

United States
Environmental Protection
Agency

Office of Water
(4607)

EPA 815-F-98-007
June 1998

EPA Safe Drinking Water Is In Our Hands

Existing Standards
and Future Priorities



Office of Ground Water and Drinking Water

MISSION

The Office of Ground Water and Drinking Water, states, tribes, and our many partners will protect public health by ensuring safe drinking water and protecting ground water.

PRINCIPLES

We will accomplish this mission using the following principles:

- **Prevention** as an effective approach
- **Risk-based priority setting** for new and existing regulations, using sound science, quality data, and good standards
- **Partnership and involvement** of public and private organizations, citizens and communities
- **Flexibility and effectiveness** in implementation while maintaining a national public health baseline
- **Accountability** of all parties through public participation and accessible information
- **Results** documented and presented clearly

National Primary Drinking Water Regulations

Contaminant	MCLG ¹ (mg/L) ⁴	MCL ² or TT ³ (mg/L) ⁴	Potential Health Effects from exposure to contaminants at levels exceeding standards
INORGANIC CHEMICALS			
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood glucose
Arsenic	none ⁵	0.05	Skin damage; circulatory system problems; increased risk of cancer
Asbestos (fiber >10 micrometers)	7 million fibers per Liter	7 MFL	Increased risk of developing benign intestinal polyps
Barium	2	2	Increase in blood pressure
Beryllium	0.004	0.004	Intestinal lesions
Cadmium	0.005	0.005	Kidney damage
Chromium (total)	0.1	0.1	Allergic dermatitis
Copper	1.3	TT ⁶	Short term exposure: Stomach or intestinal problems; Long term exposure:
			Liver or kidney disease. Those with Wilson's Disease should consult their personal doctor if their water systems exceed the copper action level.
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems
Fluoride	4.0	4.0	Bone disease (pain and tenderness)
Lead	zero	TT ⁶	Infants and children: Delays in physical or mental development; slight deficits in attention span and learning abilities; Adults: Kidney problems, high blood pressure
Inorganic Mercury	0.002	0.002	Kidney damage
Nitrate (measured as Nitrogen)	10	10	"Blue baby syndrome" in infants under six months – life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath

National Primary Drinking Water Contaminants *continued*

Contaminant	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects
Nitrite (measured as Nitrogen)	1	1	"Blue baby syndrome" in infants under six months – life threatening without immediate medical attention. Symptoms: Infant looks blue and has shortness of breath
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems
ORGANIC CHEMICALS			
Acrylamide	zero	TT ⁷	Nervous system or blood problems; increased risk of cancer
Alachlor	zero	0.002	Eye, liver, kidney, or spleen problems; anemia; increased risk of cancer
Atrazine	0.003	0.003	Weight loss; cardiovascular system problems; reproductive difficulties
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer
Benzo(a)pyrene	zero	0.0002	Reproductive difficulties; increased risk of cancer
Carbofuran	0.04	0.04	Problems with blood, nervous system or reproductive system
Carbon tetrachloride	zero	0.005	Liver problems; increased risk of cancer
Chlordane	zero	0.002	Blood or nervous system problems; increased risk of cancer
Chlorobenzene	0.1	0.1	Liver or kidney problems
2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems
Dalapon	0.2	0.2	Minor kidney changes
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Reproductive problems; increased risk of cancer
o-Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems
p-Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood

