

## Summary

On this 25th anniversary of the founding of the Council, we can look back on many accomplishments of the organization. We see that it has had a positive influence on water resources, research, and education programs at the

university level and on research at the national level. These activities have also stimulated additional support in many states. This has been accomplished by the exchange of ideas at the annual meetings, activities of committees, and testimony of its officers and delegates on national legislation, resolutions and policies.

# WATER RESOURCES ISSUES: SAFE DRINKING WATER ACT AMENDMENTS OF 1986

Joseph A. Cotruvo\*

After months of deliberation, the United States House and Senate passed final legislation to renew and amend the 1974 Safe Drinking Water Act. The Amendments restricted part of the Environmental Protection Agency's discretion in setting standards for contaminants in drinking water. Previously, EPA had set primary standards for 26 substances including inorganic and organic chemicals, radionuclides and biological contaminants, plus 12 secondary standards and monitoring requirements for sodium and corrosion.

In addition to requiring the EPA to set additional standards for contaminants possibly in drinking water, the amended Act gave the Agency the power to issue administrative orders to force water systems operators to comply with federal standards. The Amendments also create a ground-water protection program which requires states to develop plans to protect public drinking water system wellfields from contamination. Other provisions in the Amendments require the EPA to develop regulations requiring the disinfection of drinking water and filtering of surface supplies, and to provide a schedule for monitoring other contaminants which may pose a health risk. They also forbid use of lead-containing materials in solder and plumbing after June 1988. A brief examination will be made of the timetable and standard-setting process, the monitoring requirements, the filtration and disinfection criteria, the variances and exemptions from the requirements, and the wellfield protection program.

## Timetable and Standard-Setting

Included in the 1986 Amendments is a list of 83 specific contaminants which were identified by EPA as candidates

in advance notices of proposed rulemaking in 1982 and 1983. Under the legislation, EPA will set Maximum Contaminant Level Goals (formerly called "Recommended Maximum Contaminant Levels"), and Maximum Contaminant Levels for nine of the listed contaminants within twelve months of enactment. The agency is further required to set standards for 40 additional listed contaminants in 24 months from the date of enactment, and the remaining 34 in 36 months from the date of enactment (by 1989). In addition, the SDWA requires that every three years EPA list contaminants that present public health concerns which need to be regulated.

The Maximum Contaminant Level Goals (MCLGs) are to be set at a level "... at which no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety." The Maximum Contaminant Levels (MCLs) are to be set as close to the MCLGs as is "feasible." The definition of feasible is "... within the use of best technology, treatment techniques and other means, which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking costs into consideration)." The Amendments identify granular activated carbon filters as a "feasible" treatment for the removal of synthetic organic chemicals. Maximum Contamination Levels for synthetic organic chemicals will be based on the efficiency with which these filters can remove them. However, EPA may designate another technology as the "best available" for meeting MCL's as long as it is at least as effective as activated carbon. Included in its issuance of MCLGs and MCLs, EPA must designate the best treatment technique, within the

\*Director, Criteria and Standards Division, Office of Drinking Water, U.S. Environmental Protection Agency

definition of "feasible," to meet the quantitative standards of the MCL.

Alternatively, EPA may specify a treatment technique instead of an MCL in situations where it finds that "it is not economically or technologically feasible" for a public drinking water system to monitor for the substance. Those utilities which cannot meet the MCL, even with the application of best available treatment technology, will be eligible for variances.

Presently, the EPA has established MCLGs and MCLs for eight volatile organic chemicals (VOCs) and for one inorganic chemical (IOC). They have also designated a best available technology as Packed Tower Aeration (PTA) or as Granular Activated Carbon (GAC) for seven of the VOCs and Packed Tower Aeration for vinyl chloride.

