U.S. Army Center for Health Promotion and Preventive Medicine

Just the Facts

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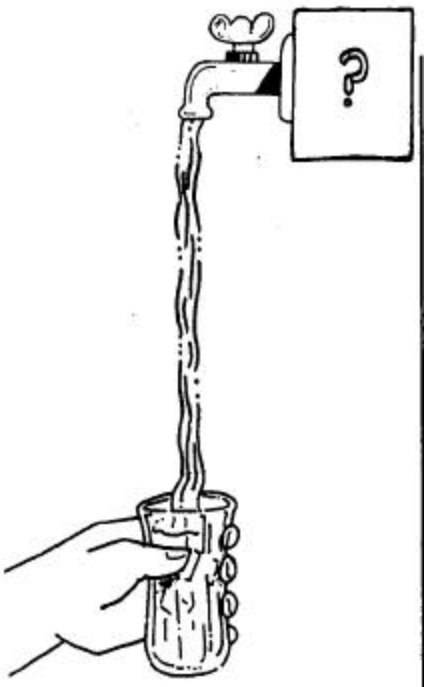
Safe Drinking Water for Unregulated Systems



- Routine Tests for Unregulated Drinking Water
- Troubleshooting Tests
- System Operation & Maintenance

Background

Many small Army facilities receive their drinking water from water systems that are not regulated by the strict health criteria established as a result of the Safe Drinking Water Act (SDWA). Examples of such facilities may be small depots, National Guard armories, Reserve centers, range wells, and campgrounds. Although unregulated systems are relieved from an extensive monitoring program, they are often left with no assurance that the water provided is safe. This fact sheet provides some general guidance on actions these facilities can take to ensure the safety of their drinking water.

Purchased Versus Individual Water Supplies

Army facilities receive their drinking water in one of two ways: they operate their own drinking water system (either directly or through a contractor) or they purchase their water from a neighboring supplier. The latter are referred to as "purchased" water systems. As long as a purchased water system provides no further treatment (e.g., re-disinfection) and does not sell the water it receives, the system is, not regulated by the SDWA. (Note: Some States may require purchased water systems to perform routine distribution system monitoring and may have operational and maintenance requirements that apply.) Army facilities that operate their own drinking water system may or may not be regulated. Typically, systems that serve 15 or more buildings or 25 or more people for at least 60 days out of the year are considered public water systems and must comply with the SDWA. States may have slightly different definitions of public water systems and the State regulator should be contacted when determining the applicability of any regulations.

Individual Unregulated Systems

Individual water systems can use ground water or surface water as a source. Most small unregulated systems receive their drinking water from a well. The Army requires this water to be disinfected. Disinfectant residual should be closely monitored to ensure proper protection. Table 1 provides a list of other routine drinking water tests for individual wells and safe and acceptable ranges for the values. Values outside of the

Table 1. Routine Tests

Parameter	Frequency	Typical Range	Affects….
Coliform Bacteria	annually	Absent	H
Nitrate	annually	<5 mg/L*	H
PH	annually	6.5-8.5 units	†
Total Dissolved Solids	annually	<500 mg/L	A
Sulfate	once/3 years	#250 mg/L	H/A‡
Chloride	once/3 years	#250 mg/L	A
Iron	once/3 years	<0.3 mg/L	A
Manganese	once/3 years	<0.05 mg/L	A
Hardness	once/3 years	50 – 150 mg/L	A
Corrosion Index**	once/3 years	Positive value	**
Lead	at least one time	<0.015 mg/L	H

H – Health, A – Aesthetic

*The Health limit for nitrate is 10 mg/L. However, there is no safety factor in that limit. Values over 5 mg/L should be closely monitored

†pH affects the corrosivity of water and the disinfection process

‡High concentrations may have laxative effects on non-acclimated personnel.

**Corrosion index is calculated using values of water temperature, pH, total dissolved solids, alkalinity and calcium hardness. Corrosive water can deteriorate plumbing and can leach harmful concentrations of metals, such as lead. into the water.

