

Uranium in Manitoba Well Water

This fact sheet is part of a series on naturally occurring elements sometimes found in well water. In some Manitoba wells, uranium has been found at concentrations exceeding health guidelines.

What is uranium?

Uranium is a naturally occurring radioactive element found in low concentrations in nature. It is present in certain types of soil and rocks, especially granite bedrock. Uranium can also be found in the environment as a result of human activity. Sources include mill tailings, emissions from the nuclear industry, phosphate fertilizer production and burning coal or other fuels.

Exposure to uranium

Exposure to uranium can occur through food, water or air. Uranium may occur in groundwater when rocks containing the element break down and dissolve.

Drinking water standard for uranium

Health Canada has established an interim maximum acceptable concentration (MAC) for uranium in drinking water of 0.02 milligrams per litre (mg/L). This is the same value used in Manitoba as a standard for uranium in all public (municipal) drinking water supplies. Private well owners are not legally required to meet the standard but where levels are high, a treatment device or other corrective action is recommended.

Health effects of uranium

The health effects of uranium depend on the duration and level of exposure. Studies show that high levels of uranium in drinking water can increase a person's risk of kidney damage. Little is currently known about the long-term health effects of human exposure to uranium. However, the available evidence has not linked ingested uranium in humans and animals to increased cancer rates.

How uranium gets into well water

The uranium found in Manitoba well water occurs naturally. It is the result of groundwater coming into contact with rock or soil containing uranium. The concentration of uranium in a well water sample depends on factors such as the amount of uranium present in the rock through which the groundwater has passed and whether the water chemistry is favourable for uranium to remain dissolved.

Uranium in Manitoba well water

Manitoba Sustainable Development evaluated the results of groundwater samples collected through recent groundwater quality surveys and its provincial observation well sampling program. A map of the distribution of uranium in the groundwater samples is available online at <http://www.manitoba.ca/sd/water/drinking-water/well-videos/index.html>.

Uranium concentrations above the drinking water quality standard (0.02 mg/L) have been found in:

- bedrock granitic aquifers in parts of southeastern Manitoba, particularly east of Lac du Bonnet
- the bedrock shale aquifer in south central Manitoba
- some bedrock aquifers in the Gypsumville area
- some sand and gravel aquifers in southern Manitoba

Recommendations for testing well water

Private well owners are responsible for testing and, if necessary, treating their water to ensure it is safe to drink. All wells should be tested to ensure there are no uranium concerns. In general, well water should be tested for uranium every three to five years in areas known to have elevated levels. More frequent testing is recommended if uranium levels are at or near the drinking water quality standard.

Public (municipal) water systems that use well water are tested regularly by the water system owner or by the Office of Drinking Water as required under *The Drinking Water Safety Act*.

How to test well water for uranium

Uranium does not create a taste or odour in water. The only way to know if well water contains uranium is to have a water sample tested by a laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA). Information on accredited laboratories is available from your local telephone directory yellow pages (refer to Laboratories - Testing) or online.

Three accredited laboratories in Manitoba have created test packages for the five elements addressed in this series of fact sheets, including uranium:

ALS Environmental

12-1329 Niakwa Road E.
Winnipeg, MB R2J 3T4
Phone: 204-255-9720
Toll Free: 1-800-607-7555
Fax: 204-255-9721

Horizon Lab Ltd.

4055 Portage Avenue
Winnipeg, MB R3K 2E8
Phone: 204-488-2035
Fax: 204-488-4772

Bureau Veritas Canada Inc.

Unit D, 675 Berry Street
Winnipeg, MB R3H 1A7
Phone: 204-772-7276
Fax: 204-772-2386

Private well owners should ask for the Manitoba Trace Elements Package. Test costs will vary from year to year, and well owners should contact the laboratories directly for an estimate.

Well owners should use the bottle(s) provided by the laboratory and should collect samples carefully, following the instructions provided.

What to do if uranium is found in your well water

If the uranium level in the well water is above the drinking water standard, private well owners should consider how they are using this water and may wish to discuss health risks with their doctor, who can consult their regional medical officer of health for more information.

Private well owners should consider options to increase the safety of water used for drinking or food preparation (such as for beverages, baby formula, soup and coffee). These options include:

- hooking up to a public (municipal) piped water system if one is available in the area
- installing a cistern and arranging for the delivery of safe drinking water by a water hauler
- drilling a new well at a different location or to a different depth. This may or may not solve a uranium problem. Manitoba Water Stewardship can be consulted for advice.
- using commercially bottled water from a supplier who is a member of the Canadian Bottled Water Association or International Bottled Water Association
- treating the well water

Treating the well water

Common treatment systems like water softeners, carbon filters and sediment filters cannot adequately remove uranium from drinking water. Boiling will only concentrate the uranium, it will not remove it.

Water treatment methods that can remove uranium from drinking water include reverse osmosis, distillation, anion exchange units and adsorption with activated alumina or other special filter media. A treatment device may be installed at the kitchen faucet (point-of-use) or where the water enters the home (point-of-entry).

Generally, it is recommended that the treatment device be certified to meet the appropriate NSF International (NSF)/American National Standards Institute (ANSI) standard but there is no standard for removal of uranium at present. Certification is still recommended though, as certified devices are tested to ensure the safety of the materials used in the devices and to ensure they perform as claimed.

Accredited certification organizations include NSF, the Canadian Standards Association (CSA), Underwriters Laboratories Incorporated (UL), the International Association of Plumbing and Mechanical Officials (IAPMO), and the Water Quality Association (WQA).

Quotes should be obtained from reputable water treatment equipment suppliers. The supplier should provide information on how much uranium will be removed, maintenance requirements and costs.

Once installed, manufacturer's instructions on the use and maintenance of treatment devices and disposal of filter media should be followed. The well water and treated drinking water should be tested annually for uranium to confirm that the treatment system is working properly.

For more information

For more information on uranium, refer to Health Canada's website at www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-uranium.html or the Agency for Toxic Substances and Disease Registry at www.atsdr.cdc.gov/toxfaqs/tfacts150.pdf.

For more information on well construction or on relocating your well, contact Manitoba Sustainable Development's Groundwater Management Section at 204-945-6959.

For more information on water treatment, contact Manitoba Sustainable Development's Office of Drinking Water at 204-945-5762, or refer to the website at http://www.manitoba.ca/sd/pubs/water/drinking_water/odw_contact.pdf for a local office near you.

For information on certification of water treatment devices visit www.nsf.org.

For health related questions on uranium, call Health Links/Info Santé at 204-788-8200 or toll free at 1-888-315-9257 or your local public health office.