Protect Our Health From Source To Tap

National Drinking Water Program Highlights

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For More Information

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Protect Our Health from Source to Tap

It takes many levels of protection to ensure tap water is safe to drink. A variety of safeguards, from the drinking water source to the consumer's tap, form multiple barriers against contamination. These include assessing the vulnerability of drinking water sources to contamination; adopting community programs to protect wells and collection systems; setting standards to control the level of contaminants in raw water from deep injection wells and shallow disposal systems; making sure water is treated by qualified operators; ensuring the integrity of distribution systems; setting regulations to control the level of contaminants in tap water; and making information available to the public on drinking water quality. EPA, states, tribes, drinking water utilities, communities and citizens share the responsibility of protecting America's drinking water.

Protecting Drinking Water Sources

Because of population growth, increased urbanization and land development, there is growing concern over the quality and quantity of the nation's drinking water. Communities must learn about the sources of and threats to their drinking water to make informed choices to protect them. As of 2001, all 50 states, Washington, DC, Puerto Rico and several tribes are completing assessments to make this information available. Source Water Assessments identify the area of land that most directly contributes the raw water used for drinking water, and the major potential sources of contamination to drinking water supplies, describe the susceptibility of those water supplies, and inform the public about the results of this analysis. Three-and-a-half years after approval, states must complete these assessments for every public water system, so that every person will be able to understand and act on the information to protect their drinking water. Funding to conduct assessments is available through the Drinking Water State Revolving Fund program. Assessing and protecting drinking water consists of six steps:

Step 1. Delineate protection area

For each ground water well or surface water intake that supplies public drinking water, the land area that could contribute water and pollutants to the water supply must be delineated and mapped. For ground water supplies, the map would include land areas where, if pollutants are spilled or discharged on the surface, they could filter through the soil to the ground water and be drawn into a particular well. For surface water supplies, the map would include the land area in the watershed upstream of the intake.

Step 2. Identify major potential sources of contamination

This inventory includes a list and a map of facilities and activities within the delineated area that may release contaminants into the ground water supply or the watershed of the river or lake. Examples of major potential pollutant sources include landfills, underground or above-ground fuel storage tanks, residential or commercial septic systems, storm water runoff from streets and lawns, farms that apply pesticides and fertilizers, and sludge disposal sites.

Step 3. Determine susceptibility

The next step is to evaluate how susceptible the water supply is to contamination from identified sources. This evaluation provides information local decision-makers may use to prioritize approaches for protection. Hydrogeological data and information about contamination sources, water resource characteristics, or environmental management practices may help determine

susceptibility. States prioritize threats of contamination from identified potential sources or specific chemicals. Some states are comparing the susceptibility across public water supplies.

Step 4. Release results to the public

Assessments are not complete until the information is available to the public. Source water assessment results help communities understand potential threats and identify priority needs to safeguard water supplies. States may release the information to the public in a variety of ways. Some plan to convene public workshops; others will have copies available in public libraries, local government offices, or water suppliers. Many also plan to post the assessment summaries on the Internet. Annual consumer confidence reports community water systems must prepare for their customers will also include assessment results.

Step 5. Manage sources of contamination

Once source water assessments are publicized, communities should use the information to protect their drinking water. Some tools for source water protection include local land-use ordinances, zoning, conservation easements and land purchases. Examples of best management practices are on page 6. Detailed information on managing sources of contamination and data are on the web at www.epa.gov/safewater/protect/ ontamdata.html. Set-asides for Source Water Protection and Wellhead Protection activities are available through the Drinking Water State Revolving Fund.

Step 6. Establish a contingency plan

Source water assessments will also provide information that should help protect water supplies against emergency contamination incidents and ensure a safe future water supply. Many states and water suppliers have developed these plans already, relying on civil defense and local emergency preparedness and response plans as the foundation of their contingency water supply replacement programs. Resources on contingency planning are available at www.epa.gov/safewater/protect/contingency. html.