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range may indicate a health or aesthetic problem. The State health department or USACHPPM should be contacted for guidance. The testing frequencies are general guidelines. Unique situations or known contamination episodes may require more detailed or more frequent testing. Some examples are in Table 2. Individual supplies that use a surface water source should contact the USACHPPM or the local health department to ensure the safety of their source. Surface water is more susceptible to contamination, especially from microbiological contaminants, and therefore may require more complex treatment.

Purchased Unregulated System

Purchased water systems that receive their water from a regulated supplier can assume that their drinking water is safe when it arrives at the facility. This can be verified by requesting a copy of the regulatory monitoring results from the supplier. Smaller facilities can estimate water quality provided to their building(s) from the results of near-by sample sites in the supplier's monitoring program. Large Army facilities may want to request that the supplier include a building or two on the facility as a sample site in their sampling plans.

Table 2. Triggers for Additional Sampling

Conditions	Parameters to Test
Recurrent gastro-intestinal illness	coliform bacteria
Household plumbing contains lead	pH, lead, copper
Scaly residues, soaps don't lather/produce suds	hardness
Radon in indoor air or region is radon rich	radon
Discolored water	manganese (black), iron (orange)
Stained plumbing fixtures or laundry	iron, copper manganese
Objectionable taste or smell	hydrogen sulfide, metals
Water appears cloudy, frothy,	color, detergents
Corrosion. of pipes	corrosion index, pH lead, copper
Rapid wear of water treatment equipment	pH, corrosion index
Nearby areas of intensive agriculture	nitrate, pesticides, coliform bacteria
Coal or other mining operations nearby	metals, pH, corrosion index
Gas drilling operation nearby	chloride, sodium, barium, strontium
Odor of gasoline or fuel oil, nearby gas station or fuel storage tanks	volatile organic compounds (VOCs)
Dump, junkyard, landfill, factory or dry-cleaning operation nearby	VOCs, total dissolved solid (TDS), sulfate, chloride, metals
Salty taste, seawater or a heavily salted road nearby	chloride, TDS, sodium

Distributed Water Quality

The quality of drinking water received at the tap is affected by conditions within the distribution system. Bacterial regrowth, cross-connections, corrosive water and deteriorating plumbing materials may add many contaminants to the drinking water after it leaves the treatment facility. Proper and conscientious operation and maintenance of the distribution system is the only protection available from such deterioration of drinking water quality. Most importantly a disinfectant residual should be detectable in ALL portions of the distribution system to protect against microbial contamination. The residual should be monitored at least monthly, weekly if possible, and more frequently if bacterial contamination (positive total coliform analysis) is known to exist. Other distribution system maintenance concerns include proper cross-connection control, maintenance of adequate pressures, flushing of the mains, especially in low water use areas, and regular inspections and cleaning of storage tanks. Last, but not least, buildings' interior plumbing also requires maintenance. Flushing taps in buildings that have low water use helps to remove stagnant water of deteriorating quality. Lead concentrations in tap water can be greatly reduced by routine morning flushing prior to use. Lead concentrations in drinking water can also be reduced by testing and removal of drinking water coolers (fountains) which contain leaded materials. The U.S. Environmental Protection Agency (EPA) has published a list of coolers known to contain lead and also a sampling manual for testing drinking water from water coolers. Either can be obtained from the EPA's Safe Drinking Water Hotline 1-800-426-4791.

Further Assistance

The USACHPPM Water Supply Management Program can provide technical assistance for all drinking water issues and can provide sampling and analytical support when needed through the fully accredited USACHPPM laboratory. We can be reached at the address, phone or email listed on the front of this fact sheet. Many concerns can be answered via telephone conversations, others may require an on-site visit from our trained personnel. Purchased water systems may be able to contact their supplier with additional questions or concerns. Local health departments and State regulatory departments are also good resources when problems arise.