ALABAMA COOPERATIVE Extension SYSTEM

ALABAMA A&M AND AUBURN UNIVERSITIES

ANR-790-2.1.3

Drinking Water Standards

Protecting Your Health: Primary Standards

The Primary Standards for drinking water, as set forth in the Safe Drinking Water Act (SDWA), are based on health considerations and are enforced by the EPA in public community water systems. Some of the substances currently regulated by Primary Standards occur naturally in our environment and in the foods we eat. The Primary Standards set by EPA reflect the levels we can safely consume in our water, taking into account the amounts we are exposed to from other sources.

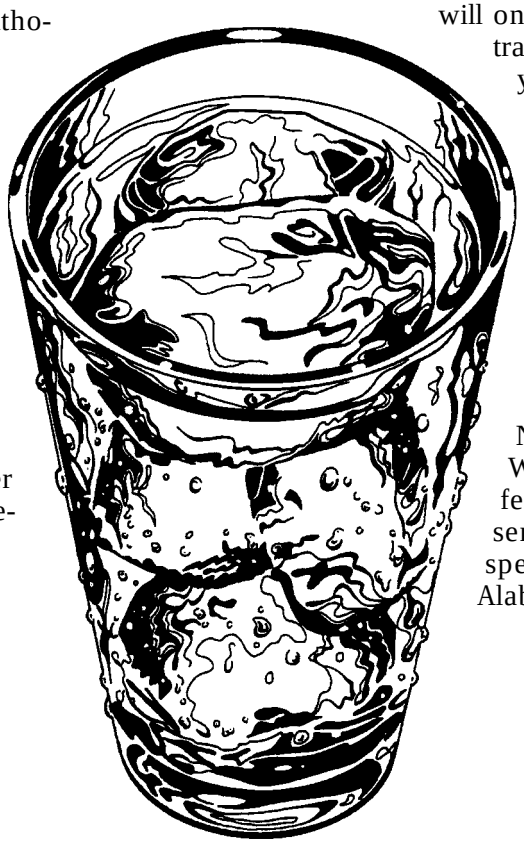
Primary Standards set a limit, called a Maximum Contaminant Level (MCL), on the highest allowable concentration of a contaminant in drinking water supplied by municipal water systems. The MCL is usually expressed in milligrams per liter (mg/L). Many labs report contaminant levels in parts per million (ppm). These units are numerically equivalent.

Primary Standards protect you from three classes of toxic pollutants: pathogens, radioactive elements, and toxic chemicals.

Only two substances for which standards have been set pose an immediate health threat whenever they are exceeded: microbiological agents (primarily bacteria) and nitrate. Effects from other contaminants, especially radioactivity, may be cumulative.

Coliform bacteria from human and animal wastes may be found in drinking water if the water is not properly treated. These bacteria generally do not cause diseases themselves but indicate that other more harmful organisms may be present in the water. Waterborne diseases such as typhoid, cholera, infectious hepatitis, and dysentery have been traced to improperly disinfected drinking water. If you should receive notice that the bacteria level in your water exceeds the minimum standard, follow the directions given in the notice.

Nitrate in drinking water above the national standard poses an immediate threat to children, especially those under 6 months old. In some infants, excessive levels of nitrite, which is generated from nitrate, have been known to react with the hemoglobin in the blood to produce an anemic condition commonly known as Blue Baby Syndrome. If you receive notice that your drinking water contains an excessive amount of nitrate, do not give the water to infants and do not use it to prepare a formula. Do not boil the water because boiling will only increase the nitrate concentration. Simply read the notice you receive and follow its instructions carefully.



Although only microbiological organisms and nitrate pose an immediate threat to public health, other substances must be controlled because drinking water that exceeds MCLs over long periods of time may prove harmful. MCLs for National Primary Drinking Water Standards and health effects of contaminants are presented in Table 1. Chemicals with special monitoring requirements in Alabama are presented in Table 2.

Table 1. Levels And Effects Of Primary Drinking Water Contaminants.