Preventing Contamination of Drinking Water

To address concern over the nation's drinking water, EPA and a number of partners have launched an effort to establish a National Source Water Contamination Prevention Strategy that will:

- Provide an overview of the challenges to preserving and protecting safe drinking water
- Define a national vision for prevention
- Clarify goals and objectives establishing performance measures that would guide priorities and determine adequacy and timeliness of progress
- Describe the role and importance of data systems and information in advancing this program

Preventing contamination of drinking water sources should be a standard part of the multiple barrier approach to providing safe drinking water. It is a collaborative process that depends on the awareness, participation and actions of federal and state agencies, tribal officials, local governments, interest groups, individual citizens and the business community.

Linking source water protection with source control programs is critical; the Safe Drinking Water Act mandates source water assessments but not source water protection, with the exception of the Underground Injection Control program. Therefore, effective protection measures must involve the Clean Water Act and other laws with source control mandates, such as the Resource Conservation and Recovery Act. It is also important to integrate water-related programs by institutionalizing links between source control and drinking water programs at the federal, state, tribal, and local level.

Water programs were developed to protect separate parts of the ecosystem or separate uses of its resources. However, this fragmented approach can be an obstacle to public health protection. Rivers, streams and ground water that are drinking water sources also have ecological value, and their functions cannot be separated.

Underground Injection Control

An effective Underground Injection Control (UIC) Program is essential to protecting drinking water sources from contamination. Underground injection is the technology of placing fluids underground, in porous formations of rocks, through wells or other similar conveyance systems. The Safe Drinking Water Act requires EPA to provide safeguards so that injection wells do not endanger current and future underground sources of drinking water. Through its UIC Program, EPA has developed minimum federal standards to regulate wells that range from deep, technically sophisticated, and highly monitored wells to shallow on-site drainage systems, such as septic systems, cesspools, and storm water drainage wells. These requirements cover wells that discharge a variety of hazardous and nonhazardous fluids above, into, or below aquifers.

The EPA groups injection wells into five classes. Each class includes wells with similar functions, construction, and operating features so that requirements can be applied consistently within each well class. These requirements affect the siting, construction, operation, maintenance, monitoring, testing, and closure of injection wells. Fluids cannot be injected if they may cause a public water system to violate drinking water standards or otherwise adversely affect public health. All operational injection wells require authorization under general rules or specific permits. Injection wells in Classes I, II, and III generally receive site-specific permits through UIC Programs because of the fluids they inject. Most class IV wells are banned.

EPA estimates that there are over 650,000 Class V wells. Class V injection wells are located in every state, especially in unsewered areas where the population is likely to depend on groundwater for its drinking water source. These wells are typically shallow, on-site disposal systems, such as dry wells, septic systems or drainage systems that inject fluids into or above underground sources of drinking water.

In 2000, EPA began to implement a new Class V Rule which addresses two subtypes of Class V wells: large-capacity cesspools and motor vehicle waste disposal wells. The rule requires that existing motor vehicle waste disposal wells close or obtain a permit; prohibits new large-capacity cesspools and new motor vehicle waste disposal wells nationwide; and requires closure of all existing large-capacity cesspools.

In addition, EPA conducted a study that collected information on other types of Class V wells. Based on the analysis of this information, the Agency proposed a determination that no further federal regulations were required at this time to protect underground sources of drinking water. Instead, UIC program directors will continue to use their existing authorities to take any neces-

sary actions to prevent any Class V wells from endangering underground sources of drinking water. The public will have the opportunity to comment on the proposal before it is finalized in May 2002.

Possible Best Management Practices for Contamination Sources

The following list summarizes possible best management practices to prevent contamination of drinking water sources. Additional information on each set of practices will be available on EPA's Source Water Protection web site, www.epa.gov/safewater/protect.html, in summer 2001.

Large-Scale Pesticide Application

- Utilize alternatives to pesticides, through Integrated Pest Management
- Ensure proper pesticide application, mixing and loading consistent with label.
- Consider reduced pesticide use techniques such as soil incorporation, pre-plant and post-emergent applications, spot treatment, and split applications.
- Ensure proper storage and disposal
- Avoid applying pesticides near drinking water wells, agricultural drainage wells, and surface waters.

