

## The drop on water

# Arsenic

### Arsenic

Arsenic (As) is a natural element found in the Earth's crust. Some areas of Nova Scotia have a greater potential for elevated arsenic levels in drinking water. See Figure 1.

### Sources

Arsenic is likely to be found in well water throughout Nova Scotia. The presence of arsenic in well water depends on the rock and soil type in the area.

The most common source of arsenic in groundwater is through erosion and weathering of soils, minerals, and ores. Industrial effluents and pesticide runoff may also contribute arsenic to water in some areas.

### Maximum Acceptable Concentration for Drinking Water = 0.01 mg/L

In water, arsenic has no taste, smell, or colour. It can only be detected through a chemical test.

The Canadian drinking water quality guideline for arsenic is **0.01 milligrams per litre (mg/L)**.

The guideline limit for arsenic is based on the level that can be achieved by certified treatment units. Make every effort to keep arsenic levels as low as possible in drinking water.

### Health Risks

Short-term exposure (over days or weeks) to high levels of arsenic in drinking water can result in nausea, diarrhea, and muscle pain.

Long-term exposure (over years or decades) to low levels of arsenic in drinking water may cause certain types of cancer.

The risk to human health is through ingestion only – drinking, cooking, teeth brushing. Well water with arsenic levels greater than **0.01 mg/L** may safely be used for bathing, handwashing, dishwashing, and watering a garden.

## QUICK FACTS

- Arsenic is commonly found in well water throughout Nova Scotia.
- Arsenic in drinking water has no taste, smell, or colour.
- Arsenic can only be detected through chemical testing.
- The Canadian drinking water quality guideline for arsenic is **0.01 mg/L**.
- Exposure to high levels of arsenic in drinking water can cause nausea, diarrhea, and muscle pain. Over the long term, exposure to low levels of arsenic can cause certain types of cancer.
- Well water with arsenic greater than **0.01 mg/L** should not be used for drinking, cooking, or teeth brushing. It may be used for bathing, handwashing, and dishwashing.
- If arsenic is present in drinking water, consider water treatment options or alternative sources of water.

# Arsenic

## Testing

Regularly test your well water for a standard suite of chemical parameters, including arsenic. Use an accredited water testing laboratory. Find a list of accredited water testing laboratories at [www.gov.ns.ca/nse/water/waterlabs.asp](http://www.gov.ns.ca/nse/water/waterlabs.asp) or see the Yellow Pages under “laboratories.”

Get the special sampling bottles and instructions on proper sampling from the laboratory.

The cost of analyzing water samples can range from \$15 for a single parameter to \$230 for a full suite of chemical parameters. The cost can vary depending on the lab and the number of parameters being tested.

## Solutions

If arsenic is present in the first test, get a second test to confirm the original results.

If arsenic is confirmed to be present in the well water,

- Find an alternate source of water for drinking, cooking, and teeth brushing, such as bottled water or a dug well that has been tested and found to be safe.  
or
- Treat your current source of water to reduce arsenic levels.

## Treatment

Arsenic cannot be removed from water through boiling, chlorination, or pitcher-style filtration units. Boiling water may increase the concentration of arsenic.

Effective treatment methods include

- adsorption
- anion exchange
- distillation
- reverse osmosis

## REGULAR TESTING

Homeowners are responsible for monitoring the quality of their well water:

- Test for bacterial quality every 6 months.
- Test for chemical quality every 2 years.
- Test more often if you notice changes in physical qualities – taste, smell, or colour.

Regular testing alerts you to problems with your drinking water.



Buy a treatment system that has been certified to meet the current NSF standards for arsenic reduction. NSF International is a not-for-profit, non-governmental organization that sets health and safety standards for manufacturers in 80 countries. See its website at [www.nsf.org](http://www.nsf.org).

Once installed, re-test your water to ensure the treatment system is working properly. Maintain the system according to the manufacturer's instructions to ensure a continued supply of safe drinking water.