Name Of Contaminant	Maximum Contaminant Level (MCL) (mg/L, unless noted otherwise)	Health Effects Of Contaminant
	Inorganic Chemicals	
Antimony	0.006	Decreases longevity, alters cholesterol and glucose levels
Asbestos longer than 10 microns)	7 MFL (million fibers per liter	Benign tumors
Arsenic	0.05	Dermal and nervous system toxicity effects
Barium	2	Circulatory system effects and increased blood pressure
Beryllium	0.004	Cancer risk and damage to bones and lungs
Cadmium	0.005	Concentrates in the liver, kidneys, pancreas, and thyroid
Chromium	0.1	Skin sensitization, liver, and kidney effects
Cyanide	0.2	Spleen, liver, and brain effects
Fluoride	4 (secondary MCL of 2 triggers public notice)	Skeletal damage
Mercury	0.002	Central nervous system disorders; kidney effects
Nickel	0.1	Nervous system and skin sensitization
Nitrate (as N)	10	Methemoglobinemia (Blue Baby Syndrome—oxygen deprivation in infants)
Nitrite (as N)	1	Methemoglobinemia (Blue Baby Syndrome—oxygen deprivation in infants)
Total Nitrate/Nitrite	10	Methemoglobinemia (Blue Baby Syndrome—oxygen deprivation in infants)
Selenium	0.05	Nervous system effects
Sulfate	500	Gastrointestinal effects
Thallium	0.002	Liver, kidney, intestinal, and brain effects
Lead	0.015 (action level)	Nervous system damage and kidney effects; highly toxic to infants
Copper	1.3 (action level)	Indicates potential high lead level
	Organic Chemicals	
Pesticides		
Alachlor	0.002	Cancer risk
Aldicarb	0.003	Nervous system
Aldicarb sulfoxide	0.002	Nervous system
Aldicarb sulfone	0.004	Nervous system
Atrazine	0.003	Reproductive and cardiac effects
Carbofuran	0.04	Nervous system and reproductive system
Chlordane	0.002	Cancer risk
Dalapon	0.2	Liver and kidney effects
Dibromochloropropane (DBCP)	0.0002	Cancer risk
Dinoseb	0.007	Thyroid and reproductive effects
Diquat	0.02	Kidney and gastro intestinal effects and cataract risk
Endothall	0.1	Liver, kidney, gastrointestinal, and reproductive effects
Endrin	0.002	Kidney and nervous system

Name Of Contaminant	Maximum Contaminant Level (MCL) (mg/L, unless noted otherwise)	Health Effects Of Contaminant
	Organic Chemicals (cont.)	
Pesticides (cont.)		
Ethylene dibromide (EDB)	0.00005	Cancer risk
Glyphosate	0.7	Liver and kidney effects
Heptachlor	0.0004	Cancer risk
Heptachlor epoxide	0.0002	Cancer risk
Lindane	0.0002	Nervous system, kidney, and liver effects
Methoxychlor	0.04	Nervous system, kidney, and liver effects
Oxamyl (Vydate)	0.2	Kidney effects
Pentachlorophenol	0.001	Cancer risk
Picloram	0.5	Liver and kidney effects
Simazine	0.004	Cancer risk
Toxaphene	0.003	Cancer risk
2, 4, 5, - TP (Silvex)	0.05	Nervous system, kidney, and liver effects
2, 4 - D	0.07	Nervous system, kidney, and liver effects
Volatile Organic Chemicals		
Benzene	0.005	Cancer risk
Carbon tetrachloride	0.005	Cancer risk
para-Dichlorobenzene	0.075	Cancer risk
ortho-Dichlorobenzene	0.6	Kidney and liver effects
1, 2 - Dichloroethane	0.005	Cancer risk
1, 1 - Dichloroethylene	0.007	Kidney and liver effects
cis - 1, 2 - Dichloro-ethylene	0.07	Nervous system and liver effects
trans - 1, 2 - Dichloro-ethylene	0.1	Nervous system and liver effects
Dichloromethane	0.005	Cancer risk
1, 2 - Dichloropropane	0.005	Cancer risk
Ethylbenzene	0.7	Kidney and liver effects
Monochlorobenzene	0.1	Kidney and liver effects
Styrene	0.1	Nervous system and liver effects
Tetrachloroethylene (PCE)	0.005	Cancer risk
Toluene	1	Nervous system and kidney effects
1, 2, 4 - Trichlorobenzene	0.07	Liver and kidney effects
1, 1, 1 - Trichloroethane	0.2	Nervous system effects
1, 1, 2 - Trichloroethane	0.005	Liver and kidney effects
Trichloroethylene (TCE)	0.005	Cancer risk
Vinyl chloride	0.002	Cancer risk
Xylenes (total)	10	Liver and kidney effects