National Primary Drinking Water Contaminants
continued

Contaminant	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects
1,2-Dichloroethane	zero	0.005	Increased risk of cancer
1,1-Dichloroethylene	0.007	0.007	Liver problems
cis-1,2-Dichloroethylene	0.07	0.07	Immune system problems
trans-1,2-Dichloroethylene	0.1	0.1	Liver or immune system problems
Dichloromethane	zero	0.005	Liver problems; increased risk of cancer
1,2-Dichloropropane	zero	0.005	Increased risk of cancer
Di(2-ethylhexyl)adipate	0.4	0.4	General toxic or reproductive difficulties
Di(2-ethylhexyl)phthalate	zero	0.006	Adverse reproductive effects; increased risk of cancer
Dinoseb	0.007	0.007	Reproductive difficulties
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer
Diquat	0.1	0.1	Cataracts
Endothall	.02	.02	Stomach and intestinal problems
Endrin	0.002	0.002	Nervous system effects; convulsions
Epichlorohydrin	zero	TT ⁷	Stomach problems; increased risk of cancer
Ethylbenzene	0.7	0.7	Liver or kidney problems
Ethylene dibromide	zero	0.00005	Stomach, kidney, or reproductive system problems; increased risk of cancer
Glyphosate	0.7	0.7	Kidney problems; adverse reproductive effects
Heptachlor	zero	0.0004	Liver damage; increased risk of cancer
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer
Hexachlorobenzene	zero	0.001	Liver or kidney problems; adverse reproductive effects; increased risk of cancer
Hexachlorocyclopentadiene	0.05	0.05	Kidney problems
Lindane	0.0002	0.0002	Liver or kidney problems; increased risk of cancer
Methoxychlor	0.04	0.04	Reproductive difficulties
Oxamyl (Vydate)	0.2	.2	Slight nervous system effects

National Primary Drinking Water Contaminants *continued*

Contaminant	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer
Pentachlorophenol	zero	0.001	Liver or kidney problems; increased risk of cancer
Picloram	0.5	0.5	Liver problems
Simazine	0.004	0.004	Problems with blood
Styrene	0.1	0.1	Liver, kidney and blood problems
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer
Toluene	1	1	Nervous system, kidney, or liver problems
Total Trihalomethanes (TTHMs)	none ⁵	0.10	Liver, kidney or central nervous system problems; increased risk of cancer
Toxaphene	zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer
2,4,5-TP (Silvex)	0.05	0.05	Liver problems
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system or circulatory problems
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney or immune system problems
Trichloroethylene	zero	0.005	Liver problems; increased risk of cancer
Vinyl chloride	zero	0.002	Increased risk of cancer
Xylenes (total)	10	10	Nervous system damage
RADIONUCLIDES			
Beta particles and photon emitters	none ⁵	4 millirems per year	Increased risk of cancer
Gross alpha particle activity	none ⁵	15 picocuries per Liter (pCi/L)	Increased risk of cancer
Radium 226 & Radium 228 (combined)	none ⁵	5 pCi/L	Increased risk of cancer

National Primary Drinking Water Contaminants *continued*

Contaminant	MCLG (mg/L)	MCL (mg/L)	Potential Health Effects
MICROORGANISMS			
<i>Giardia lamblia</i>	zero	TT ⁸	Giardiasis, a gastroenteric disease
Heterotrophic Plate Count (HPC)	N/A	TT ⁸	HPC has no health effects but can indicate how effective treatment is at controlling microorganisms.
<i>Legionella</i>	zero	TT ⁸	Legionnaire's Disease, commonly known as pneumonia
Total Coliforms (including fecal coliform and <i>E. coli</i>)	zero	5.0% ⁹	Used as an indicator that other, potentially harmful bacteria may be present ¹⁰
Turbidity	N/A	TT ⁸	Turbidity has no health effects but can interfere with disinfection and provide a medium for microbial growth. It may indicate the presence of microbes.
Viruses (enteric)	zero	TT ⁸	Gastroenteric disease

NOTES

- 1) Maximum Contaminant Level Goal (MCLG) — 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 for an adequate margin of safety. MCLGs are non-enforceable public health goals.
- 2) Maximum Contaminant Level (MCL) — The maximum permissible level of a contaminant in water which is delivered to any user of a public water system. MCLs are enforceable standards. The margins of safety in MCLGs ensure that exceeding the MCL slightly does not pose significant risk to public health.
- 3) Treatment Technique — An enforceable procedure or level of technical performance which public water systems must follow to ensure control of a contaminant.
- 4) Units are milligrams per Liter (mg/L) unless otherwise noted.
- 5) MCLGs were not established before the 1986 SDWA Amendments. Therefore there is no MCLG for this contaminant.
- 6) Lead and copper are regulated in a Treatment Technique which requires systems to take tap water samples at sites with lead pipes or copper pipes that have lead solder and/or are

National Primary Drinking Water Contaminants *continued*

served by lead service lines. The action level, which triggers water systems into taking treatment steps if exceeded in more than 10% of tap water samples, for copper is 1.3 mg/L and for lead is 0.015 mg/L.

