National Testing Laboratories, Ltd.
Quality Water Analysis

So Your Customer Wants to Know "Is My Water Safe?"

When new wells are drilled for residential, state or local health departments require a water test. Typically the test is referred to as a potability test. What is potability? The American Heritage Dictionary vaguely defines potable as "fit to drink". According to the Water Quality Association (WQA) Glossary of Terms, potable water is defined as a water supply, which meets the USEPA and/or state water quality standards and that is considered safe and fit for human consumption. In my experience, when health departments are requiring a potability test for new wells they are usually looking for a bacteria test. Occasionally they will request additional analysis depending on local requirements. Unfortunately, water that is free of bacteria may still be unfit for human consumption. There are many other contaminants known to pose health risks.

What is contamination?

Water is often referred to as the "universal solvent" because of its ability to dissolve almost anything it comes into contact with. The superior solvent action of water allows it to easily become contaminated by water-soluble material. For example, well water typically contains minerals such as calcium, magnesium, iron and manganese due to its contact with geological formations containing these minerals. These contaminants do not necessarily pose a health risk, but can cause problems with staining on fixtures and laundry, and can reduce the life of appliances such as dishwashers, washing machines, and water heaters. Water also dissolves metal from pipes and plumbing fixtures, which may contain lead, copper, iron, etc. Water is the leading cause of lead poisoning in young children. Additionally, industrial chemicals and petroleum compounds are finding their way into our drinking water.

Where did this problem originate and why now?

Water pollution and contamination are issues that have been attracting more and more attention since the beginning of America's Industrial Revolution. The Industrial Revolution prompted a rise in the manufacturing of goods. This increased manufacturing led to the creation of new synthetic materials. The U.S. chemical industry produced 11 trillion pounds of synthetic organic chemicals between 1945 and 1991, most of which has ended up in our environment: soil, air and/or water.

In mankind's effort to improve the quality of life, many different chemicals have been developed. Some of the numerous uses include: food preservation; aerosols sprays for personal hygiene; pet care; and cleaning homes and automobiles. Over a thousand chemicals are created each year to meet the demands in the marketplace.

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In the past, these chemicals were developed and released into the environment with little thought given to the potential dangers they may present. Environmental activists have forced industry and governmental agencies to become more conscious of waste disposal and its impact on the environment. Traditionally, hazardous waste has been disposed of via deep-well injection, surface impoundments and landfills. Current regulations for deep well injections do not require long-term monitoring of the sites, which allow waste to contaminate the soil and water long after monitoring periods have passed. According to the U.S Environmental Protection Agency (EPA), approximately 70% of surface impoundments (pits, ponds and lagoons) that are used for hazardous waste disposal do not have liners and as many as 90% may threaten ground water. The Office of Technology Assessment has determined that eventually even the best designed and secured landfills will leak hazardous waste into nearby surface and groundwater. Past hazardous waste management practices have allowed thousands of chemical compounds to find their way into many drinking water supplies.

When is a contaminant considered harmful?

In 1974, Congress passed the Safe Drinking Water Act, which authorized the EPA to establish safety levels for certain contaminants in public water supplies. These safety levels are referred to as Maximum Contaminant Levels (MCLs), which are the maximum allowable amounts of the regulated contaminants in public drinking water supplies.

The EPA has divided the standards for drinking water into primary and secondary standards. Primary drinking water standards regulate contaminants that present a health risk. Secondary drinking water standards regulate contaminants that cause aesthetic problems such as taste, odor, color and appearance.

The original list of inorganic and organic contaminants with established MCL's has grown from 18 in 1975 to 94 in 1999, with many additional contaminants being considered for future regulations.

Unfortunately, these are regulations designed only to monitor public water supplies. This leaves homeowners with the responsibility to test their private wells to ensure the water is safe. The EPA recommends testing annually or even semi-annually depending on environmental conditions.

How small is one contaminant?

Very small!! The standard unit for measuring contaminants include milligrams per liter (mg/L), parts per million (ppm), and parts per billion (ppb). The maximum contaminant levels are written in mg/L. To give you an idea of how small these measurements are, one part per billion is equivalent to one second in 32 years. 16 parts per million equals 1600 parts per billion. Very small quantities of toxic contaminants usually do not cause immediate health problems, but if consumed over a long period of time they can cause serious and possibly irreversible health complications.

What is the risk to us?

Chemicals are being introduced into the environment faster than we can calculate their risks and benefits. There are currently in excess of 70,000 chemicals in commercial use. According to the National Academy of Science only 10% of these have been tested for toxicity.

A perfect example of a chemical that has been used without significant toxicity testing is Methyl-Tertiary-Butyl-Ether (MTBE). MTBE is a gasoline additive first widely used in the early 1990's to aid in the reduction of air emissions from automobiles. Tragically, MTBE is now threatening drinking water supplies across the Unites States. The American Water Works Association (AWWA) reports that it has been found in areas from rural towns of Ronan, Montana and Spring Green, Wisconsin to major metropolitan areas such as Dallas, Las Vegas, and Denver. MTBE is extremely soluble in water and can travel very quickly in underground water sources. Considering this fact, even small spills on the surface, at the gasoline station or while filling the lawnmower can cause ground water contamination. Currently there are no federal regulations and states are performing toxicology tests to help in determining a safe level.

The effects of some toxic substance on human life have been understood for some time. For instance, studies have indicated that arsenic is a potent carcinogen (India). The effects of mercury poisoning became apparent in the early 1950's in Japan where eating mercury-tainted fish crippled thousands of people. Significant studies have been conducted, which determined that even small amounts of lead could have adverse health consequences especially in infants and small children. According to the EPA almost 1 in 5 Americans drink tap water containing excess levels of lead (including 7 million children).

The Threat is Real!

Consider the following:

- According to the National Water Quality Assessment Program, an on-going study by the U.S. Geological Survey, about fifty percent (50%) of streams sampled contained five or more pesticides.

- According to studies conducted by the Environmental Working Group, between 19954-1995 (the most recent federal data available at time of publication) over 45 million Americans were supplied drinking water that violated federal health standards for fecal matter, parasites, disease-causing microbes, radiation, toxic chemicals, lead and other pollutants.

- There are approximately 1.4 million underground storage tanks containing petroleum products or other hazardous chemicals in the United States. The EPA estimates about 20% of these are leaking, which breaks down to about 280,000 tanks.

- According to another study conducted by the Environmental Working Group in 1999, Atrazine, a toxic weed killer, was found in the drinking water of 796 towns throughout the Midwest.

Many contaminants are colorless, tasteless and odorless, which lead people to believe they have safe drinking water. This may not be a safe assumption. Analysis by a qualified laboratory is the only way to accurately determine if contaminants are present and at what levels. National Testing Laboratories, Ltd. offers several test packages to analyze for various contaminants found in drinking water.

National Drillers Buyers Guide
May 2000
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