Small Scale Pesticide Application

- Read and follow label instructions carefully.
- Reduce pesticide use by selecting healthy seeds that resist disease, alternating plants each year, manually removing weeds and pests, properly maintianing plant health, using biological controls where possible.
- Ensure proper storage and disposal.

Agricultural Fertilizer Application

- Utilize application rates and fertilizer types consistent with actual plant nutrient needs.
- Time fertilizer application with the period of maximum crop uptake.
- Utilize techniques to impede runoff such as conservation tillage, buffer strips or filter strips.
- Ensure proper fertilizer storage and disposal.
- Avoid applying fertilizer near drinking water wells, agricultural drainage wells, and surface waters.

Turfgrass and Gardening Fertilizer Application

- Eliminate Excess Fertilizer Use.
- Ensure proper fertilizer application.
- Avoid applying fertilizer near drinking water wells, agricultural drainage wells, and surface waters.
- Ensure proper storage and disposal.

Septic Systems

- Establish proper siting criteria.
- Establish appropriate design and construction criteria.
- Establish operation and maintenance protocols.
- Analyze assimilative capacity of soils and receiving waters to determine appropriate density of septic systems.

Livestock and Poultry Waste

- Prevent animal waste-to-water contact.
- Ensure proper land application of manure, including avoidance of applying near wells and surface waters.
- Implement pasture management techniques such as fencing and planting legumes.

Non-Livestock Waste

- Aerobically compost horse manure.
- Clean up and dispose of companion animal waste.

Sanitary Sewer Overflows and Combined Sewer Overflows

- Consider non-structural prevention methods such as visual inspections, monitoring and maintenance programs, employee training and public education.
- Consider structural prevention methods such as upgrading the collection system, constructing wet weather storage facilities, building new sewer collection systems.

Storm Water Runoff

- Consider pollution prevention practices such as: erosion and sedimentation control measures; land use controls; grassed swales; buffer strips; filter strips; storm water ponds; constructed wetlands; and BMPs for Class V storm water drainage wells.

Vehicle Washing

- Use alternative cleaning agents such as phosphate-free, biodegradable detergents.
- Discourage use of cleaning agents containing solvents and emulsifiers.
- Install water recycling systems.
- Provide employee training to prevent vehicle wash water from entering storm water drains, prevent spills, or control and manage spills.

Underground Storage Tanks

- Ensure compliance with Federal UST requirements.
- Consider local registration programs for exempt tanks.
- Consider local land use controls such as zoning, use restrictions, permits, and setbacks.

Above Ground Storage Tanks

- Ensure ASTs have corrosion protection for the tank.
- Ensure there is a secondary containment area that contains spills.
- Follow proper maintenance recommendations.
- Consider land use controls such as zoning, use restrictions, permits and setbacks.

Small Quantity Chemical Use

- Avoid excess chemical use.
- Ensure proper use and handling of chemicals.
- Provide employee training on spill control, and response protocols.

Meeting Infrastructure Needs

Although our drinking water supply is among the safest in the world, there is concern that utilities will need to increase investments in infrastructure to protect public health and the environment in the future. EPA estimates public water systems will need to invest at least $150.9 billion over a 20 year period to continue providing safe water, according to a 2001 study of US infrastructure needs.

One tool available to states to fund high priority infrastructure projects and state and local activities is EPA's Drinking Water State Revolving Fund. The goal of the program is to help ensure that permanent institutions exist in each state to provide financial support for drinking water needs for many years to come. Through December 31, 2000,

- Congress has provided $3.2 billion in grants to all 50 states and Puerto Rico to capitalize revolving loan funds for infrastructure projects and to fund local activities.
- States have made more than 1,550 low-interest loans totaling $3.2 billion for needed infrastructure projects to meet public health and compliance needs.

- Seventy-five percent of all loans have gone to small water systems. States have reserved $515 million for activities that support their drinking water programs, enhance the management ability of water systems and protect sources of drinking water.

