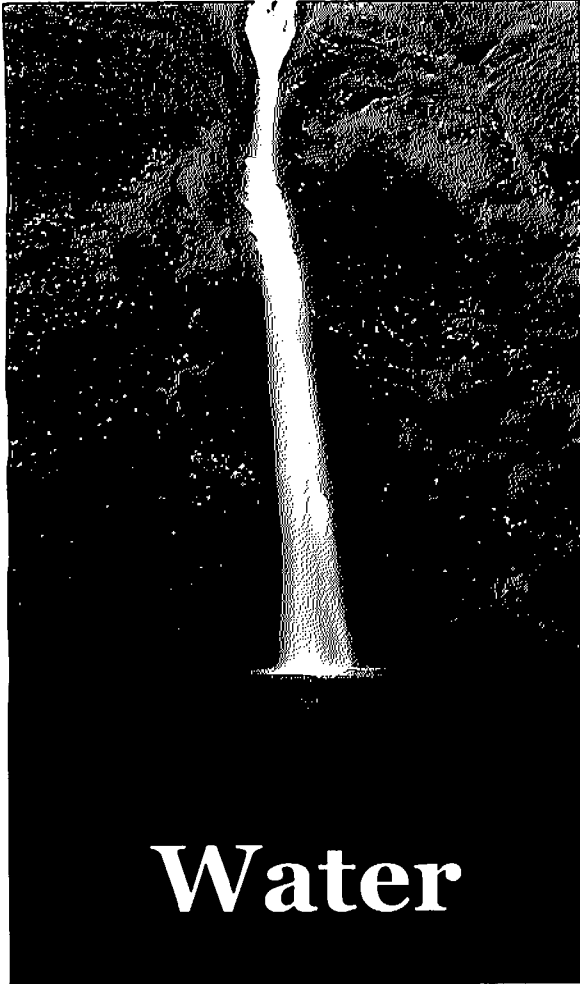


IS YOUR WATER REALLY SAFE?



The essential
natural resource
that most of us
take for granted...

**A Basic Water Knowledge
and Information Book**

Introduction

Americans enjoy some of the best supplies of drinking water on our planet. However, there are many substances and contaminants in our water that can effect whether or not your water is safe to drink. Federal and state standards help keep most of our tap water supplies safe but various environmental issues continue to be a increasing threat.

Some contaminants in water are not regulated or adequately controlled even though they pose immediate health problems when present.

Most of America's water supplies are safe, but to be sure what you consume is safe, test it yourself.

This booklet provides you with basic water information and facts about some of the more common problems. It does not cover all the issues and concerns related to water. If you want more knowledge or information about a particular substance or contaminant in water; call one of the following organizations:

United States Environmental Protection Agency (EPA)	
Drinking Water Hotline	1-800-426-4791
The Water Quality Association	1-630-505-0160
American Water Service	1-800-788-4825

In addition, we urge you to visit your local library and review the numerous books and articles devoted to issues surrounding water.

The most important message we can deliver to you is that you need to take control yourself in monitoring (testing) and treating your water to be sure what is coming from your tap is in fact safe for you and your family. Whether it's someone else's responsibility (as in a public supplier) or yours (as in private wells), be sure to test it regularly.

Be Sure Your Water is Safe!

1. Test Your Water Regularly
2. Preventative Treatment is smart
3. Fix Any Problem(s)

Is Your tap water really safe?

Every day, millions of people in the world turn on their taps to drink, bathe, wash dishes, cook, or clean clothes.

Most people assume their water is safe, but the concerns for water quality have increased worldwide.

Your water may have any number of contaminants in it and be unsafe to drink, even if it tastes good.

Are You Concerned?

Don't guess or assume when it comes to the safety of your water. None of us should take for granted the quality of an element that is so essential to life itself.

Safe water is critical to everyone's health. Water contaminated with harmful bacteria, nitrates or nitrites, lead, and other pollutants can cause a host of problems, including diarrhea, cramps, nausea, headache, and in some cases, serious illness and even death.