VOC	MCLG (mg/l)	MCL (mg/l)	BAT
Trichloroethylene	0	.005	PTA/GAC
Carbon Tetrachloride	0	.005	PTA/GAC
Vinyl Chloride	0	.002	PTA
1,2-Dichloroethane	0	.005	PTA/GAC
Benzene	0	.005	PTA/GAC
para-Dichlorobenzene	.075	.075	PTA/GAC
1,1-Dichloroethylene	.007	.007	PTA/GAC
1,1,1-Trichloroethane	.2	.2	PTA/GAC
<b>IOC</b>			
Fluoride	4	4	Activated Alumina Reverse Osmosis

(mg/l) = milligrams per liter

In addition, EPA has set proposed MCLGs for 29 synthetic organic chemicals (SOCs), 11 inorganic chemicals, and 4 microbiological parameters, and is preparing MCLGs and MCLs for 6 radionuclides for publication in 1988.

IOC	Existing NIPDWR (mg/l)	Proposed MCLG (mg/l)
Arsenic	0.050	0.05
Asbestos	—	7.1 mf/l
Barium	1.0	1.5
Cadmium	0.010	0.005
Chromium	0.05	0.12
Copper	—	1.3
Lead	0.05	0.02
Mercury	0.002	0.003
Nitrate (as Nitrogen)	10.0	10.0
Nitrite (as Nitrogen)	—	1.0
Selenium	0.01	0.045

mg/l = milligrams per liter

mf/l = million fibers per liter (longer than 10 μm)

SOC	Existing NIPDWR (mg/l)	Proposed MCLG (mg/l) (1985)
Acrylamide	—	zero
Alachlor	—	zero
Aldicarb, Aldicarb sulfoxide, and Aldicarb sulfone	—	0.01
Carbofuran	—	0.036
Chlordane	—	zero
cis-1,2-Dichloroethylene	—	0.07
DBCP	—	zero
1,2-Dichloropropane	—	0.006
0-Dichlorobenzene	—	0.62
2,4-D	0.1	0.07
EDB	—	zero
Epichlorohydrin	—	zero
Ethylbenzene	—	0.68
Heptachlor	—	zero
Heptachlor epoxide	—	zero
Lindane	0.004	0.0002
Methoxychlor	0.1	0.34
Monochlorobenzene	—	0.06
PCBs	—	zero
Pentachlorophenol	—	0.22
Styrene	—	0.14
Toluene	—	2.0
2,4,5-TP	0.01	0.05
Toxaphene	0.005	zero
Trans-1,2-Dichloroethylene	—	0.07
Xylene	—	0.44

Microbiological Parameter	Existing NIPDWR	Proposed MCLG's
Total Coliforms	1-4/100 ml	zero
Turbidity	1-5 NTU	0.1 NTU
Giardia	—	zero
Viruses	—	zero

NTU = Nephelometric turbidity unit

Radionuclides	Draft MCLG's
Radium 226	zero
Radium 228	zero
Uranium	zero
Radon	zero
Gross Alpha particle	zero
Beta particle and photon radioactivity	zero

According to SDWA, EPA may make up to seven substitutions of listed contaminants for others that are identified as potential health threats. A final list of substitutes and candidates for removal from the list of 83 was developed by the EPA on January 22, 1988.

#### Removed from List of 83

Zinc	Sodium	Vanadium
Silver	Molybdenum	Dibromomethane
Aluminum		

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Substituted into List of 83

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Aldicarb sulfoxide	Aldicarb sulfone	Ethylbenzene
Heptachlor epoxide	Heptachlor	Styrene
Nitrite		

#### Monitoring Requirements -

The monitoring requirements for listed contaminants were developed with the first phase of MCLGs and MCLs in June of 1987. Monitoring of listed contaminants is to be done every four years initially, subsequently varying from quarterly to once every five years depending on whether contaminants are found in the initial monitoring and whether the system is vulnerable to contamination. The initial monitoring for volatile organic chemicals is to be done for surface and groundwater as four quarterly samples, with the stipulation that the state can exempt systems from subsequent monitoring if no VOCs are detected in the first sample.

The timetable that was developed for phasing in the monitoring requirements was based on the size of the system. Those systems which serve 10,000 or more people must meet the monitoring requirements within one year, and should begin monitoring by January 1, 1988. Systems serving between 3,300 and 10,000 people must begin monitoring by December 31, 1989. Finally, the smallest-sized class, those serving less than 3,300, has four years to begin monitoring, or until January 1, 1991.

