

Arsenic

What You Need to Know

Arsenic and Old Lace, the classic play by Joseph Kesserling about two sweet old ladies who poison gentlemen callers, may be what comes to mind first when you think of arsenic. The use of arsenic as a poison is widely documented in detective and mystery stories. As a result, many people take alarm when they hear that their drinking water, either from a public or private water system, may contain an amount of arsenic. What do you do if your water contains arsenic, and can it be removed? This Q&A addresses these questions and more.

What is arsenic?

Arsenic is a semi-metallic element with the chemical symbol "As". It is a member of the nitrogen family, and it occurs naturally in rocks, soils, and waters that come in contact with these rocks and soils. Arsenic is odorless and tasteless.

Arsenic can combine with other elements to form inorganic and organic arsenicals. In general, inorganic derivatives are regarded as more toxic than the organic forms. While food can contain both inorganic and organic arsenicals, primarily inorganic forms are present in water.

Exposure to arsenic at high levels poses potential serious health effects as it is a known human carcinogen, or cancer-causing agent. It also has been reported to affect the vascular system in humans and has been associated with the development of diabetes.

Is my private well at risk?

At this time, there are very few groundwater supplies in the United States that exceed the current U.S. EPA arsenic standards. However, there are wells in some parts of the Southwest and other localized areas around the United States that do exceed this standard. Your state's Department of Natural Resources or Geological Survey Office may have information on any areas of your state that may be prone to the presence of high levels of arsenic.

Private well water should be tested annually for bacteria and anything else of concern to the well owner, such as arsenic. Testing should be conducted by a certified drinking water laboratory. Visit www.epa.gov/safewater/pwells1.html for a state-by-state listing of certification officers, or call the National Ground Water Association at (800) 551-7379. The certification officer in your state can provide a list of certified labs in your area.

If you do have an arsenic level in your water that is higher than you would like, there are water treatment technologies available to address the problem. Do not attempt to remove arsenic by boiling water. This will only concentrate the arsenic.

What types of treatment solutions are available to private well owners?

NSF International, a not-for-profit organization that develops standards, product testing procedures, and certification services for products including water treatment devices, has certified point-of-use reverse osmosis and distillation devices for the reduction of arsenic in drinking water. Pretreating water through chlorination or oxidation may be necessary to make reverse osmosis devices effective for arsenic removal. NSF is also working on certification standards for filtration devices that can be used to reduce arsenic. For more information or a list of NSF-certified devices, contact the organization at (877) 8-NSF-HELP, or visit its Web site at www.nsf.org.

Some of the treatment technologies may not be amenable to point-of-entry, or whole-house, treatments. In these cases, point-of-use units, which treat water at the tap, may be the best option.

Following installation of a treatment device, water quality should again be tested to verify the operation of the device. After that, water should be tested at least annually to confirm treatment effectiveness. A maintenance agreement for such devices is highly recommended.

Again, since water quality varies greatly, be sure to have your water tested and consult a local water professional for advice before purchasing a water treatment system.

How does arsenic enter a private water system?

Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. It can be further released into the environment through natural activities such as volcanic action, erosion of rocks, and forest fires, or through human actions. Approximately 90 percent of industrial arsenic in the United States is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps, and semiconductors. Agricultural applications, mining, and smelting also contribute to arsenic releases in the environment. Arsenic-related pollutants enter the groundwater system by gradually moving with the flow of groundwater from rains, melting of snow, etc.

Testing water for arsenic in areas where arsenic is a concern is an important strategy for private water well owners to safeguard the health and well-being of their family. Working with a water professional to monitor and maintain the quality of the well and water supply is an important responsibility of the private water system owner. Your groundwater contractor is your central source of information about caring for your system.

What is the measurement of arsenic?

The U.S. EPA established the current maximum contaminant level (MCL) for arsenic, 50 micrograms per liter (or parts per billion). The EPA does not regulate private water wells, but its drinking water rules provide a good standard by which to measure your water quality.

In January 2001, the Clinton administration issued a rule that, when effective, would lower the MCL from 50 micrograms per liter to 10. However, in March 2001, the Bush administration announced it would propose to withdraw the rule. The U.S. EPA has said it will seek independent reviews of both the science behind the lower standard and of the estimates of the costs to communities of implementing the rule at the 10 microgram level.

What are the symptoms of overexposure to arsenic?

Observable symptoms of arsenic poisoning are thickening and discoloration of the skin, stomach pain, nausea, vomiting, diarrhea, numbness in hands and feet, partial paralysis, and blindness.

Where can I get more information?

For more information on your private water well, contact your local contractor. Also, visit the Web site of the National Ground Water Association, www.ngwa.org, and its site just for well owners, www.wellowner.org.