

Arsenic in Well Water

What is arsenic?

Arsenic is a semi-metallic element with the symbol "As." This substance is sometimes found to occur naturally in rocks and soils. Arsenic is a well known poisonous substance and is classed as being carcinogenic to humans. It occurs within organic compounds (combined with hydrogen and carbon), and within inorganic compounds (combined within sulphur, chlorine or oxygen). In water, arsenic has no smell or taste and can only be detected through a chemical test. Arsenic concentrations tend to be higher in water from wells than from surface water supplies. The maximum acceptable concentration (MAC) for arsenic in drinking water in Health Canada's Guidelines for Canadian Drinking Water Quality opens new window is 0.010 mg/L. (milligrams per litre)

What are the known sources of arsenic?

Arsenic is common in the rocks and soils of Newfoundland but does not easily dissolve in water. However arsenic concentrations that exceed the drinking water guideline have been found in public water supplies in several areas of Newfoundland. The arsenic is most likely from natural sources, although arsenic can be produced by human activity such as mine tailings runoff or certain kinds of pressure treated wood. Arsenic is much more likely to be found in water that comes from wells drilled into the bedrock compared to surface water sources or dug wells, especially if the bedrock contains high natural levels of arsenic. The slow movement of groundwater in bedrock allows for long periods of contact between the bedrock and the groundwater. This long contact time allows for the weathering of arsenic bearing minerals and ores dissolving arsenic into the groundwater.

What are the Potential Health Effects?

The primary health concern with exposure to arsenic is cancer. Exposure to arsenic over many years can increase your chances of getting certain types of cancer, or other health effects, such as diarrhea, poor blood production, and abnormal heart beat. The health outcomes depend on the length of time that you are exposed to arsenic from any source, the amount of arsenic in your water, the amount of water that you drink, and your current level of health. The risk of developing health effects are the same for everyone, including children pregnant women and other vulnerable groups.

Where have high arsenic levels been found in Newfoundland & Labrador well waters?

Research on arsenic in groundwater is being carried out by the Departments of Environment and Mines and Energy under a Memorandum of Agreement between both departments. To date, no arsenic exceedances have been reported for Labrador water supplies. (an exceedance is a test where arsenic values above the MAC guideline value have been found).

Natural arsenic concentrations in rock vary considerably across the province. Analysis of arsenic values in lake muds allows high natural arsenic areas of the province to be mapped. Research suggests that there is a relationship between high arsenic in lake sediments and elevated arsenic

in well water. However elevated arsenic levels in drinking water can be found outside of areas indicated as high in arsenic by lake sediment surveys; and water from most wells in areas known to be drilled into high arsenic bedrock do not contain higher amounts of arsenic.