

WHAT ARE E. COLI AND COLIFORM BACTERIA?

Coliform are a group of several types of bacteria from the same family which typically live and reproduce in the intestines of animals. Coliform bacteria can also be found in soil, surface water, and plants--anywhere animal feces may be present. *E. coli* is an abbreviation for *Escherichia coli*, a genus and species of bacteria. *E. coli* is a member of the coliform group and is the predominant bacteria in the gut of warm-blooded animals. The fact that it originates only in warm-blooded animals makes *E. coli* a better indicator than coliform of the potential for human diseases. A water test will give you results for both *E. coli* and total coliform. The presence of *E. coli* in water indicates direct contamination with fecal matter and therefore, the presence of disease causing microorganism.

WHY WASN'T MY WATER TESTED FOR ALL MICROORGANISMS THAT CAUSE DISEASES?

There are numerous water-borne diseases, each requiring a different method of detection; therefore, it is impractical to look for all the possible disease-causing microbes in water. Testing for Coliform is a good alternative to looking for all the disease-causing microbes. When coliform are found in groundwater, this indicates that the groundwater is being affected by surface water or surface activities. Because coliform originate on the land surface, it is used as a tracer for disease-causing bacteria. Since *E. coli* must originate in the gut of a warm blooded animal, its presence indicates contamination from animal feces and the high likelihood of disease-causing organisms being present as well. Since testing for a specific disease-causing organism is impractical, testing for total coliform and *E. coli* are considered the best way to determine whether or not a water supply is protected from microbial contamination. Water containing any total coliform or *E. coli* should not be used for drinking or cooking unless boiled for 5 minutes or otherwise disinfected.

WHAT CAN CAUSE A WELL TO TEST POSITIVE FOR THESE BACTERIA?

Bacteria in wells usually comes from surface water that enters the well without first percolating through the soil and porous material above the water table. Your well can be contaminated if the well was improperly constructed, located in a depression that collects surface runoff, or can also occur during floods when flood water overtops the well casing. Newly drilled or serviced wells will also contain these bacteria due to material entering the well from the surface. Shallow wells, less than 60 feet deep, are much more susceptible to contamination from bacteria than are deeper wells. Shallow groundwater may not be sufficiently filtered by the soil and porous material above the water table to remove surface bacteria. If a septic system is too close to the well or not working properly, this can be the bacteria source.

Other causes for contamination include:

Open wells, which can allow animals, such as rodents to fall into the well. Even the smallest opening will allow insects to travel in and out.

Backflow from outside hoses, caused by negative pressure in the plumbing, can bring dirty water back into the well. Faulty check valves also contribute to this problem.

Unsanitary Plumbing, which can be a problem even when wells are well-constructed and properly located.

Groundwater does not contain a small amount of chlorine (as do most municipal water supplies) that serves to prevent bacterial growth within the plumbing. Forgetting to regularly service water treatment filters can also allow bacteria to accumulate and grow.

WHAT SHOULD BE DONE TO CORRECT WELL CONTAMINATION?

The well can be disinfected by a process known as shock chlorination, **but unless the cause of contamination is discovered and corrected, the bacteria problem will return.** Test your water again after all traces of the shock chlorination treatment are gone. If the bacteria are still present after repeating this treatment, your well may have an unseen problem, or the groundwater itself may be the source of the bacteria. You can still use this water for your household by installing a continuous disinfection system such as a chlorinator, ultraviolet light, or ozone system.

WHAT ARE NITRATES/NITRITES?

Nitrates and nitrites are chemicals that can be found naturally in our environment. Two of the earth's most common elements, nitrogen and oxygen, combine to form these nitrogen-containing compounds. Nitrates are essential (needed) nutrients for plants to grow. Nitrates can be found in the air, soils, surface waters and ground water.

How do Nitrates get into the environment?

Nitrates are generally found in surface waters and shallow ground water. Plants naturally release nitrogen when they die and decompose (rot). The nitrogen from the rotting plants oxidize (combine with oxygen) to form nitrates. During a rainfall, surface water can move through the soil and carry these nitrates down to the underground drinking water (ground water). Other ways water can be contaminated with nitrates is through the use of products that contain large amounts of ammonia. Ammonia is oxidized (combines with oxygen) and forms nitrites. Liquid ammonia fertilizer spills can form nitrates that also make their way through the soil to the ground water. Old and poorly maintained sewage systems and improper well construction can contaminate ground water with nitrates as well.

Who is at risk to Nitrate/Nitrite exposure?

The persons most at risk to exposure to nitrates/nitrites are infants less than four-months old who are fed formula made with nitrate-contaminated water. Pregnant women may be more sensitive to nitrates because their blood contains higher levels of methemoglobin. They may be especially sensitive at the 30th week of pregnancy. The elderly and people with chronic (on-going) health problems are also at risk to chemical exposure from nitrates/nitrites in drinking water.