

ARSENIC

in Anoka County Private Wells and Its Health Effects¹

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Many private well owners are surprised to learn that they may have natural arsenic in their water. Arsenic is an element found in varied concentrations of the earth's geologic formations. Arsenic concentrated in glacial clay deposits is thought to dissolve in groundwater which is drawn into wells. Most Anoka County residents have some measurable amount of arsenic in their drinking water. Data of Anoka County private well tests indicate that about ten percent (10%) have natural arsenic at a level above 10 micrograms per liter ($\mu\text{g/L}$) or parts per billion. The U.S. Environmental Protection Agency established a Maximum Contaminant Limit (MCL) for arsenic in drinking water at 10 $\mu\text{g/L}$. Public water suppliers may not exceed the arsenic MCL. Residents have to test their home well to learn the level of arsenic in their drinking water.

Despite its reputation as a deadly poison, the arsenic concentration in groundwater doesn't represent an immediate threat to health. The harm depends on factors such as the amount to which we're exposed and for how long. This fact sheet will present information about arsenic in homeowner wells; its health effects; and what you can do if you have arsenic in your drinking water.

The Occurrence of Arsenic in Anoka County Private Wells

Usually, arsenic in a private well is from a naturally occurring source. However, human activities can contribute to arsenic levels in drinking water. Past use or disposal of pesticides containing arsenic, mining operations, and manufacturing all displace arsenic from its original location and make it available to work its way into groundwater and wells.

In 1997, Anoka County Environmental Services completed a reconnaissance study² of private wells that determined the concentration of arsenic in randomly selected wells. The study focused on the rural areas that are not served by a public water supply system. Of the 189 private wells sampled, 26 contained arsenic at a concentration above 10 $\mu\text{g/L}$. Fourteen percent (14%) of the private wells exceeded 10 $\mu\text{g/L}$.

How Does Arsenic Get in Drinking Water?

Arsenic is a naturally occurring mineral in soil and rock that can dissolve into groundwater. The concern is that private wells may not have been tested for arsenic. Since 2002, newly constructed wells are required to be tested. Private wells constructed before 2002 were not tested for arsenic. If the arsenic test indicated levels above 10 $\mu\text{g/L}$, the owner was notified and encouraged to avoid using the water for drinking.

How Can Arsenic Affect Health?

In nature, pure arsenic is rare. Arsenic is usually found in combination with other elements that are "organic" or "inorganic", depending on the other elements with which it is combined. Arsenic from plants and animals is usually organic. Approximately two-thirds of the arsenic in food is in the organic form. Organic arsenic is generally not toxic. Arsenic in soil, rock, and water is usually toxic.

A one-time oral dose of 70,000 to 180,000 micrograms (μg) is fatal for most people. Although this amount, (approximately 1/50 the weight of a penny) seems very small, it is extremely high compared to levels naturally present in water.

Consumed over a longer period, much lower amounts of arsenic can be harmful. Daily consumption of water containing 100 $\mu\text{g/L}$ over many years can cause problems with circulation, nervous system, and diabetes. Studies have also linked long-term exposure to increased cancer of the bladder, lungs, liver, and other organs. While levels below 100 $\mu\text{g/L}$ are not definitely linked to health effects, a growing body of evidence indicates that lower levels of arsenic may be associated with increased health effects.

Since arsenic is not easily absorbed through the skin and doesn't evaporate with water, using the water for other purposes, such as bathing and washing dishes and laundry, is safe.

What Is the Drinking Water Standard for Arsenic?

In 2001, the U.S. Environmental Protection Agency (EPA) lowered the Maximum Contaminant Limit (MCL) for arsenic from 50 to 10 $\mu\text{g/L}$ to protect the public from long-term exposure in drinking water. EPA standards apply to public water supplies, only. Private drinking water (home) wells are not required to meet the federal or state standards for arsenic.

¹ This fact sheet is adapted from Arsenic in Minnesota's Well Water by the Minnesota Department of Health, 7/2/2015.

² Evaluation of Trace Metals and Sulfates in Individual Water Supplies; Anoka County Environmental Services, Dec. 1997.

