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Information: New Hampshire Water Well Association

Information in this document is provided in good faith to inform the public about groundwater and water wells. Well owners should ensure that their well contractor has obtained permits (if required) and has referred to local codes, rules, regulations and laws for site selection, construction, maintenance and operation of water wells and water system equipment.

ARSENIC AND GROUNDWATER

Arsenic does occur in the water from some New Hampshire's wells. The source of the arsenic is minerals in the bedrock or the sands & gravels made up of bedrock particles. It is the homeowner's responsibility to check the quality of drinking water obtained from an on-site well. All new wells should be tested for arsenic and so should existing wells that have no record of a water test that includes arsenic. It is not difficult to remove arsenic to make drinking water safe but there is not a "one-size-fits-all" solution. In some cases arsenic in well water may just be coming from one fracture system, with other fractures producing arsenic-free water. For that reason, in areas where ground water levels fluctuate, the arsenic level in well water can vary with the season. The United States Geological Survey in Pembroke, NH has maps of areas of the state most likely to have arsenic in the groundwater.

What is Arsenic?

Arsenic is the 52nd most abundant element on the earth and is considered by chemists to be a metal. Elemental arsenic is a steel-gray colored mineral with a metallic luster. The free elemental form of arsenic does not often occur, and arsenic is usually bound up in rocks with other minerals such as iron pyrite.

History of Arsenic

The deadly properties of arsenic were known to Roman and Egyptian physicians and professional "hitman" in the fourth century B.C. It was an ideal poison because it is odorless, tasteless and colorless in solution. Despite the long association of arsenic as a poison, arsenic was also once widely used in some medical treatments. A popular "bracing tonic" known as Dr. Fowler's Solution was invented in the early 1800s as a cure for just about any ailment. During the Victorian Era of the mid to late 1800s, it was fashionable in some society circles for women to whiten their complexion by eating a mixture of vinegar, chalk, and arsenic. Arsenic was also part of the treatment for syphilis until the mid 1930s.

Arsenic and Human Health

The United States Environmental Protection Agency (EPA) classifies arsenic as a known human carcinogen. Resulting cancer types include skin, bladder, lung, kidney, nasal passages, liver, and prostate. Arsenic is considered an "accumulative enabler" because it makes people more likely to become ill from various cancers, diabetes, and high blood pressure. It may cause diseases related to the cardiovascular, pulmonary, immunological, neurological and endocrine systems within the body. (In other words ... you don't want to drink water containing arsenic!). The EPA Maximum Contaminant Level (MCL) for arsenic in drinking water is 10 ppb. An MCL is legally enforceable for public water systems, but not private wells. However, it is recommended that homeowners use 10 ppm as a benchmark for arsenic levels in private water wells.

Is there Arsenic in the water?

There are two types of arsenic. A laboratory test is needed to establish which is present. Arsenite (AsIII) is more toxic and more common in ground water than arsenate (AsV). In order to get the highest removal efficiency (capacity) from a treatment method, the arsenite species first has to be pre-oxidized to form an arsenate species.

Water Treatment Methods for Arsenic

There are many commercially available treatment systems. Which one your well contractor selects will depend on how much arsenic is present, how much water you use and on what other constituents (such as iron, manganese, calcium) are in the water. The use of activated alumina, granular ferric oxide, oxidation, anion exchange, or reverse osmosis are some of the methods used by arsenic treatment systems that can be installed for home use.

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