Sources of additional information

For additional information, contact your state drinking water program.

General information

- Safe Drinking Water Hotline - (800) 426-4791
- EPA's Office of Ground Water and Drinking Water - http://www.epa.gov/safewater
- EPA's Capacity Development Program - http://www.epa.gov/safewater/smallsys/small.htm

Technical Assistance Providers

- National Rural Water Association (NRWA) - http://www.nrwa.org
- Rural Community Assistance Partnership (RCAP) - http://www.rcap.org
- National Environmental Services Center (NESC) - http://www.nesc.wvu.edu
- Technology Assistance Centers (TACs) - http://www.tacnet.info

Financial Assistance Providers

There are many sources of financial assistance and incentives to help systems fund multiple barrier approach programs and activities. Some of the key providers of financial assistance are:

- Drinking Water State Revolving Fund (DWSRF) - http://www.epa.gov/safewater/dwsrf.html
- Rural Development Water and Wastewater Loan and Grant Program - http://www.usda.gov/rus/water/states/usamap.htm
- Community Development Block Grants (CDBG) - http://www.hud.gov/offices/cpd/communitydevelopment/programs/

This poster identifies examples of surface and groundwater sources of drinking water (in blue); potential threats to those drinking water sources (in red); and the multiple barriers that together protect our nation's public health (in green). The complete poster can be ordered from http://yosemite.epa.gov/water/owrccatalog.nsf.

EPA
United States Environmental Protection Agency

The Multiple Barrier Approach to Public Health Protection

Safe drinking water is essential to our physical health and to the economic health of our communities. However, drinking water is vulnerable to contamination from many potential threats. The 1996 Safe Drinking Water Act Amendments created a coordinated set of programs and requirements to help water systems make sure they have a safe supply of drinking water. These programs and requirements form a Multiple Barrier Approach that places technical and managerial barriers that help prevent contamination at the source, treatment, and tap to provide a safe supply of drinking water for consumers.

The barriers are:

Risk Prevention: Selecting and protecting the best source of water where possible or protecting a current source of water.

Risk Management: Using effective treatment technologies, properly designed and constructed facilities, and employing trained and certified operators to properly run system components.

Monitoring and Compliance: Detecting and fixing problems in the source and/or distribution system.

Individual Action: Providing customers with information on water quality and health effects so they are better informed about their water system.

By placing integrated barriers from the source to the consumer at the tap, water systems can help protect communities from the risk of contamination and waterborne disease. A successful multiple barrier approach includes:

Barriers between potential threats and the consumer.

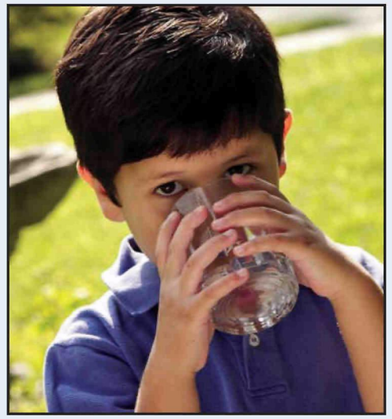
For example:

- Source water protection activities such as identifying and reducing contamination in watersheds.
- Appropriate source water treatment.
- Properly trained, certified operators.
- Properly designed and constructed facilities.

Programs and activities to make sure the barriers are in place and operational.

For example:

- Sanitary surveys to evaluate the adequacy of a water system's facilities for producing and distributing safe drinking water.
- Comprehensive Performance Evaluations to identify cost-effective improvements in system performance.
- Standards for the design and construction of a system's components.
- Continuing education and training of managers and certified operators.
- Strategic and emergency response planning to make sure a system is prepared for the future and for potential crises or disasters.

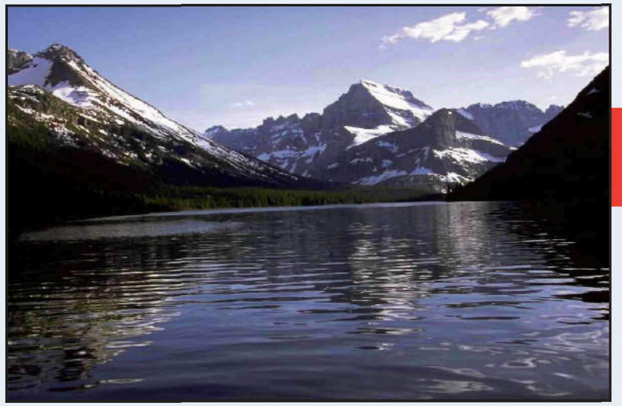


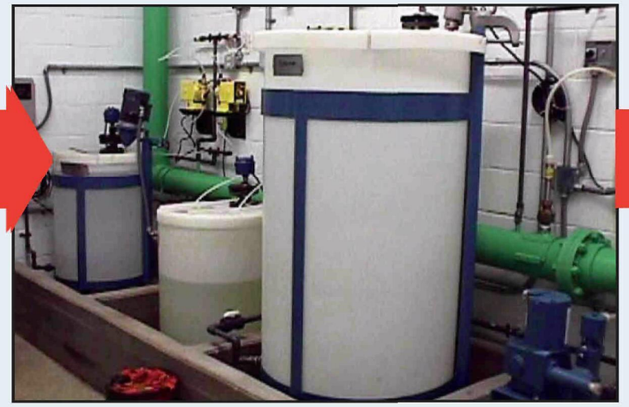
Did You Know?