However, solutions to meeting the nation's infrastructure needs must also include tools that increase efficiencies within the drinking water industry, such as adequate rate structures, consolidation, research and development and other creative incentives. Issues that may help to shape national dialogue include:

- **Public health protection** – Assuring that drinking water utilities are first and foremost committed to protecting public health
- **Regulatory compliance** – Providing support to help drinking water utilities achieve compliance with current and future regulations
- **System sustainability** – Promoting systems' capacity to provide safe and affordable drinking water
- **Financial mechanisms** – Developing tools that support drinking water utilities' ability to fund capital improvements in a timely, effective and fiscally sound manner
- **Partnerships and stakeholder involvement** – Fostering involvement so that responsibility for addressing infrastructure needs is shared by all affected entities

Determining Priorities for Drinking Water Standards

EPA is currently undertaking several activities to review existing regulations and examine the need for future regulations.

- **Setting Priorities for the Future:** The Contaminant Candidate List is the primary source of priority contaminants for the agency's drinking water program. Starting with a list of 60 contaminants identified in 1998 (50 chemical, 10 microbiological), EPA plans to make regulatory determinations on at least five contaminants by early fall 2001.
- **Ensuring Safety of Existing Standards:** The agency is reviewing 66 national primary drinking water regulations set before 1996. This fall, EPA plans to publish, for public comment, protocol and preliminary decisions to revise or not revise these standards; final decisions on revisions are expected in August 2002. The protocol includes whether existing MCLs and MCLGs are still appropriate, given new science, methods and treatment technology. The 1996 amendments to the Safe Drinking Water Act require EPA to conduct such a review every six years.

- **Research:** EPA plans to finalize a research plan for CCL contaminants in fall 2001. The agency is also developing a comprehensive strategy for all drinking water research over the next 5-10 years. EPA headquarters and regional offices are developing these strategies in cooperation with states, the National Drinking Water Advisory Council and other partners in associations and utilities.
- **Data Collection:** The primary source of occurrence data to identify emerging contaminants is collected via the Unregulated Contaminant Monitoring Rule. EPA is collecting occurrence data on 25 contaminants and developing analytical methods for several others. This data will be used to support regulatory decision making about CCL contaminants.

Unregulated Contaminant Monitoring Rule List

LIST 1

Assessment Monitoring of Contaminants with Available Methods

(1) 2,4-dinitrotoluene
(2) 2,6-dinitrotoluene
(3) DCPA mono acid
(4) DCPA di acid
(5) 4,4'-DDE
(6) EPTC
(7) Molinate
(8) MTBE
(9) Nitrobenzene
(10) Terbacil
(11) Acetochlor
(12) Perchlorate

Unregulated Contaminant Monitoring Rule List (Contd.)

LIST 2

Screening Survey of Contaminants

(13) Diuron
(14) Linuron
(15) Prometon
(16) 2,4,6-trichlorophenol
(17) 2,4-dichlorophenol
(18) 2,4-dinitrophenol
(19) 2-methyl-1-phenol
(20) Alachlor ESA*
(21) 1,2-diphenylhydrazine
(22) Diazinon
(23) Disulfoton
(24) Fonofos
(25) Terbufos
(26) Aeromonas Hydrophila
(27) RDX*

Unregulated Contaminant Monitoring Rule List (Contd.)

LIST 3

Pre-Screen Testing of Contaminants Needing Research on Methods

(28) Algae and toxins*
(29) Echoviruses*
(30) Coxsackieviruses*
(31) Helicobacter pylori*
(32) Microsporidia*
(33) Caliciviruses*
(34) Adenoviruses*
(35) Lead-210*
(36) Polonium-210*

For indicated contaminants (*), further methods development is needed before monitoring can occur.