Monitoring of unregulated contaminants is also required by the Amendments and was included in the June 1987 regulations. The regulations specify up to 50 VOCs which are not regulated and require all systems to sample each drinking water source once in a four year period for their presence. This list of 50 is divided into three groups: 33 of the VOCs must be tested for by all utilities; 2 of the VOCs must be tested for by vulnerable systems; and 15 of the VOCs are to be tested for at the discretion of the state. The states will have the opportunity to delete some of the contaminants from the EPA monitoring list based on their assessment that they are not likely to be found. These state-initiated deletions are subject to approval by the EPA, although the states may add to the list without such approval.

#### Filtration and Disinfection

The Amendments gave EPA 18 months to develop filtration criteria for those utilities that use surface

water. These criteria were to be developed based on such factors as the quality of the water supplies, the degree to which supplies are protected through watershed management and the treatment techniques the utility uses. The deadlines for state compliance with the federal regulations are as follows:

- within 18 months of the establishment of the federal criteria, states must adopt conforming regulations.
- within an additional 12 months, states must decide which utilities need to filter their water.
- within another 18 months utilities must install the designated filtering facilities.

To date the Surface Water Treatment Rule has been proposed that would apply to all utilities that use surface water. A treatment technique has been provided in lieu of MCLs for *Giardia lamblia*, viruses and certain bacteria. In addition, certain site-specific conditions are to be met such as disinfection levels, monitoring, and waterborne disease-outbreak history. In certain conditions where the source water quality meets specified criteria, exceptions from the filtering are permitted.

The disinfection requirements for those water suppliers which are unfiltered state that all systems must disinfect. Performance criteria, which require 99.99 percent inactivation of *Giardia* and enteric viruses, operation criteria detailing disinfectant concentration, contact times, and design criteria are also included. The proposed monitoring requirement for unfiltered systems is for continuous monitoring of disinfectant concentration and of residual disinfectant concentration. All systems that do not filter their water are required to meet source water quality and other site-specific criteria within 30 months of promulgation; otherwise, they must begin filtering their water within 48 months of promulgation. Those systems that have filtered water supplies are required to obtain the same performance criteria as was noted earlier by using both filtration and disinfection. The monitoring requirements are the same as for those utilities that do not filter. EPA is now taking comment on these proposals and considering additional options. Final regulations are expected by the end of 1988.

The SDWA Amendments also call for EPA to issue regulations within 36 months that require all utilities to disinfect their water. Included in this regulation will be grounds for variances from the requirement. The primary disinfection regulations will be developed in 1989-90 in concert with comprehensive revised regulations on the chemical byproducts of disinfection.

## Variations and Exemptions

Utilities may obtain variations or exemptions from requirements set by EPA under the Amendments. EPA can vary its application or get available technology depending upon the number of people served by the utility or “other physical conditions related to engineering feasibility and cost of compliance.” Utilities that install best available technology and still exceed the MCL may apply for a variance.

Exemptions of up to three years may be provided by the EPA or by states with primacy in enforcing the regulations, to utilities that show they have taken all “practicable steps” to meet standards set under the Amendments. Smaller utilities that serve less than 500 people may apply for renewable exemptions provided they can show that they require financial assistance. Operators of small systems are also eligible for special technical assistance in achieving compliance with standards.

## Wellfield Protection

The establishment of a groundwater protection program by the Amendments provides for states to develop a ground-water protection plan within three years. Under the Amendments EPA has one year to

develop guidelines for the state plans. Federal grants are not available for these activities.

## Research Needs

The principal uncertainties that need to be resolved in the setting of health-related drinking water standards are: (1) the toxicology of substances (especially possible carcinogens) at the trace levels found in drinking water; (2) the extent of human exposure from non-drinking water routes (i.e., food and air) which usually are predominant; and (3) the feasibility of water treatment in small communities. Analytical methods are available for most substances of interest but the costs can be substantial as the list of potential contaminants to be monitored for increases. Low cost screening methods for groups of contaminants are needed.

The most complex and technically interesting area for research lies in deciphering the components of the complex mixtures of by-products produced during the disinfection of drinking water by chlorine, ozone, chloramines or chlorine dioxide. The problem is to determine which of the byproducts may be harmful and to find ways of minimizing their presence in finished drinking water while maintaining the biological safety.