Name Of Contaminant	Maximum Contaminant Level (MCL) (mg/L, unless noted otherwise)	Health Effects Of Contaminant
	Organic Chemicals (cont.)	
Synthetic Organic Chemicals		
Benzo (a) pyrene	0.0002	Cancer risk
Di (2 - ethylhexyl) adipate	0.4	Liver and reproductive effects
Di (2 - ethylhexyl) phthalate	0.006	Cancer risk
Hexachlorobenzene	0.001	Cancer risk
Hexachlorocyclo-pentadiene (HEX)	0.05	Kidney and stomach effects
PCBs	0.0005	Cancer risk
2, 3, 7, 8 Tetrachloro-dibenzo - p - dioxin	3×10^{-8}	Cancer risk
	Disinfection By-Products	
Total trihalomethanes (TTHMs)	0.1	Cancer risk
	Turbidity	
Turbidity	For conventional and direct filtration plants, less than 0.5 NTU, 95% of the time. For slow sand filters, diatomaceous earth filters, and other technologies, less than 1 NTU, 95% of the time. For groundwater supplies, less than 5 NTU.	Interferes with disinfection
	Microbiological Contaminants	
Total coliform	Less than 40 samples/month, no more than 1 positive. 40 samples or more/month, no more than 5% positive. MCLG = 0 for total coliform, fecal coliform, and E. coli.	The presence of these bacteria indicate other disease-causing organisms may be present in the water.
Giardia lamblia[a]	MCLG = 0	Giardiasis
Viruses[a]	MCLG = 0	Gastrointestinal and other viral infections
	Radionuclides	
Natural		
Gross alpha	15 pC/l[b]	Cancer risk
Combined Radium 226 and Radium 228	5 pC/l	Bone cancer risk
Gross beta	4mrem/yr[c]	Cancer risk
Tritium[d]	20,000 pCi/l	Cancer risk
Strontium 90[d]	8 pCi/l	Bone cancer risk

[a]At present no Alabama standards have been set for these.

Sources: ADEM 1992, and Linker 1993.

[b]pCi/l = picocuries per liter.

[c]mrem/yr = millirem per year.

[d]ADEM regulates even though EPA does not.

Table 2. Chemicals With Special Monitoring Requirements In Alabama.

Herbicides, Pesticides, And Miscellaneous Synthetic Organic Chemicals				
Aldrin	Carbaryl	Dieldrin	Methomyl	Metribuzin
Butachlor	Dicamba	3-Hydroxycarbofuran	Metolachlor	Propachlor
Volatile Organic Chemicals:				
Bromobenzene	Chlorodibromomethane	1,1-Dichloroethane	Naphthalene	
Bromochloromethane	Chloroethane	1,1-Dichloropropene	n-Propylbenzene	
Bromodichloromethane	Chloroform	1,3-Dichloropropane	1,1,1,2-Tetrachloroethane	
Bromoform	Chloromethane	1,3-Dichloropropene	1,1,2,2-Tetrachloroethane	
Bromomethane	o-Chlorotoluene	2,2-Dichloropropane	1,2,3-Trichlorobenzene	
n-Butylbenzene	p-Chlorotoluene	Fluorotrichloromethane	1,2,3-Trichloropropane	
sec-Butylbenzene	Dibromomethane	Hexachlorobutadiene	1,2,4-Trimethylbenzene	
tert-Butylbenzene	m-Dichlorobenzene	Isopropylbenzene	1,3,5-Trimethylbenzene	
	Dichlorodifluoromethane	p-Isopropyltoluene		

Source: ADEM 1992.

Conclusion

With increased monitoring and evaluation of chemical contaminants, drinking water quality will improve in the future. Maximum Contaminant Levels for additional chemicals becomes effective in 1995 and 1996. Under the currently proposed regulations many additional standards are likely to be included within the near future. The costs of monitoring alone is going to increase the price we pay for this precious commodity—safe drinking water.

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Information about specific Maximum Contaminant Levels is available from the Small Systems Clearinghouse at West Virginia University (1-800-624-8301) and from the EPA Safe Drinking Water Hotline (1-800-426-4791). The Clearinghouse also has a newsletter, On Tap, and brochures, which are free of charge.

This publication, supported in part by a grant from the Alabama Department of Environmental Management and the Tennessee Valley Authority, was prepared by James E. Hairston, *Extension Water Quality Scientist*, assisted by Leigh Stribling, *Technical Writer.*

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

UPS, **New June 1995,** Water Quality 2.1.3

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