A report by the Natural Resources Defense Council stated that scientists estimate that each year up to 7 million Americans become sick from contaminated tap water, which can also be lethal. The NRDC also reported on 19 major cities in the US where pollution, old pipes and outdated treatment threaten tap water quality.

The Safe Drinking Water Act was created to protect the quality of drinking water in the US. Public drinking water systems are governed by the EPA. This applies to government or privately run companies that supply drinking water to 25 people or 15 service connections.

Concern about drinking water is growing, but unfortunately many people still assume their water is safe. By assuming and not taking precautions, the risks are much greater than you think.

My water comes from a well, what can I do?

The EPA states that approximately 15 % of Americans water is supplied by private wells. The EPA also says the groundwater that supplies those wells is generally safe but ground water contamination has been found in all 50 states.

Should I test my well water?

Public drinking water sources are monitored by the EPA and the Safe Drinking Water Act. The EPA and the Safe Drinking Water Act do not monitor or protect private wells.

A report supplied by the Centers for Disease Control (CDC) said in 1999-2000, contaminated private well water caused 26% of the drinking water outbreaks that made people sick.

The EPA recommends testing your well at least once per year for coliform bacteria, nitrates, total dissolved solids, and pH levels. Test more frequently if you suspect a problem.

The private well owner is responsible for the safety of the water that comes from their well.

Be Sure! Test and Be Safe!

The world's drinking water is threatened by an increasing number of contaminants. Environmental problems that increase groundwater contamination and deteriorating water distribution systems are just two factors causing water problems.

A major concern – BACTERIA

Bacteria are microscopic organisms so small that it takes nearly 300 together to equal the diameter of a human hair.

Not all bacteria cause sickness and disease, but unfortunately, many bacteria are very harmful. The presence or absence of coliform bacteria is the determining factor used by health officials to ascertain whether or not a water system is bacteriologically safe.

The presence of coliform bacteria in drinking water is a strong indication that the water is contaminated with disease-causing organisms. The correlation between coliforms and harmful bacteria is so strong that the US Environmental Protection Agency (EPA) standard for safe drinking water is zero coliform bacteria.

Ingesting harmful bacteria is a serious issue that no one should ignore. Unfortunately, because bacteria are colorless, odorless, and tasteless, you may be ingesting harmful organisms on a regular basis without knowing it. Treatment methods are available to kill dangerous bacteria. Call your water treatment professional for advice.

NITRATES / NITRITES

Their presence indicates pollution by fertilizer, human or animal waste

The presence of nitrates and nitrites in water may indicate pollution of the water by organic matter. Nitrate/nitrite concentrations as low as 10 parts per million for nitrates and 1 part per million for nitrites present problems.

Methemoglobinemia, a blood disorder causes shortness of breath and blueness of skin, and can lead to serious illness or death. Methemoglobinemia mainly affects infants and pregnant women

In addition, the environment that results from high nitrate or nitrite levels is a favorable atmosphere for bacteria, because these pollutants come from fertilizer, human, or animal waste. For removal methods call your water treatment professional for advice.

Arsenic

Arsenic sometimes naturally occurs in water and can be found in public and private water supplies. It is a poison that can pose a health risk for people and animals. Arsenic contamination of water can result from mining operations, use of wood preservers, and pesticide application. Arsenic is often found in ground water or mineral water at levels over 100 times the safe drinking water limits as established by the US EPA. Arsenic has been linked to skin cancer and in some cases death. Consequently, anyone that has a private well should test their water for arsenic at least annually. The EPA standards for Arsenic as of January 2001 was lowered from 50 part per billion (ppb) to 10 ppb. The lower federal standard becomes effective January 2006. For treatment equipment to remove arsenic call your water treatment professional.