- 7) Each water system must certify in writing to the state (using third-party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

Acrylamide=0.05% dosed at 1 mg/L (or equivalent)

Epichlorohydrin=0.01% dosed at 20 mg/L (or equivalent).

- 8) The Surface Water Treatment Rule requires systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

Giardia lamblia: 99.9% is killed/inactivated

Viruses: 99.99% are killed/inactivated

Legionella: No limit, but EPA believes that if *Giardia* and viruses are inactivated, *Legionella* will also be controlled

Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelometric turbidity units (NTU); systems that filter must ensure that the turbidity go no higher than 1 NTU (0.5 NTU for conventional or direct filtration) in at least 95% of the daily samples for any 2 consecutive months.

HPC: No more than 500 bacterial colonies per mL.

- 9) No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples/month, no more than one sample can be total coliform-positive). Every sample that has total coliform must be analyzed for fecal coliforms. There cannot be any fecal coliforms.
- 10) Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms.

National Secondary Drinking Water Regulations

CONTAMINANT	NSDWR
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor
number	
pH	6.6 – 8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Zinc	5 mg/L

Drinking Water Historical Priorities

Pre-SDWA: Public Health Service regulated 22 contaminants

1974

Establish basic EPA drinking water program and national standards.

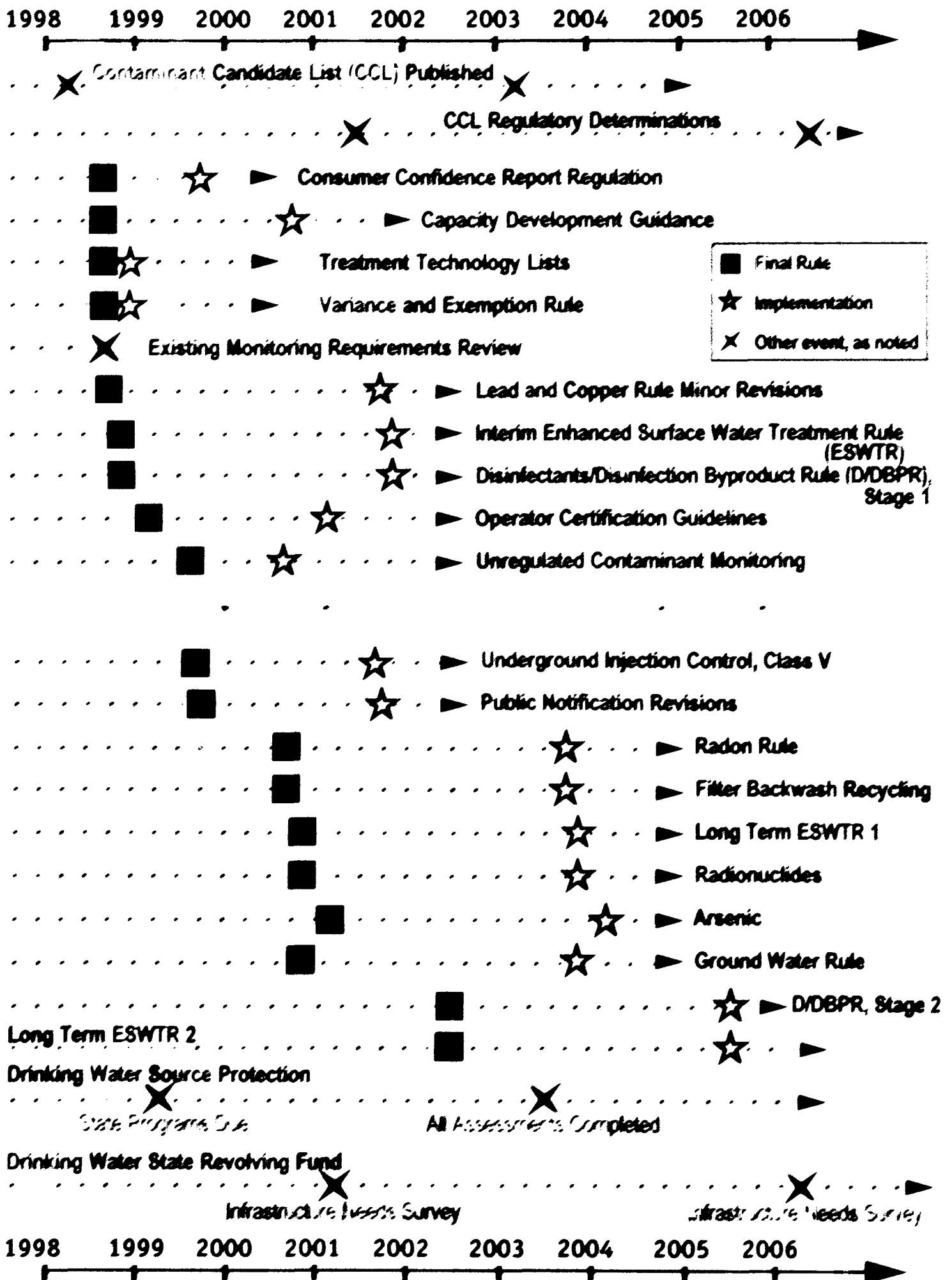
1986

Accelerate pace of drinking water standards and focus on carcinogens (25 every 3 years)

1996

Risk based priority setting–(5 determinations every 5 years); greater flexibility–small systems and economics; drinking water source assessment and protection; state loan fund; consumer confidence reports and public involvement

Timeline of SDWA Activities



Establishing Drinking Water Priorities

