Setting Standards for Safe Drinking Water

"A fundamental promise we must make to our people is that the food they eat and the water they drink are safe." - President Bill Clinton, Safe Drinking Water Act Reauthorization, August 6, 1996

The Safe Drinking Water Act (SDWA), passed in 1974 and amended in 1986 and 1996, gives the Environmental Protection Agency (EPA) the authority to set drinking water standards. This document describes how EPA establishes these standards.

What are drinking water standards?

Drinking water standards are regulations that EPA sets to control the level of contaminants in the nation's drinking water. These standards are part of the Safe Drinking Water Act's "multiple barrier" approach to drinking water protection, which includes assessing and protecting drinking water sources; protecting wells and collection systems; making sure water is treated by qualified operators; ensuring the integrity of distribution systems; and making information available to the public on the quality of their drinking water. With the involvement of EPA, states, tribes, drinking water utilities, communities and citizens, these multiple barriers ensure that tap water in the United States and territories is safe to drink. In most cases, EPA delegates responsibility for implementing drinking water standards to states and tribes.

There are two categories of drinking water standards:

A National Primary Drinking Water Regulation (NPDWR or primary standard) is a legally-enforceable standard that applies to public water systems. Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water. They take the form of Maximum Contaminant Levels or Treatment Techniques, which are described below.

A National Secondary Drinking Water Regulation (NSDWR or secondary standard) is a non-enforceable guideline regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards. This information focuses on national primary standards.

Who must comply with drinking water standards?

Drinking water standards apply to public water systems (PWSs), which provide water for human consumption through at least 15 service connections, or regularly serve at least 25 individuals. Public water systems include municipal water companies, homeowner associations, schools, businesses, campgrounds and
shopping malls.

**Who is involved in the standard setting process?**
EPA considers input from many individuals and groups throughout the rulemaking process. One of the formal means by which EPA solicits the assistance of its stakeholders is the National Drinking Water Advisory Council (NDWAC). The 15-member committee was created by the Safe Drinking Water Act. It is comprised of five members of the general public, five representatives of state and local agencies concerned with water hygiene and public water supply, and five representations of private organizations and groups demonstrating an active interest in water hygiene and public water supply, including two members who are associated with small rural public water systems. NDWAC advises EPA's Administrator on all of the agency's activities relating to drinking water.

In addition to the NDWAC, representatives from water utilities, environmental groups, public interest groups, states, tribes and the general public are encouraged to take an active role in shaping the regulations, by participating in public meetings and commenting on proposed rules. Special meetings are also held to obtain input from minority and low-income communities, as well as representatives of small businesses.

**What are EPA's current priorities for regulation development?**
EPA is working with stakeholders to develop the following regulations first:

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Action Description</th>
<th>Date</th>
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<tbody>
<tr>
<td>Microbial pathogens</td>
<td>EPA will strengthen control of microbial pathogens, including Cryptosporidium, as well as disinfectants and disinfection byproducts.</td>
<td>&quot;MDBP Cluster, Cluster of rules, 1998-2002&quot;</td>
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<tr>
<td>Radon</td>
<td>EPA will set a new standard for radon.</td>
<td>August 2000</td>
</tr>
<tr>
<td>Radionuclides</td>
<td>EPA will revise the current radionuclides regulation and set a new standard for uranium</td>
<td>November 2000</td>
</tr>
<tr>
<td>Ground Water</td>
<td>EPA will identify measures to protect ground water from microbial contamination</td>
<td>March 2003</td>
</tr>
<tr>
<td>Arsenic</td>
<td>EPA will revise the existing standard for arsenic</td>
<td>Spring 2000</td>
</tr>
</tbody>
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**How does EPA set drinking water standards?**
The 1996 Amendments to Safe Drinking Water Act require EPA to go through several steps to determine, first, whether setting a standard is appropriate for a particular contaminant, and if so, what the standard should be. Peer-reviewed science and data support an intensive technological evaluation, which includes many factors: occurrence in the environment; human exposure and risks of adverse health effects in the general population and sensitive subpopulations; analytical methods of detection; technical feasibility; and impacts of regulation on water systems, the economy and public health.

Considering public input throughout the process, EPA must (1) identify drinking water problems; (2) establish priorities; and (3) set standards.

**1) Identify drinking water problems.**
EPA must first make determinations about which contaminants to regulate. These determinations are based on health risks and the likelihood that the contaminant occurs in public water systems at levels of concern. The National Drinking Water Contaminant Candidate List (CCL), published March 2, 1998, lists contaminants that (1) are not already regulated under SDWA; (2) may have adverse health effects; (3) are known or anticipated to occur in public water systems; and (4) may
require regulations under SDWA.

2) Establish priorities.
Contaminants on the CCL are divided into priorities for regulation, health research and occurrence data collection. By August 2001, EPA will select five or more contaminants from the regulatory priorities on the CCL and determine whether to regulate them. To support these decisions, the Agency must determine that regulating the contaminants would present a meaningful opportunity to reduce health risk. If the EPA determines regulations are necessary, the Agency must propose them by August 2003, and finalize them by February 2005.