National Primary Drinking Water Regulations

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Microorganisms				
Cryptosporidium	as of 01/01/02: zero	as of 01/01/02: TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Giardia lamblia	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste
Heterotrophic plate count (HPC)	n/a	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment
Legionella	zero	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems
Total Coliforms (including fecal coliform and *E. coli*)	zero	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful bacteria may be present[5]	Total coliforms are naturally present in the environment; fecal coliforms and *E. coli* come from human and animal fecal waste.
Turbidity	n/a	TT[3]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria. These organisms can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff
Viruses (enteric)	zero	TT[3]	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Disinfectants and Disinfection Byproducts				
Bromate	as of 01/01/02: zero	as of 01/01/02: 0.010	Increased risk of cancer	Byproduct of drinking water disinfection
Chloramines (as Cl_2)	as of 01/01/02: MRDLG=4[1]	as of 01/01/02: MRDL=4.0[1]	Eye/nose irritation; stomach discomfort, anemia	Water additive used to control microbes
Chlorine (as Cl_2)	as of 01/01/02: MRDLG=4[1]	as of 01/01/02: MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes
Chlorine dioxide (as ClO_2)	as of 01/01/02: MRDLG=0.8[1]	as of 01/01/02: MRDL=0.8[1]	Anemia; infants & young children: nervous system effects	Water additive used to control microbes
Chlorite	as of 01/01/02: 0.8	as of 01/01/02: 1.0	Anemia; infants & young children: nervous system effects	Byproduct of drinking water disinfection
Haloacetic acids (HAA5)	as of 01/01/02: n/a[6]	as of 01/01/02: 0.060	Increased risk of cancer	Byproduct of drinking water disinfection
Total Trihalomethanes (TTHMs)	none[7] as of 01/01/02: n/a[6]	0.10 as of 01/01/02: 0.080	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection
Inorganic Chemicals				
Antimony	0.006	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder
Arsenic[7]	none	0.05	Skin damage; circulatory system problems; increased risk of cancer	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	7 MFL	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits
Barium	2	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Beryllium	0.004	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries
Cadmium	0.005	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints
Chromium (total)	0.1	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits
Copper	1.3	TT[8]; Action Level = 1.3	Short term exposure: Gastrointestinal distress; Long term exposure: Liver or kidney damage; People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits
Cyanide (as free cyanide)	0.2	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Fluoride	4.0	4.0	Bone disease (pain and tenderness of the bones); Children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead	zero	TT[8]; Action Level= 0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits
Mercury (inorganic)	0.002	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands
Nitrate (measured as Nitrogen)	10	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Nitrite (measured as Nitrogen)	1	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Selenium	0.05	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum refineries; erosion of natural deposits; discharge from mines
Thallium	0.0005	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories

Organic Chemicals

Acrylamide	zero	TT[9]	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/ wastewater treatment

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Alachlor	zero	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops
Atrazine	0.003	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops
Benzene	zero	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills
Benzo(a)pyrene (PAHs)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines
Carbofuran	0.04	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa
Carbon tetrachloride	zero	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities
Chlordane	zero	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide
Chlorobenzene	0.1	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
2,4-D	0.07	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops
Dalapon	0.2	0.2	Minor kidney changes	Runoff from herbicide used on rights of way
1,2-Dibromo-3-chloropropane (DBCP)	zero	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards
o-Dichlorobenzene	0.6	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories
p-Dichlorobenzene	0.075	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories
1,2-Dichloroethane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
1,1-Dichloroethylene	0.007	0.007	Liver problems	Discharge from industrial chemical factories
cis-1,2-Dichloroethylene	0.07	0.07	Liver problems	Discharge from industrial chemical factories
trans-1,2-Dichloroethylene	0.1	0.1	Liver problems	Discharge from industrial chemical factories

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Dichloromethane	zero	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories
1,2-Dichloropropane	zero	0.005	Increased risk of cancer	Discharge from industrial chemical factories
Di(2-ethylhexyl) adipate	0.4	0.4	General toxic effects or reproductive difficulties	Discharge from chemical factories
Di(2-ethylhexyl) phthalate	zero	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories
Dinoseb	0.007	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables
Dioxin (2,3,7,8-TCDD)	zero	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories
Diquat	0.02	0.02	Cataracts	Runoff from herbicide use
Endothall	0.1	0.1	Stomach and intestinal problems	Runoff from herbicide use
Endrin	0.002	0.002	Liver problems	Residue of banned insecticide