The Drinking Water Contaminant Candidate List, published March 2, 1998, will help establish priorities for the future of EPA's drinking water program. It is comprised of contaminants that are known or anticipated to occur in public water systems. Contaminants for priority drinking water research; occurrence monitoring; guidance development, including health advisories; and possible regulations, will be drawn from the CCL.

The following table divides the CCL into categories representing the next steps and data needs for each contaminant. The groupings are based on current information, and some movement of contaminants between categories can be expected as more information is evaluated and analyzed.

Regulation Determination Priorities – The Agency will select five

or more contaminants from this list and determine, by August 2001, whether to regulate them. Regulations must be proposed by August 2003, and set by February 2005.

Occurrence and Research Priorities – More data are needed for contaminants on these lists before the Agency can determine whether to regulate them. Obtaining this data will be the priority of our research and occurrence programs.

Next, EPA will determine which contaminants to address first in all categories, and outline plans of action for making regulatory decisions for five or more contaminants. To accomplish these goals, the Agency will develop short-term and long-term research plans on health, treatment, and analytical methods; develop an Unregulated Contaminant Monitoring Regulation for gathering occurrence data; and plan special occurrence studies.

The contaminant identification and selection cycle repeats every five years. Every six years, EPA will re-evaluate existing regulations.

Next Steps for Contaminants on the Contaminant Candidate List

Regulatory Determination Priorities

Acanthamoeba (guidance)	Boron	Metribuzin
1,1,2,2-tetrachloroethane	Bromobenzene	Naphthalene
1,1-dichloroethane	Dieldrin	Organotins
1,2,4-trimethylbenzene	Hexachlorobutadiene	Triazines & degradation products (including, but not limited to Cyanazine and Atrazine-desethyl)
1,3-dichloropropene	p-Isopropyltoluene	Sulfate
2,2-dichloropropane	Manganese	Vanadium
Aldrin	Metolachlor	

