1989 or in 1990. These contaminants are listed in Table 5.

The Amendments allow EPA to substitute up to seven contaminants in the list of 83. These substitutes were published on January 22, 1988 (53 FR 1892) and are also listed in Table 5.

The proposed surface water treatment rule (SWTR) was published on May 6, 1988 (53 FR 16348). The final rule should be published by June 19, 1989. The proposed rule requires that all public water systems using any surface water must disinfect, and may be required to filter, unless certain water quality source requirements and site specific conditions are met. This determination is to be made by the state. Treatment technique requirements in lieu of MCLs, are proposed for *Giardia*, viruses, heterotrophic plate count bacteria, *Legionella* and turbidity. Treatment must achieve at least 99.9% removal and/or inactivation of *Giardia lamblia* cysts and 99.9 % removal and/or inactivation of enteric viruses. In addition, all systems are required to be operated by qualified operators as determined by the state.

The total coliform rule was proposed in the **Federal Register** on November 3, 1987 (52 FR 42224). It is scheduled to be final by June 19, 1989. The currently preferred option is based on the presence or absence of total coliforms in the sample, rather than the existing rule which is based on an estimate of coliform density. Compliance requires that there be no more than one coliform positive-sample/month for systems that analyze fewer than 40 samples/month. Systems must report all total coliform-positive samples to the state. A set of repeat samples must be collected if total coliforms are detected in any sample. If any routine or repeat sample is total coliform-positive, the system must

analyze total coliform-positive culture medium to determine if fecal coliforms are present or test for *E. coli* and notify the states within 24 hours if fecal coliform or *E. coli* are present. There remain a few unresolved issues at this time concerning follow-up monitoring.

EPA is working on a disinfection/disinfection by-products rule. Proposal of this rule is scheduled for late 1989-early 1990. Disinfection by-products include trihalomethanes (chloroform, bromoform, bromodichloromethane and dibromochloromethane). The existing standard for total trihalomethanes is 0.1 mg/l (44 FR 68624).

EPA must also publish a drinking water priority list of contaminants that may require regulation under the SDWA. The seven substituted contaminants must be included on this list which must be published by January 1, 1988, and every three years following MCLGs, MCLs and monitoring requirements for at least 25 contaminants on the list must be set by January 1, 1991. This process is to be repeated every three years following January 1, 1991, from subsequent triennial lists. The Drinking Water Priority List is shown in Table 6.

The 1986 Amendments allowed public notification rules to be changed to provide for different types and frequencies of notice depending on the potential health risk. Final public notice regulations were published in October 1987. The regulations also require a special public notice for lead and for fluoride SMCL.

BAT for issuance of variances must be determined when MCLs are established. BAT may vary depending on the size of systems and other factors, including costs. Exemptions can be extended for systems with 500 connections or less. No limit is placed on the number of extensions but certain criteria must be met.

All current drinking water regulations, which have been promulgated as of July 1 in any year, may be found in the Code of Federal Regulations (CFR), Volume 40, Parts 141, 142, and 143. Regulations published between CFR editions may be found in the **Federal Register (FR)**.

References

- American Water Works Association, 1987. New Dimensions in Safe Drinking Water, Denver, CO.
- Association of State Drinking Water Administrators and U.S. Environmental Protection Agency, 1988. State Costs of Implementing the 1986 Safe Drinking Water Act Amendments, Preliminary Results, Arlington, VA.
- Camp Dresser & McKee, Inc., 1988. Summary of the Safe Drinking Water Act Regulations, Boston.
- U.S. Environmental Protection Agency, 1988. FACT SHEET: Drinking Water Regulations Under the Safe Drinking Water Act, Washington, D.C.
- U.S. Environmental Protection Agency, 1988. Drinking Water Protection: Five-Year Implementation Strategy, Washington, D.C.

