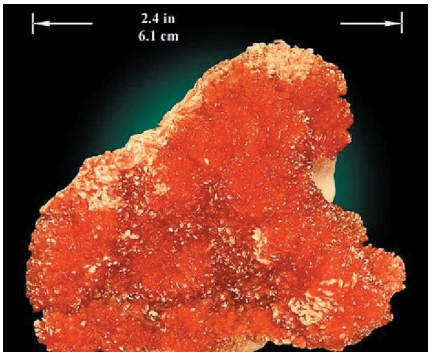
CWAG Bulletin #3

Citizens Water Advocacy Group

Arsenic in Arizona's Water Supply

Frequently Asked Questions

Why is arsenic important to everyone?



Everyone knows from movies like "Arsenic and Old Lace" that short term exposure to acute [more than 60 ppm] of arsenic can cause death. Now, the US Environmental Protection Agency has completed studies that show several percent of the population would die from cancer or a host of other illnesses caused by "chronic" [low level] arsenic exposure for a long time at a level of 50 parts per billion in drinking water. To reduce the risk of cancer from this chronic exposure to arsenic, the EPA changed the allowable limit for drinking water from 50 ppb to 10 ppb in January of 2006. This is projected to reduce the risk of cancer and other illnesses from arsenic by around 80%. The exact benefit cannot be defined because other sources of arsenic such as food or air are contributors to the health risk.

In the USA most areas have much less than this new 10 ppb limit, but at least 300 water supplies in Arizona, and many more in the Western USA, have arsenic concentrations that exceed 10 ppb. It is estimated that treatment to reduce arsenic in these water supplies will cost up to $3 billion.

CWAG hopes this brief introduction to this issue will help you decide what you need to do to protect your family from problems caused by chronic arsenic exposure from water.

What is arsenic and how does it cause health problems?

Arsenic is a mineral element that plants and animals can take up during development of new cells. In animals, arsenic can be mistaken for phosphorus and result in cells that are defective and can mutate into cancer cells. No one knows if there is a threshold concentration of arsenic below which there is no danger of damaging cells.

Where do we find arsenic?

Arsenic is the 20th most common element in the earth's crust, constituting 0.0005% of the rock and soil. That is only 5 parts per million, on average, but it is not distributed uniformly.

Arsenic is often found combined with copper and iron sulfides. When these minerals are mined, the arsenic is exposed in tailings piles or can become airborne from refining.

Arsenic can be accumulated in root crops which we eat, such as carrots, beets, potatoes or onions, if the soil or water they grow in contains arsenic.

Arsenic can be emitted into the air from large fossil fuel burning power plants, so it can be inhaled into our lungs or washed out of the air into our water supplies by rain.

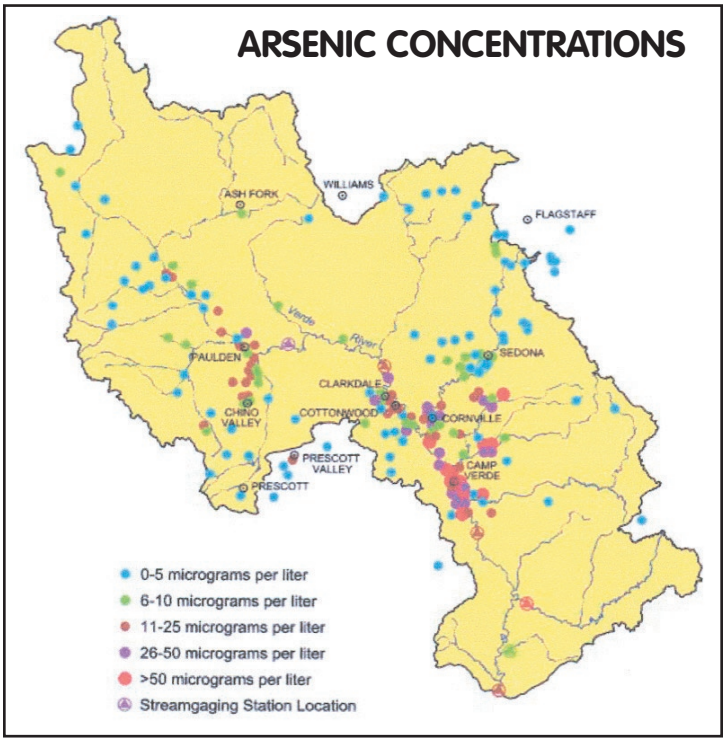
Most commercial uses for arsenic have been eliminated because of the toxicity for humans, but it is still used for some applications such as gallium arsenide crystals for computer chips, 4th of July fireworks, and wood preservatives.

How does arsenic get into our water supply?

Rain can wash airborne arsenic into our rivers and lakes which recharge the aquifers. Water in contact with arsenic mineral deposits in the ground will dissolve some of the arsenic.

This map of Yavapai County shows where water has been tested for arsenic, and what the concentrations have been. [See map next page]

All of these tests are from public and private water providers. None of this data is from the thousands of private wells in the County.



How can I find out how much arsenic is in the water I drink?

All commercial water providers serving more than 25 people are required to test for arsenic at least once a year and report the results to their customers.

Private well owners can get a test kit for around $20 from the University of Arizona Agricultural Extension Center in Prescott, by calling 928-445-6590. These test kits have some interferences that may distort the readings, so commercial labs in Phoenix should be contacted if more sophisticated tests are needed. Call the Arizona Department of Health Services at 602-364-0724 for a current list of labs certified by the State for accuracy.

How can I reduce the arsenic in my drinking water?

The EPA did a survey of water treatment technologies to define the BAT [Best Available Technology] for removing arsenic. Most of the best proven technologies require adsorption of arsenic on iron oxide or activated alumina particles, membrane separation such as reverse osmosis or electrodialysis, or distillation. An army of consultants, contractors and suppliers are already at work finding the best treatment for those water providers who have identified problems.

For private well owners who discover they also have arsenic problems, or for customers of commercial water providers who are not satisfied with the level of treatment their provider has supplied, the NSF [National Sanitation Foundation] working in partnership with the EPA, has tested a broad selection of small "off-the-shelf" treatment equipment that can be installed as a POE [Point of Entry] system on a well outlet, or POU [Point of Use] system under a kitchen sink. The results of this ETV [Environmental Technology Verification] program are names of equipment models certified as effective technologies by NSF. They can be viewed at www.nsf.org along with arsenic removal results each brand achieved.

How much will arsenic removal treatment cost for my water supply?

Large community systems with existing coagulation equipment might remove arsenic from all the water for a family of four at a cost of $5 per year [for ferric sulfate addition], whereas a groundwater supply with no current treatment other than chlorination might have to add a complete coagulation and filtration system at a cost of $100 per year per family. The EPA estimated the average impact for compliance with the new standard of 10 ppb will be $35 per year per family.

A small POE system installed on a private well discharge might cost $2000-5000 with annual operating cost of $100-300 depending on arsenic concentration.

Most private well owners will not need to treat all their water, and will choose to install small POU systems under their kitchen sink for culinary and drinking water only. These systems will vary from a few hundred dollars to several thousand depending on the type of system purchased. Annual replacement media, chemicals, and parts might average $100 per year per family.

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