FACTSHEET: ARSENIC

INTRODUCTION

This factsheet provides basic information for private water well owners regarding arsenic in their well water. To determine if water is generally safe to drink, water test results are compared to the US Environmental Protection Agency (EPA) **Primary Drinking Water Regulations** table of contaminants and the EPA **Secondary Drinking Water Standards**. The above standards only apply to public water systems, but the quality and health implications are the same for private well owners. In addition, the Wyoming Department of Environmental Quality (WDEQ) has a set of standards (Water Quality Rules and Regulations (WQRR) Chapter 8 Table 1) for water quality based on class of use, including domestic, agriculture and livestock. Keep your analytical results and your sampling documentation with your well information for future reference if there is a question about change in water quality.

WHAT IS ARSENIC?

Arsenic is a naturally occurring mineral, and can be found in rock, soil, air, food and water, generally in trace quantities. Arsenic can enter groundwater from weathering of geologic materials containing arsenic compounds, or as a by-product of some agricultural or industrial activities.

Arsenic can be found in two forms, inorganic arsenic (toxic), and organic arsenic (low-toxicity). Inorganic arsenic can be found in geologic materials (soils, rock), and water (surface water and groundwater) and can be released by mining, industrial wastes, and arsenate pesticides. Inorganic arsenic compounds contain oxygen, chlorine, and sulfur.

Organic arsenic compounds contain arsenic and carbon, and can be found in plants and animals (i.e. tobacco, seafood).

WHAT IS THE STANDARD FOR ARSENIC IN GROUNDWATER?

Arsenic is regulated under the US EPA Primary Drinking Water Regulations. The US EPA has set a maximum contaminant level for Arsenic at 0.01 milligrams per liter (mg/L) in drinking water.

Wyoming Water Quality Rules and Regulations Chapter 8, Table 1 has set a standard of 0.05 mg/L for domestic, 0.1 mg/L for agricultural and 0.2 mg/L for livestock uses of groundwater.

IS ARSENIC IN MY WATER A HEALTH CONCERN?

Inorganic Arsenic has been shown to cause thickening and discoloration of the skin, digestive problems (nausea, vomiting, diarrhea), and numbness in the hands and feet. Arsenic is considered a known human carcinogen. Long term exposure to levels greater than the MCL may cause cancer of the bladder, lungs, skin, kidneys, nasal passages, liver and prostate.

WHAT CAUSES ARSENIC IN MY WATER?

The level of Arsenic in groundwater is heavily influenced by geology and the characteristics of the groundwater itself. Some rocks may contain higher levels of arsenic or arsenic-containing compounds. Groundwater that is acidic (low pH), and/or moves through arsenic-containing rocks slowly can dissolve more arsenic from the parent rock. Higher levels of arsenic can also be found at geothermal sites, areas of mining, hazardous waste disposal sites, or areas of historical arsenate pesticide use.

HOW DO I TEST FOR ARSENIC IN MY WATER?

A list of certified labs can be found on the WDEQ Know Your Well Webpage (deq.wyoming.gov/wqd/know-your-well). Contact your selected laboratory for testing procedures and sample bottles.

WHAT CAN BE DONE TO TREAT MY WATER FOR ARSENIC?

The information below is intended as an information source only. The WDEQ suggests you discuss appropriate water treatment options with a qualified water treatment specialist, since other constituents in your water may affect the selection of the appropriate water treatment method.

Arsenic can be removed from water using a point-of-entry system (i.e whole house filtration unit) or by a point-of-use system (i.e reverse osmosis unit). Effective filtration treatment includes activated alumina, iron oxide/hydroxides, manganese greensand, anion exchange and titanium oxide/hydroxide. Distillation and reverse osmosis are also effective treatments for smaller quantities of water.

There are typically two species of arsenic in groundwater: Arsenic III and Arsenic V. Arsenic V is generally easier to remove from water than Arsenic III. Arsenic III must be oxidized to Arsenic V through chlorination, ozonation, or use of potassium permanganate prior to the use of reverse osmosis or filtration (activated alumina, manganese greensand, or anion exchange).

REFERENCES

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