The Agency will also select up to 30 unregulated contaminants from the CCL for monitoring by public water systems serving at least 100,000 people. Currently, most of the unregulated contaminants with potential of occurring in drinking water are pesticides and microbes. Every five years, EPA will repeat the cycle of revising the CCL, making regulatory determinations for five contaminants and identifying up to 30 contaminants for unregulated monitoring. In addition, every six years, EPA will re-evaluate existing regulations to determine if modifications are necessary.

Beginning in August 1999, a new National Contaminant Occurrence Database will store data on regulated and unregulated chemical, radiological, microbial and physical contaminants, and other such contaminants likely to occur in finished, raw and source waters of public water systems of the United States and its territories. While EPA will be the primary user of the NCOD, information stored in the database will be available to the public.

3) Propose and finalize a National Primary Drinking Water Regulation.
After reviewing health effects studies, EPA sets a 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 an adequate margin of safety. MCLGs are non-enforceable public health goals. Since MCLGs consider only public health and not the limits of detection and treatment technology, sometimes they are set at a level which water systems cannot meet. When determining an MCLG, EPA considers the risk to sensitive subpopulations (infants, children, the elderly, and those with compromised immune systems) of experiencing a variety of adverse health effects.

- **Non-Carcinogens (not including microbial contaminants):** For chemicals that can cause adverse non-cancer health effects, the MCLG is based on the reference dose. A reference dose (RFD) is an estimate of the amount of a chemical that a person can be exposed to on a daily basis that is not anticipated to cause adverse health effects over a person's lifetime. In RFD calculations, sensitive subgroups are included, and uncertainty may span an order of magnitude.
  --The RFD is multiplied by typical adult body weight (70 kg) and divided by daily water consumption (2 liters) to provide a Drinking Water Equivalent Level (DWEL).
  --The DWEL is multiplied by a percentage of the total daily exposure contributed by drinking water (often 20 percent) to determine the MCLG.

- **Chemical Contaminants -- Carcinogens:** If there is evidence that a chemical may cause cancer, and there is no dose below which the chemical is considered safe, the MCLG is set at zero. If a chemical is carcinogenic and a safe dose can be determined, the MCLG is set at a level above zero that is safe.

- **Microbial Contaminants:** For microbial contaminants that may present
public health risk, the MCLG is set at zero because ingesting one protozoa, virus, or bacterium may cause adverse health effects. EPA is conducting studies to determine whether there is a safe level above zero for some microbial contaminants. So far, however, this has not been established.

Once the MCLG is determined, EPA sets an enforceable standard. In most cases, the standard is a **Maximum Contaminant Level (MCL)**, the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

The MCL is set as close to the MCLG as feasible, which the Safe Drinking Water Act defines as the level that may be achieved with the use of the best available technology, treatment techniques, and other means which EPA finds are available (after examination for efficiency under field conditions and not solely under laboratory conditions) are available, taking cost into consideration.

When there is no reliable method that is economically and technically feasible to measure a contaminant at particularly low concentrations, a **Treatment Technique (TT)** is set rather than an MCL. A treatment technique (TT) is an enforceable procedure or level of technological performance which public water systems must follow to ensure control of a contaminant. Examples of Treatment Technique rules are the Surface Water Treatment Rule (disinfection and filtration) and the Lead and Copper Rule (optimized corrosion control).

After determining a MCL or TT based on affordable technology for large systems, EPA must complete an economic analysis to determine whether the benefits of that standard justify the costs. If not, EPA may adjust the MCL for a particular class or group of systems to a level that "maximizes health risk reduction benefits at a cost that is justified by the benefits." EPA may not adjust the MCL if the benefits justify the costs to large systems, and small systems unlikely to receive variances.

States are authorized to grant **variances** from standards for systems serving up to 3,300 people if the system cannot afford to comply with a rule (through treatment, an alternative source of water, or other restructuring) and the system installs EPA-approved variance technology. States can grant variances to systems serving 3,301-10,000 people with EPA approval. SDWA does not allow small systems to have variances for microbial contaminants.

Under certain circumstances, **exemptions** from standards may be granted to allow extra time to seek other compliance options or financial assistance. After the exemption period expires, the PWS must be in compliance. The terms of variances and exemptions must ensure no unreasonable risk to public health.

**When must public water systems comply with new primary standards?**
Primary standards go into effect three years after they are finalized. If capital improvements are required, EPA's Administrator or a state may allow this period to be extended up to two additional years.

**Are there special considerations for small systems?**
Small systems receive special consideration from EPA and states. More than 90 percent of all PWS are small, and these systems face the greatest challenge in providing safe water at affordable rates. The 1996 SDWA Amendments provide states with tools to comply with standards affordable for small systems. When setting new primary standards, EPA must identify technologies that achieve compliance and are affordable for systems serving fewer than 10,000 people. These may include packaged or modular systems and point-of-entry/point-of-use treatment devices under the control of the water system. When such technologies cannot be identified, EPA must identify affordable technologies that maximize contaminant reduction and protect public health. Small systems are considered in...
three categories: serving 10,000-3301 people; 3,300-501 people; and 500-25 people.

**How can I provide input?**
Public meeting notices and rules open for comment are published in the *Federal Register*. The following resources provide this and other drinking water information:

Office of Ground Water and Drinking Water web site
http://www.epa.gov/safewater/

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

[Back to Drinking Water Standards Program](#)