Other Contaminants

Contaminants in water are typically measured and referred to in one or more of the following ways:

- Milligram per liter = mg/l
- Parts per million = ppm
- Parts per billion = ppb
- Grains per gallon = grains

We have reviewed contaminants like bacteria, nitrates, nitrites, and arsenic that can render a water supply immediately unsafe. These are by no means the only pollutants that can be harmful or affect your water supply. The EPA regulates and requires water suppliers, including bottled water companies, to test regularly for over 100 substances. This required testing does not assure compliance, or that what is actually flowing from your tap is within desired standards. Therefore, the only way you can be sure that what is coming from your tap is safe is to regularly check it yourself or have it tested.

Protect your family! Be sure! Be safe!

Some of the potential problems with water are rare, others more common. Some problems, whether aesthetic or health related, are easy and inexpensive to correct, while others are complicated and expensive to correct. A detailed water analysis covering all of the EPA listed substances may cost over \$1000, and should be completed by a certified laboratory. Some labs offer a limited analysis that costs up to \$200. Home analysis of some of the more common problems can be done for under \$100. Most water treatment companies will do basic testing for minimal charges or even free.

Take time to educate yourself and test your own water. The knowledge you gain by becoming informed and testing your water yourself will help you make a better decision as to the type of treatment equipment you might need.

Besides bacteria, nitrates, nitrites some of the more common water problems are lead, arsenic, hardness, acidity, alkalinity, iron, copper, chlorine, hydrogen sulfide, turbidity, sediment, taste and odor.

Lead

Lead is a substance that in very small amounts (as low as 15 ppb) can cause major health problems, especially in small children. Lead poisoning can range from gastrointestinal disturbances to brain, spinal cord damage and paralysis. For pregnant women, lead poisoning can result in miscarriage. Lead contamination can be a very serious health problem and should be immediately treated.

Lead can get into your water from pipes, lead solder, or brass fittings, or it can be in the water coming from the ground or the public water supply.

The general condition of your water can affect how readily it will leach lead from solder, pipes and/or fixtures. For example, acidic water (pH level 6.5) will normally absorb more lead than neutral water (pH level 7). For treatment methods to remove lead call your water treatment professional.

Hardness

Hardness is generally determined by the presence of calcium and magnesium in water. Hardness is normally measured in ppm or grains. One (1) grain equals 17.1 ppm.

Hardness Chart

<u>Hardness</u>	<u>grains</u>	<u>ppm</u>
Very soft	< 1	< 17
Soft	1-3	17-50
Moderately Hard	3-6	50-100
Hard	6-10	100-170
Very Hard	>10	>170

The effects of hardness can be costly because of damage to water heaters and plumbing, and the extensive use of soap, detergent, and shampoo. In addition, hard water causes significant aesthetic and cleaning problems.

Hardness can be easily solved by a water softener, and while a softener is not normally recommended until the hardness level exceeds 3 grains, many people prefer the very soft water (< 1 grain).

Acidity and Alkalinity

Acidity and alkaline levels in water are measured in pH (Positive Hydrogen) units, and total alkalinity in ppm. A pH scale of 0-14 indicates whether water is acid or alkaline.

A pH of 7 is neutral and ideal. An acid level of 6.8 or lower will cause corrosion of both copper (blue-green staining) and galvanized plumbing, which can lead to serious damage to plumbing lines and equipment, especially water heaters.

High alkaline levels (above 180 ppm or pH 10) may cause dry skin conditions, and / or objectionable taste. For treatment methods call your water treatment professional.

Copper

Copper occurs naturally in small amounts in many waters, and is generally not a problem. However, if copper levels are above 1 ppm, problems can begin developing.

Copper can poison red blood cells and cause jaundice, pancreatitis, and hemolytic anemia. Copper levels above 3 ppm can result in severe gastrointestinal reactions. Also, persons with the disease called " Wilsons Disease" accumulate copper in their bodies, thus leading to deterioration of the brain and liver.

Iron

Iron generally occurs naturally in water and does not present a problem unless it exceeds the EPA standard of < .3 ppm. As iron levels increase, plumbing and laundry stains will occur. In some cases, the levels and type of iron can form sludge deposits, creating problems with well tank bladders, plumbing lines, water heater, toilets, and other plumbing fixtures.

