Guidelines for Selecting a Home Arsenic Treatment System

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Naturally occurring arsenic has been found in many private wells in West Anchorage. Homeowners in this area should:

- Test your well water to determine if arsenic is present. A list of drinking water laboratories certified by the state of Alaska can be found at: http://info.dec.state.ak.us/eh/lab/certchemlabs/.aspx
- Decide if you want to use the water, switch to bottle water or install an in-home treatment unit.

Arsenic in Anchorage groundwater

For the last 18 months, the University of Alaska Anchorage (UAA) School of Engineering and the Municipality of Anchorage Department of Health and Human Services (DHHS) have evaluated the ability of various in-home treatment systems to remove arsenic from groundwater wells in West Anchorage. The results of these studies have been summarized in this pamphlet to help homeowners evaluate their options.

Why is arsenic present?

The arsenic in Anchorage drinking water wells appears to be released from naturally occurring arsenic bearing minerals. Even though it is derived from natural sources, this arsenic can pose a health threat if present in high enough concentration. Our study indicated that elevated arsenic, greater than 10 parts per billion (ppb), is present in many wells in West Anchorage. Unfortunately, there are insufficient data at this time to predict whether a specific well has high arsenic levels. The only way to know if your well contains arsenic is to have it tested, preferably at a state-certified laboratory.

What are your options?

If you determine that arsenic is present in your well, you can elect to use the well water as is, switch to an alternate source of drinking water such as bottled water or install a treatment unit in your home. Treatment systems can be divided into two main categories point-of-use (POU) or point-of-entry (POE.) POU systems are designed to treat water at a single tap, most often at the kitchen sink, to provide treated water for drinking and cooking. With a POE device all other water used in the home (e.g. bathing and dishwashing) will be treated to remove arsenic. Health concerns involving arsenic stem from ingestion of water. Therefore, for most homes a POU device is capable of reducing most health risk associated with elevated levels of arsenic. These devices are also generally less expensive and easier to maintain than a POE devices and as a result, many homeowners will opt to install a POU versus a POE system.

There are two primary methods of treatment used in the POU systems on the market today. Adsorptive media systems use an iron or aluminum based material specifically designed to chemically bind with arsenic to remove it from water. These systems typically consist of a media cartridge that is inserted into a stainless steel or plastic housing. When the capacity for removing arsenic from solution has been exhausted, the cartridge is replaced. Cartridge life may range from several weeks to over a year depending upon the quality and amount of water treated. Initial costs for POU adsorption units range from

If you decide to install an Point-of-Use treatment system, keep these things in mind:

1. *Buy a quality system specifically designed to remove arsenic. Not all treatment systems on the market will effectively remove arsenic*

2. *Monitor the performance of your system and budget to replace the system elements on a regular basis*

For more information on the UAA/DHHS West Anchorage Arsenic Study contact:

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$150 to over $500. The majority of the devices cost $200 to $300. Costs of replacement filters vary from $40 to $500, with the majority in the $100 to $200 range.

In reverse osmosis (RO) treatment, untreated water flows under pressure past a membrane. The membrane selectively rejects arsenic and other contaminants and allows treated water to pass through. POU RO units range in cost from $300 to over $1100. The majority of devices cost $300 to $700. RO systems utilize filter cartridges which become fatigued over time and must be replaced to maintain treated water quality. The costs of replacement membrane cartridges vary from $40 to $250, with the majority in the $100 to $200 price range. A typical RO system will contain one or two membrane cartridges. Many systems also incorporate an activated carbon filter as well.

Both adsorptive media and RO systems are capable of providing excellent arsenic removal, but their effectiveness is highly dependent upon the type of the water being treated.

What type of system will work best?

The UAA/DHHS study evaluated three available RO units and two adsorptive media system to determine how these systems work on the groundwater water found in West Anchorage.

Two of the three RO systems tested in the UAA/DHHS were not effective in removing arsenic from West Anchorage wells. The results suggest that West Anchorage groundwater quality is such that RO systems may not be effective in every case. Homeowners should carefully evaluate system performance claims of these popular units and evaluate actual performance to ensure that arsenic can be consistently removed.

More consistent performance was obtained with the adsorptive media systems. Both the aluminum based and iron based adsorptive media systems were able to effectively remove arsenic at several locations throughout the study area. The iron based system evaluated in this project was particularly robust and effective over a wide range of water qualities. These systems had effective cartridge lives of over 10 months in the UAA/DHHS study, although results will vary from site to site depending on water quality and usage rates.

Buying and maintaining a POU device

If you determine that that arsenic is present in your well and you elect to install a POU treatment system, here are a few things to keep in mind.

Buy a quality system designed specifically for arsenic removal

Most of the inexpensive charcoal or activated carbon filters on the market have not been designed to remove arsenic. Make sure you buy a quality unit (plan on spending $400-$1000) designed to remove arsenic and budget to replace the active cartridges on a regular basis.

Verify your system is working

Because water quality and water usage rates will vary from home to home, it is important that you regularly monitor the water produced from your POU device, especially during the first year of operation. Replace the active elements of the POU device when the arsenic level starts to increase. For most homeowners, cartridge elements should be replaced once or twice per year. For homes with high water use, more frequent replacement may be required.