

wellcare® information for you about **Arsenic & Well Water**

What is Arsenic?

Arsenic is a naturally occurring mineral found in soil and bedrock. Arsenic works its way into groundwater through erosion. Wells that are in or just below large amounts of shale or shaley soil often have higher levels of arsenic in the water.

Arsenic is also widely used to make wood preservatives, paints, dyes, metals, drugs, soaps, and semi-conductors, and was once common in pesticides. Manufacturing, farming, or simple mishandling of these materials can permit arsenic to enter groundwater.

Arsenic can be present in well water as Arsenic III (arsenite), Arsenic V (arsenate), or a combination of the two. Arsenic III is more toxic and more common in groundwater than Arsenic V.

What are the health effects of Arsenic?

Arsenic poisoning can easily go undetected because many of its symptoms point to a number of other illnesses. Health effects from arsenic exposure include skin damage, cardiovascular, endocrine disruption, immunological, neurological, pulmonary effects, and an increased cancer risk, including cancers of the skin, bladder, lungs, kidneys, nasal passages, liver, and prostate. Early warning signs may include stomach pain, nausea, vomiting, diarrhea, and numbness in the extremities.

Arsenic is not easily absorbed through the skin and does not evaporate into the air. Showering, bathing, or other household uses of water are safe unless your arsenic levels are higher than 500 parts per billion (ppb).

How do I test for Arsenic?

Arsenic in drinking water has no taste or odor. The only way to determine its presence is to have the water tested. The EPA sets a maximum limit for arsenic in public drinking water supplies of 10 ppb (0.010 mg/L). Some states have set the limit at 5 ppb (0.005 mg/L) or even lower.

Contact your state or local health department for a list of state-certified laboratories in your area. If there is arsenic in your water, a laboratory can determine how much and which type(s) of arsenic is present, through a method called "speciation." This is significant because treatment methods vary for each type. You may also wish to test for other contaminants, including iron, manganese, and pH because the presence of these contaminants may hinder the effectiveness of arsenic removal and will need to be removed before treatment.

It is particularly important to test regularly for arsenic – at least once a year – in areas of concern. Your state's Department of Natural Resources or Geological Survey Office should have information on areas prone to high levels of arsenic.

What are the treatments for Arsenic in drinking water?

Arsenic can be reduced in water by point-of-entry (entire household) systems or by point-of-use systems.

Effective treatment methods include: activated alumina, distillation, iron oxide/hydroxides, manganese greensand, reverse osmosis, strong base anion exchange, and titanium oxy/hydroxide.

There are two conditions that dominate the behavior of arsenic in water: its state of oxidation (valence) and the pH of the water. Generally, negatively charged (ionized) Arsenic V is much easier to remove than uncharged Arsenic III.

In well-water, where Arsenic III is expected to predominate, an oxidation step such as chlorination, ozonation, or potassium permanganate is necessary if a technique other than iron-based systems are used. Treatment methods such as reverse osmosis, activated alumina media filtration, manganese greensand filtration, and strong base anion exchange require oxidation of Arsenic III to Arsenic V first in order to successfully remove the arsenic. Some iron-based specialty media, such as iron oxide/hydroxide-impregnated and iron coated activated alumina filtration media or anion exchange resins, have shown effectiveness in removing both Arsenic III and Arsenic V. Distillation has also been shown to remove arsenic to less than 2 parts per billion, but is best used at point-of-use for smaller quantities of water.

It is important to note that other ions present in the water can compete against arsenic for removal sites, therefore, it is recommended to test water before and after installation of the treatment device and annually thereafter to confirm effectiveness. *Do not attempt to remove arsenic by boiling water. This only serves to concentrate the contaminant.* Contact a local water treatment professional to assist with the selection and installation of any water treatment device(s). If you need assistance in locating a water treatment professional or have any questions on information contained in this sheet contact the wellcare® Hotline at 888-395-1033 or www.wellcarehotline.org.

This information sheet was reviewed by the Water Quality Association. The Water Quality Association (WQA) is a not-for-profit international trade association representing the residential, commercial and industrial water treatment industry. For more information on WQA and their programs visit their website at www.wqa.org.

FOR MORE INFORMATION to help you maintain your well and protect your water supply



wellcare® is a program of the **Water Systems Council (WSC)**. WSC is the only national organization solely focused on protecting the health and water supply of the 43 million people nationwide who depend on household wells for their water supply.

This publication is one in a series of wellcare® information sheets. There are more than 90 information sheets available FREE at www.watersystemscouncil.org.

Well owners and others with questions about wells or groundwater can also contact the FREE wellcare® Hotline at 1-888-395-1033 or visit www.wellcarehotline.org.

JOIN THE WELLCARE® WELL OWNERS NETWORK!

By joining the FREE wellcare® Well Owners Network, you will receive regular information on how to maintain your well and protect your well water.

Contact us at 1-888-395-1033 or visit www.watersystemscouncil.org or www.wellcarehotline.org.