Next Steps for Contaminants on the Contaminant Candidate List

Occurrence Priorities

Adenoviruses*	Microsporidia*	Acetochlor*	Linuron
Aeromonas hydrophila	1,2-diphenylhydrazine*	DCPA (Dacthal) mono-acid & di-acid degradates	Molinate
Cyanobacteria (Blue-green algae), other freshwater algae, and their toxins*	2,4,6-trichlorophenol*	DDE	MTBE
Caliciviruses*	2,4-dichlorophenol*	Diazinon	Nitrobenzene
Coxsackieviruses	2,4-dinitrophenol*	Disulfoton	Perchlorate
Echoviruses	2,4-dinitrotoluene	Diuron	Prometon
Helicobacter pylori*	2,6-dinitrotoluene	EPTC (s-Ethyl-dipropylthiocarbonate)	RDX*
	2-methyl-phenol*	Fonofos*	Terbacil
	Alachlor ESA* and		Terbufos

* Suitable analytical methods must be developed prior to obtaining occurrence data.

Next Steps for Contaminants on the Contaminant Candidate List

Research Priorities

Health Research	Treatment Research	Analytical Methods Research
<p>Aeromonas hydrophila</p> <p>Cyanobacteria (Blue-green algae), other freshwater algae, and their toxins</p> <p>Caliciviruses</p> <p>Helicobacter pylori</p> <p>Microsporidia</p> <p>Mycobacterium avium intercellulare (MAC)</p>	<p>Adenoviruses</p> <p>Aeromonas hydrophila</p> <p>Cyanobacteria (Blue-green algae), other freshwater algae, and their toxins</p> <p>Caliciviruses</p> <p>Coxsackieviruses</p> <p>Echoviruses</p>	<p>Adenoviruses</p> <p>Cyanobacteria (Blue-green algae), other freshwater algae, and their toxins</p> <p>Caliciviruses</p> <p>Helicobacter pylori</p> <p>Microsporidia</p> <p>1,2-diphenylhydrazine</p>
<p>1,1-dichloropropene</p> <p>1,3-dichloropropane</p> <p>Aluminum</p> <p>DCPA mono-acid & di-acid degradates</p> <p>Methyl bromide</p> <p>Methyl tert-butyl ether (MTBE)</p> <p>Perchlorate</p> <p>Sodium (guidance)</p>	<p>Helicobacter pylori</p> <p>Microsporidia</p> <p>Mycobacterium avium intracellulare (MAC)</p> <p>Aluminum</p> <p>MTBE</p> <p>Perchlorate</p>	<p>2,4,6-trichlorophenol</p> <p>2,4-dichlorophenol</p> <p>2,4-dinitrophenol Phenols</p> <p>2-methyl-Phenol</p> <p>Acetochlor</p> <p>Alachlor ESA</p> <p>Fonofos</p> <p>Perchlorate</p> <p>RDX (cyclo trimethylene trinitramine)</p>

Current Standards Timetable

REGULATION	FINAL
National Interim Primary Drinking Water Regulations	December 24, 1975
Radionuclides National Interim Primary Drinking Water Regulation	July 9, 1976
National Secondary Drinking Water Regulations	July 19, 1979
Trihalomethane National Interim Primary Drinking Water Rule	November 29, 1979
Fluoride Rule	April 2, 1986
Phase 1 VOCs & Unregulated Contaminant Monitoring	July 8, 1987
Public Notification Rule	October 18, 1987
Total Coliform Rule	June 29, 1989
Surface Water Treatment Rule	June 29, 1989
Lead & Copper Rule	June 7, 1991
Phase II/IIB SOCs, IOCs (38 Contaminants & Unregulated Contaminant Monitoring)	January 30, 1991 (II) July 1, 1991 (IIB)
Phase V Rule (18 SOCs and 5 Inorganic Chemicals)	July 19, 1992
Information Collection Rule	May 14, 1996
Safe Drinking Water Act Reauthorized	August 6, 1996

For More Information

EPA Office of Ground Water & Drinking Water
homepage location:

<http://www.epa.gov/safewater>

Safe Drinking Water Hotline: 1 (800) 426-4791

EPA/OGWDW: (202) 260-5543