Uranium in Glastonbury Groundwater Wells
June 2021

Uranium is a toxic heavy metal which can impact kidney, reproductive, bone, and neurological health and increase the likelihood for cancer.

To understand the potential risk to Glastonbury residents, an analysis was conducted using 821 groundwater well water samples collected by residents and Town staff since 2018.

What did we find out?

The original source is likely Glastonbury Gneiss, a type of bedrock known to contain uranium.

Geology and geochemistry change over time, allowing uranium to enter into the surrounding groundwater.

Since the underlying geology is fractured, water quality prediction for individual wells is unreliable.

70% of the wells with uranium concentrations > 30 ppb are deeper than 400 ft.

Next Steps: Citizens

Submit test results from untreated well water to the Glastonbury Health Department.

Install a reverse osmosis (RO) or anion exchange (AE) treatment system.

Next Steps: Town

Work with consulting firm Tighe and Bond to evaluate opportunities to extend public water service to areas with high uranium levels.

Incorporate new well water results into community map to help inform next steps and Glastonbury citizens.

For questions and additional resources, refer to the Town of Glastonbury website: www.glastonburyct.gov/uranium

Understanding the Prevalence of Uranium in Groundwater Wells in Glastonbury, CT Report Summary - June 2021

Consumption of uranium is a serious concern because it is a potentially toxic heavy metal which may lead to bone and critical organ damage, as well as increase one's potential for cancer and reproductive challenges.

The Glastonbury Health Department has been conducting an ongoing investigation on the presence of uranium in private well water since 2018. The Town has encouraged private groundwater well owners to share their own well water test results with the Glastonbury Health Department. Of 821 wells tested in Glastonbury, Connecticut about 35% had uranium concentrations greater than the United States Environmental Protection Agency's maximum contaminant level of 30 ppb. An analysis of the geology, water quality and quantity, and groundwater well characteristics has been conducted to better understand the occurrence of uranium in groundwater.

Public Health Study Findings

1. **Geology:** After comparing maps of the bedrock and surface geology with the locations of uranium-containing groundwater wells, the presence of uranium was found to be primarily associated with Glastonbury Gneiss. The original source of uranium in the groundwater wells in Glastonbury is likely granitic gneiss and similar rocks. Over time, the geology and geochemical environment change, allowing for uranium to dissolve into groundwater in the area.
2. **Water quality:** Uranium was especially present in areas where the surficial geology is a thin till. Due to the fractured nature of the bedrock coupled with the overlying thin till, water can move easily from the surface and through the ground. Since the subsurface is structurally complex, it is challenging to predict water quality and availability for individual wells.
3. **Groundwater well characteristics:** After comparing the prevalence of uranium with groundwater well characteristics, 70% of studied wells with uranium concentrations greater than 30 ppb are deeper than 400 ft.

Steps Forward for Glastonbury Citizens

Connection to a public water system provides a drinking water supply that is routinely tested and treated for a variety of contaminants and water concerns, including uranium. However, expansion of public water into areas currently not served can take years. If public water is not available, there are two methods of treatment commonly used to remove uranium from private well water: reverse osmosis (RO) and anion exchange (AE).

1. Reverse osmosis (RO): RO systems remove unwanted salts, metals, and other impurities and can be installed for point-of-use (usually at the kitchen sink and best to remove low levels of uranium) or can treat the whole house. Point-of-use RO systems generally cost less than $1,000. Wastewater from a point-of-use system may be discharged to a septic system. A whole house RO system is currently estimated at $30,000. Backwash wastewater from a whole house RO system must be discharged to a sanitary sewer or dedicated leaching structure. Since RO systems remove almost all of the minerals, the water becomes very corrosive and minerals may have to be added back into the RO-treated water to protect the home's plumbing.
2. Anion exchange (AE): AE systems use a salt-recharged filter media to remove negatively charged ions, such as uranium and sulfate. AE systems generate wastewater that is discharged into the sanitary sewer or into a dedicated leaching structure. It cannot be discharged into the home's septic system. AE systems reduce the water's pH, so a pH neutralizer may be needed to prevent corrosion of the home's plumbing. The AE filters cost from $1,200 to $2,000 as well as an additional $2,500 to $4,000 for the backwash leaching structure.

Steps Forward for the Town of Glastonbury

The Town of Glastonbury is working with consulting engineering firm Tighe & Bond on a preliminary report to potentially extend public water service to areas of high uranium concentration in residential wells. As part of its ongoing efforts, the Glastonbury Health Department is continuing to receive uranium test results for residential wells, and plotting the data on a community map. This map is available to community members and will help guide any potential future extension of public water service.

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