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Epichlorohydrin	zero	TT[9]	Increased cancer risk, and over a long period of time, stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals
Ethylbenzene	0.7	0.7	Liver or kidneys problems	Discharge from petroleum refineries
Ethylene dibromide	zero	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries
Glyphosate	0.7	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use
Heptachlor	zero	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide
Heptachlor epoxide	zero	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor
Hexachlorobenzene	zero	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories
Hexachloro-cyclopentadiene	0.05	0.05	Kidney or stomach problems	Discharge from chemical factories

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Lindane	0.0002	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens
Methoxychlor	0.04	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock
Oxamyl (Vydate)	0.2	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes
Polychlorinated biphenyls (PCBs)	zero	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals
Pentachlorophenol	zero	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood preserving factories
Picloram	0.5	0.5	Liver problems	Herbicide runoff
Simazine	0.004	0.004	Problems with blood	Herbicide runoff
Styrene	0.1	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Tetrachloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners
Toluene	1	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories
Toxaphene	zero	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle
2,4,5-TP (Silvex)	0.05	0.05	Liver problems	Residue of banned herbicide
1,2,4-Trichlorobenzene	0.07	0.07	Changes in adrenal glands	Discharge from textile finishing factories
1,1,1-Trichloroethane	0.20	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories
1,1,2-Trichloroethane	0.003	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories
Trichloroethylene	zero	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories
Vinyl chloride	zero	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential health effects from exposure above the MCL	Common sources of contaminant in drinking water
Xylenes (total)	10	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories
Radionuclides				
Alpha particles	none[7] as of 12/08/03: zero	15 pico-curies per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters	none[7] as of 12/08/03: zero	4 millirems per year (mrem/yr)	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 and Radium 228 (combined)	none[7] as of 12/08/03: zero	5 pCi/L	Increased risk of cancer	Erosion of natural deposits
Uranium	as of 12/08/03: zero	as of 12/08/03: 0.03	Increased risk of cancer; kidney problems	Decay of natural and man-made deposits

Notes

1 Definitions

- Maximum Contaminant Level Goal (MCLG) – The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL) – The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG) – The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Maximum Residual Disinfectant Level (MRDL) – The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- Treatment Technique (TT) – A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 EPA's surface water treatment rules require 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:

- *Cryptosporidium*:(as of January 1, 2002) 99% removal
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: At no time can turbidity (cloudiness of water) go above 5 nephelolometric 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 in any month. As of January 1, 2002, turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- HPC: No more than 500 bacterial colonies per milliliter

4 No more than 5.0% of samples may be total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample may be total coliform-positive during a month). Every sample that has total coliforms must be analyzed for either *E. coli* or fecal coliforms to determine whether human or animal fecal matter is present (fecal coliform and *E. coli* are part of the total coliform group). There may not be any fecal coliforms or *E. coli*.

5 Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people with severely compromised immune systems.

6 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

7 MCLGs were not established before the 1986 Amendments to the Safe Drinking Water Act. This standard was set

prior to 1986 and therefore, does not have an MCLG. (For arsenic: In January 2001, EPA published a new standard requiring public water supplies to reduce arsenic to 0.01 mg/L by 2006. EPA is reviewing the science and costing analysis of the rule. For status updates, call the Safe Drinking Water Hotline or check the web site.)

8 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10% of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

9 Each water system must certify, in writing, to the state that when it uses acrylamide and/or epichlorohydrin to treat water, 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).

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

Contaminant	NSDWR
Odor	3 threshold odor number
pH	6.5 – 8.5
Silver	0.1 mg/L
Sulfate	250 mg/L
Total Dissolved Solids (TDS)	500 mg/L
Zinc	5 mg/L

A National Secondary Drinking Water Regulation is a non-enforceable guideline regarding contaminants that may cause cosmetic effects (such as taste, odor, or color). Some states choose to adopt them as enforceable standards.