Iron frequently leaves a reddish brown stain. It may be present in one of the following forms:

Soluble ferrous iron

Ferric ions – soluble in acidic

Ferric hydroxite – insoluble in neutral or alkaline water

Ferric oxide – appears as rust in pipes

Iron bacteria - is an unpleasant problem that most of the time is easily corrected. To test for a typical iron bacteria problem, follow these two easy steps.

- 1) Turn on the hot water only. While water is running, observe color and smell. If iron bacteria are present, water will most likely show a reddish tint and will have a " sewer" smell that is very offensive.
- 2) Turn on the cold water only. If the smell or appearance significantly changes in a few minutes while water is running, there is a strong possibility you have iron bacteria.

Removal methods are available for both iron and copper. Call your water treatment professional for advice.

Chlorine (Cl₂)

Chlorine is a poison that is very effective in killing bacteria, and from that standpoint, it helps provide millions of Americans with bacteriologically safe water. However, chlorine will not kill cryptosporidium cysts, and therefore does not guarantee microbiologically safe water.

In addition, chlorination by-products, trihalomethanes, have been linked to cancer, and therefore consuming chlorinated water may create long-term health risks.

Chlorine also produces an objectionable taste and odor which discourages many people from drinking the recommended daily amount of water.

Dechlorination via activated carbon will remove trihalomethanes and eliminate normal taste and odor problems associated with chlorinated water. Call your water treatment professional for advice.

Hydrogen Sulfide (H₂S)

Hydrogen Sulfide is a gas that, when present in concentrations as low as 1 ppm, will produce a very unpleasant "rotten egg" smell.

Removal is generally accomplished by converting the gas into elemental sulfur or by off-gasing through aeration.

There are several methods to accomplish this, depending upon the level of H₂S present. Each method has limits, therefore, proper sizing and choice of solution will directly affect results.

To confirm your problem is hydrogen sulfide and not something else, perform the following simple test: Turn on the cold water and check for the "rotten egg" smell immediately and after letting the water run for a couple of minutes. Perform the same function on the hot side only. If you smell the "rotten egg" odor on both hot and cold sides you probably have a H₂S problem. If the smell is only on either side, and not both, then H₂S is not your problem. Call your water treatment professional for advice.

Turbidity & Sediment

Turbidity (fine particles) will remain suspended in water for periods of time. Sediment (coarse particles) will settle out within an hour or so. Both are caused by any combination of sand, scale, silt, iron, organic substances such as vegetable or animal matter, grease, oil, or other material. The EPA standard for turbidity and sediment is 5 ppm.

Turbidity or sediment problems may affect the performance of equipment, clog plumbing lines and fixtures, and create a generally unpleasant and unappetizing situation with water, and both should be treated.

A cost-effective solution is a throwaway filter. To prevent contamination, the filter housing should be disinfected each time the filter housing is opened.

Some turbidity problems require coagulating agents when the particles are very small. The particles and coagulate form a "floc" that can be trapped by a filter. Call your water treatment professional for advice

Taste & Odor

Taste and odor in water come from the things in water other than water. Objectionable taste and odor come from organic matter, gas or chemicals.

Generally, filtering and passing water through activated carbon will remove the objectionable taste and odor. Occasionally, oxidizing agents and/or aeration may be required. Call your water treatment professional for advice.

Conclusion

Water and its quality can have a dramatic impact on your life. Hopefully, the information in this book has increased your understanding and knowledge of water, our most valuable resource.

Now you should be better equipped to take control of your water and make sure that you and your family's water supply is safe and healthy.

REMEMBER THE 4 STEPS TO SAFE WATER:

- 1) Test Your Water
- 2) Fix Any Problem(s)
- 3) Preventative Treatment is Smart
- 4) Regularly Check Your Water

This information book was written by American Water Service, Matthews, North Carolina, for the purpose of educating the public on the growing problems with the water we consume. There are a number of articles, reports, and studies on file at your local library that provide additional information.

For additional information email us or call toll free:

water@purtest.com

or

1-800-788-4825

We encourage you to take charge of the water you consume.

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