Capacity development — the development of a system's technical, managerial, and financial ability to provide safe and adequate drinking water to its customers — is the foundation of a successful multiple barrier approach for any system.

Office of Water (4606M)
EPA 816-K-06-005
www.epa.gov/safewater
September 2006

Water Systems' Multiple Barriers to Protect Public Health





Barrier #1: Risk Prevention

The first barrier in a water system's multiple barrier approach is risk prevention. Risk prevention focuses on the selection and protection of drinking water sources. Systems should be aware of potential contamination caused by agricultural drainage, urban runoff, organic materials, and other factors.

When selecting sources, systems should examine:

- The quality of the raw water (e.g., does it contain pathogens, chemicals, radionuclides, nitrates, or high turbidity?).
- The risk of contamination (e.g., will development encroach on the water source?).
- The ability of the supply to meet current and future needs.

Water systems, unless they are new systems, rarely have the opportunity to select their water source. But existing systems can and should take steps to protect their water sources, including:

- Identifying sources of contamination in watersheds and recharge areas.
- Identifying the conditions under which the risks increase.
- Developing and implementing source water protection strategies.

By properly selecting and protecting its water source, a system can reduce its need for and reliance on treatment and increase the reliability of its water quality and quantity.

The financial incentive for systems to prevent risks is significant. It is almost always more cost-effective for a water system to protect its source water from contamination than to remove or inactivate contamination during treatment.

Barrier #2: Risk Management

Risk management barriers focus on the protection provided by water treatment and system operations. Public water systems traditionally have relied on treatment to prevent waterborne disease. Treatment continues to play a central role in protecting public health.

Water treatment:

- Removes and inactivates contaminants present in source water.
- Leads to improved finished water quality.

No single treatment technology or process can solve every water quality problem, so a water system should consider using a combination of treatment technologies and processes if necessary.

To provide adequate protection of public health, a water system:

- Must meet its state's minimum design and construction standards.
- Should develop asset management plans that help provide sound infrastructure.
- Must meet federal and state drinking water standards.

In addition to using the appropriate treatment, water systems should make sure that their operators are properly certified and know how to apply treatment concepts to the specific circumstances facing their system. Water systems should also test the treatment process that they are using to be certain that the treatment is working correctly.

The risk management barrier also includes developing and putting in place appropriate security arrangements and comprehensive plans to respond to emergencies, thus reducing the risk of serious consequences from a security breach or other emergency.

A wide range of financial assistance and incentives are available to help systems fund upgrades or replacement of their treatment components. Contact information for some key providers of financial assistance is listed on the last page of this brochure.

Barrier #3: Monitoring and Compliance

Under the monitoring and compliance barrier, systems aim to detect and fix problems in the source and/or distribution system as early as possible. They accomplish this by collecting information about:

- The presence of contaminants.
- The effectiveness of current treatment processes.
- Any deterioration in the quality of source or treated water.

Monitoring the quality of water is very important in the distribution system, as well as throughout the entire water system. Even if water from an extremely clean source is adequately treated, breakdowns in the distribution system can lead to waterborne illnesses. In particular, the contamination of treated water can result from:

- Line breaks.
- Inadequate water pressure.
- Deficiencies in storage tanks.
- Inadequate separation of water supply lines and sewers.

Part of the strategy for this barrier should include a cross-connection detection and control program as well as efforts to make sure that all distribution system components are properly sized and maintained. Water systems must also monitor water in the distribution system for the formation of byproducts from disinfection and for the leaching of lead and copper from household plumbing.

Monitoring programs should be developed around the needs and characteristics of individual water systems, and they should comply with all regulatory requirements. The monitoring and compliance barrier helps a system maintain the physical integrity of its components and make adjustments as necessary to provide a consistent, safe supply of water.

From a financial perspective, operators who have data on the performance and condition of their system's components (as part of an asset management plan) can increase the useful life of system components and quickly identify and respond to small problems before they become large and expensive.

Barrier #4: Individual Action

Consumer awareness and participation are key components in the multiple barrier approach.

A community water system is required to prepare and provide to their customers, at least annually, Consumer Confidence Reports (Annual Water Quality Reports) that discuss:

- The condition of the system's source water.
- The level of contaminants in the system's drinking water.

The reports are a way to raise consumer awareness about drinking water, and they can be used as a tool to encourage dialogue between consumers and the water system.

Water systems are also required to notify the public of any violations of national drinking water standards. Public notification makes sure that:

- Consumers are informed of any health risks in a timely manner.
- Water systems build trust with consumers by sharing information.

Beyond information sharing, systems can benefit greatly from involving the public in a variety of activities. For example:

- Systems can further their source water protection efforts by helping the public form watershed associations.
- Systems can encourage the public to notice and report activities that could represent contamination or sabotage threats to the water system.

Informed and involved consumers can become advocates for improvements in their water system's operations. Public education and participation can also help consumers become more aware of the true cost and value of water.

From a financial perspective, customers who have a better understanding of their water system, the true cost and value of water, and the role they play will be more likely to support rate increases and bond issues needed to fund multiple barrier approach activities.