Drinking Water Program Milestones

Determining Priorities for Drinking Water Regulations

EPA is developing proposed rules for the Long Term 2 Enhanced Surface Water Treatment Rule and Stage 2 Disinfectants and Disinfection Byproducts Rule; and final rules for the Long Term 1 Enhanced Surface Water Treatment Rule, Ground Water Rule, Radon and Arsenic. The agency is also developing a secondary standard for Methyl Tertiary Butyl Ether. Dates of promulgation are subject to change. For the most up-to-date information, contact the Safe Drinking Water Hotline (800) 426-4791, or check the web site, www.epa.gov/safewater.

Activity	Date	Action
Contaminant Candidate List	Nov. 2001	• Final decisions on whether or not to regulate five or more contaminants
	2003, then every 5 years	• Next CCL list published
Six-Year Review	October 2001	• Notice of Intent on preliminary revise/ not revise decisions for National Primary Drinking Water Regulations set prior to 1996.
	August 2002	• Final decisions on which regulations need to be revised.
	2002, then every 6 years	• Next review cycle begins.
Data Collection via the Unregulated Contaminant Monitoring Rule	Ongoing	• EPA is collecting data on 36 contaminants to support regulatory decisions on the CCL contaminants.
Research	Fall 2001	• CCL Research Plan
	Ongoing	• Developing a comprehensive strategy for all drinking water research for the next 5-10 years.
Radionuclides	December 2000	• Final National Primary Drinking Water Regulation
	December 2003	• Implementation
Filter Backwash Recycling Rule	May 2001	• Final Rule
	May 2004	• Implementation

Activity	Date	Action
Interim Enhanced Surface Water Treatment Rule	December 1999	• Final National Primary Drinking Water Regulation
	January 2002	• Implementation
Stage 1 Disinfectants and Disinfection Byproducts Rule	December 1999	• Final National Primary Drinking Water Regulation
	January 2002	• Implementation: large surface water systems implementation
	January 2004	• Implementation: ground water systems and small surface water systems

Protecting Drinking Water Sources from Contamination

Source Water Assessment Program	2003	• Complete and Publicize Assessments
	Ongoing	• Source Water Protection
Drinking Water Contamination Prevention Strategy	2001	• Final Strategy on Internet
	Ongoing	• Implement Strategy

Activity	Date	Action
Underground Injection Control	March 2001	Study of the Risks Associated With Class I Underground Injection Wells
		Class V Phase II Determination:
	April 30, 2001	• Proposal
	May 31, 2002	• Final
	February 2002	South Florida Wastewater Disposal Well Final Rule
	April 2002	Class I Municipal Well Final Rule
	Ongoing through 2003	States revise UIC 1422 primacy programs for Class V Phase I Rule
	January 2002	Coal Bed Methane Hydro-Fracture Study Phase I
	2000 thru 2008:	*Class V Phase I Rule Implementation:*
	April 2000	• All new large capacity cesspools banned
	April 2000	• All new motor vehicle waste disposal wells banned

Activity	Date	Action
	April 2005	• All existing large capacity cesspools closed
	January 2006	• All existing motor vehicle waste disposal wells closed or under permits in source water protection areas
	January 2008	• All motor vehicle waste disposal wells closed or under permits in all other regulated areas
Drinking Water Information		
Consumer Confidence Report	Every July	Deadline for public water systems to distribute annual water quality reports to their customers.
Public Notification	May 2002	Implementation of new requirements to make notification easier and more effective. Systems violating drinking water standards must provide notice to customers within 24 hours.

Activity	Date	Action
Databases	Winter 2001	Implement new strategy designed to examine regulatory burden requirements for environmental data and integrate cross-program information needs
Support for Water Systems		
Drinking Water State Revolving Fund	Annual	• Allot funds
	2005	• Publish next report assessing national drinking water needs
Capacity Development	Sept. 2002, then every 3 years	States must submit reports to their governors and make them available to the public.
Operator Certification Training	Feb. 2001	States must submit programs for agency approval.
	Ongoing	EPA's Drinking Water Academy provides training and information to help EPA, States, Tribes, and others increase their capability to implement the 1996 Safe Drinking Water Act Amendments. See *www.epa.gov/safewater/dwa.html*