TABLE 1: Contaminants Required to be Regulated under the SDWA of 1986**Volatile Organic Chemicals**

Trichloroethylene	Benzene
Tetrachloroethylene	Chlorobenzene
Carbon tetrachloride	Dichlorobenzene
1,1,1-Trichloroethane	Trichlorobenzene
1,2,-Dichloroethane	1,1-Dichloroethylene
Vinyl chloride	trans-1,2,Dichloroethylene
Methylene chloride	cis-1,2,-Dichloroethylene

Microbiology and Turbidity

Total coliforms	Viruses
Turbidity	Standard plate count
Giardia lamblia	Legionella

Inorganics

Arsenic	Molybdenum
Barium	Asbestos
Cadmium	Sulfate
Chromium	Copper
Lead	Vanadium
Mercury	Sodium
Nitrate	Nickel
Selenium	Zinc
Silver	Thallium
Fluoride	Beryllium
Aluminum	Cyanide
Antimony	

Organics

Endrin	1,1,2-Trichloroethane
Lindane	Vydate
Methoxychlor	Simazine
Toxaphene	PAH's
2,4,-D	PCB's
2,4,5-TP	Atrazine
Aldicarb	Phthalates
Chlordane	Acrylamide
Dalapon	Dibromochloropropane (DBCP)
Diquat	1,2-dichloropropane
Endothall	Pentachlorophenol
Glyphosate	pichloram
Carbofuran	Dinoseb
Alachlor	Ethylene dibromide (EDB)
Epichlorohydrin	Dibromomethane
Toluene	Xylene
Adipates	Hexachlorocyclopentadiene
2,3,7,8-TCDD (Dioxin)	

Radionuclides

Radium 226 and 228	Gross alpha particle activity
Uranium	Beta particle and photon radioactivity
Radon	

TABLE 2: VOCs:Final MCLGs and MCLs (in mg/l)

	Final MCLG*	Final MCL
Trichloroethylene	zero	0.005
Carbon Tetrachloride	zero	0.005
Vinyl Chloride	zero	0.002
1,2 Dichloroethane	zero	0.005
Benzene	zero	0.005
para-Dichlorobenzene	0.0	0.075
1,1-Dichloroethylene	0.007	0.007
1,1,1-Trichloroethane	0.2	0.2

*Final MCLGs were published Nov. 13, 1985. The MCLG and MCL for p-dichlorobenzene were republished at zero and 0.005 mg/l on April 17, 1987; comment was requested on levels of 0.075 mg/l and 0.075 mg/l, respectively.

Monitoring for Unregulated VOCs

Required for all systems:

- | | |
|------------------------------|--------------------------------|
| 1 chloroform | 19 1,2-dichloropropane |
| 2 bromodichloromethane | 20 1,1,2,2-tetrachloroethane |
| 3 chlorodibromomethane | 21 ethylbenzene |
| 4 bromoform | 22 1,3-dichloropropane |
| 5 trans 1,2-dichloroethylene | 23 styrene |
| 6 chlorobenzene | 24 chloromethane |
| 7 m-dichlorobenzene | 25 bromomethane |
| 8 dichloromethane | 26 1,2,3-trichloropropane |
| 9 cis-1,2-dichloroethylene | 27 1,1,1,2-tetrachloroethane |
| 10 O-dichlorobenzene | 28 chloroethane |
| 11 dibromomethane | 29 1,1,2-trichloroethane |
| 12 1,1-dichloropropene | 30 2,2-dichloropropane |
| 13 tetrachloroethylene | 31 o-chloroaniline |
| 14 toluene | 32 p-chlorotoluene |
| 15 p-xylene | 33 bromobenzene |
| 16 o-xylene | 34 1,3-dichloropropene |
| 17 m-xylene | 35 ethylene dibromide |
| 18 1,1-dichloroethane | 36 1,2-dibromo-3-chloropropane |

Required for Vulnerable Systems:

Ethylene dibromide (EDB)
1,2-Dibromo-3-chloropropane

State Discretion:

- | | |
|--------------------------|----------------------------|
| 1 1,2,4-trimethylbenzene | 8 1,2,5-trimethylbenzene |
| 2 1,2,4-trichlorobenzene | 9 p-isopropyltoluene |
| 3 1,2,3-trichlorobenzene | 10 isopropylbenzene |
| 4 n-propylbenzene | 11 tert-butylbenzene |
| 5 n-butylbenzene | 12 sec-butylbenzene |
| 6 naphthalene | 13 fluorotrichloromethane |
| 7 hexachlorobutadiene | 14 dichlorodifluoromethane |
| | 15 bromochloromethane |

TABLE 3: Proposed MCLGs for SOCs

<u>SOC</u>	<u>Existing NIPDWR (mg/l)</u>	<u>Proposed MCLG (mg/l)</u>
Acrylamide		zero
Alachlor		zero
Aldicarb, aldicarb sulfoxide and aldicarb sulfone		0.01
Atrazine		0.003
Carbofuran		0.04
Chlordane		zero
cis-1,2-Dichloroethylene		0.07
Dibromochloropropane(DBCP)		zero
1,2-Dichloropropane		zero
o-Dichlorobenzene		0.6
2,4-D	0.1	0.07
Ethylenedibromide (EDB)		zero
Epichlorohydrin		zero
Ethylbenzene		0.7
Heptachlor		zero
Heptachlor epoxide		zero
Lindane	0.004	0.0002
Methoxychlor	0.1	0.4
Monochlorobenzene		0.1
(PCBs)(as decachlorobiphenyl)		zero
Pentachlorophenol		0.2
Styrene		zero
Tetrachloroethylene		zero
Toluene		2.0
2,4,5-TP	0.01	0.05
Toxaphene	0.005	zero
trans-1,2-Dichloroethylene		0.01
Xylene		

TABLE 4: Proposed MCLGs for IOCs

<u>IOC</u>	<u>Existing NIPDWR (mg/l)</u>	<u>Proposed MCLG mg/l</u>
Asbestos		7 FL.
Barium	1.0	5
Cadium	0.010	0.005
Chromium	0.05	0.1
Mercury	0.002	0.002
Nitrate (as Nitrogen)	10	10
Nitrite (as Nitrogen)		1.0
Selenium	0.01	0.05

MFL = million fibers per liter

* 7 million fibers/liter (only fibers longer than 10 um)

TABLE 5: Other IOCs And SOCs

Arsenic	Nickel
Methylene Chloride	Thallium
Antimony	Beryllium
Endrin	Cyanide
Dalapon	1,1,2-Trichloroethane
Diquat	Vydate
Endothall	Simazine
Glyphosate	PAHs
Andipates	Atrazine
2,3,7,8-TCDD (Dioxin)	Phthalates
Trichlorobenzene	Pichloram
Sulfate	Dinoseb
Hexachlorocyclopentadiene	

Removed from SDWA List of 83:

Zinc	Sodium	Vanadium
Silver	Molybdenum	Dibromomethane
Aluminum		

Substituted into SDWA List of 83:

Aldicarb sulfoxide	Heptachlor eoxide
Aldicarb sulfone	Styrene
Ethylbenzene	Nitrite
Heptachlor	

TABLE 6: Priority List of Drinking Water Contaminants

1,1,1,2-tetrachloroethane	bromoform	hypochlorite ion
1,1,2,2-tetrachloroethane	chloramine	isophorone
1,1-dichloroethane	chlorate	methyl tertbutyl ether
1,2,3-trichloropropane	chlorine	
1,3-dichloropropane	chlorite	
1,3-dichloropropene	chloroethane	
2,2-dichloropropane	chloroform	
2,4,5-T	chloromethane	
2,4-dinitrotoluene	chloropicrin	
aluminum	cryptosporidium	
ammonia	cyanazine	
boron	cyanogen chloride	
bromobenzene	dibromoacetone	
bromochloroacetonitrile	dibromochloromethane	
bromodichloromethane	dibromomethane	
dichloroacetonitrile	dicamba	
FTU	trifluralin	
metolachlor	vanadium	
metribuzin	zinc	
molybdenum	o-chlorotoluene	
ozone byproducts	p-chlorotoluene	
silver	halogenated acids, alcohols	
sodium	aldehydes, ketones, and other	
strontium	nitriles	
trichloroacetonitrile		