For more information on water treatment, see our publications *Water Treatment Options* and *Maintaining Your Water Treatment*, part of the *Your Well Water* booklet series at [www.gov.ns.ca/nse/water/privatewells.asp](http://www.gov.ns.ca/nse/water/privatewells.asp).

### Considerations

Drilled wells are more vulnerable to arsenic contamination than dug wells.

### Considerations for anion exchange method

Arsenic is a negative ion (anion) in solution. When you use anion exchange treatment, the resin in the unit will remove certain anions more readily than others. If other more preferred anions are present such as uranium or sulphate, the effectiveness of the unit may be reduced. The resin in the anion exchange unit may need to be regenerated more frequently to reduce the concentration of arsenic to a satisfactory level. It is important that a detailed chemical analysis of your water be completed to determine if other substances are present that will affect arsenic treatment.

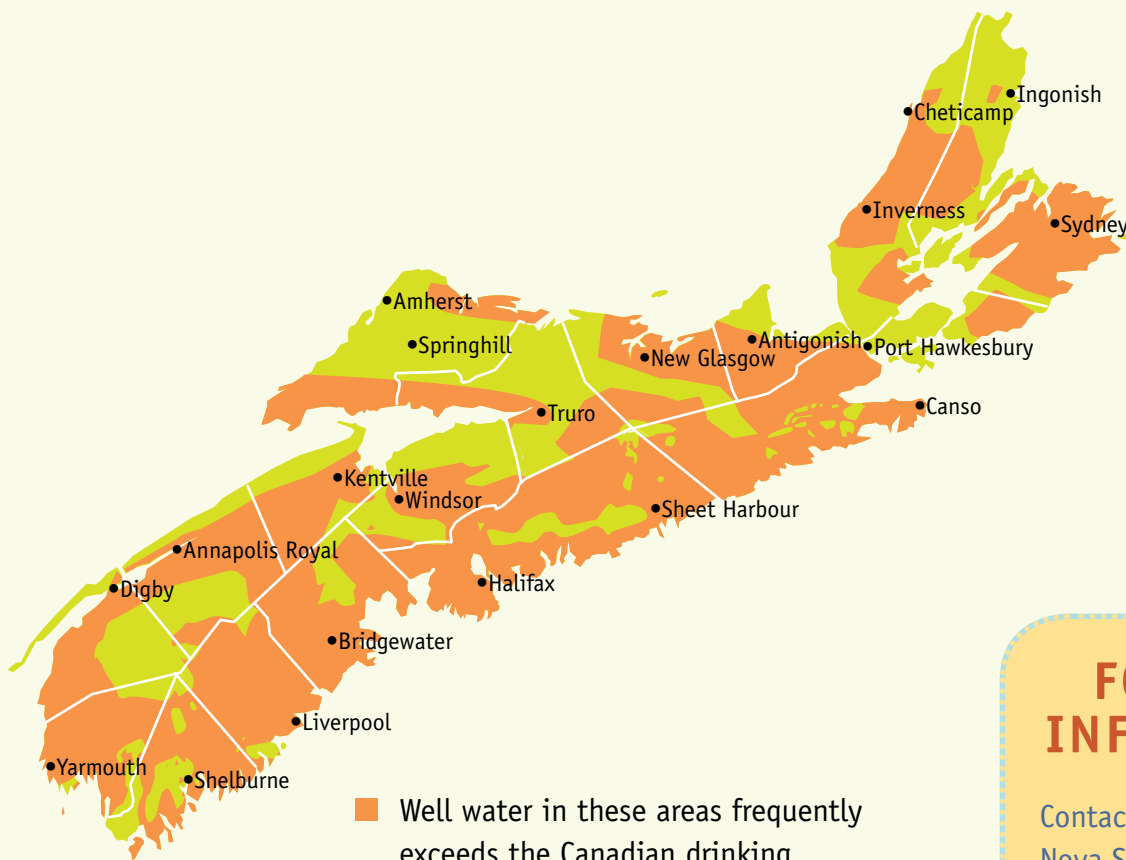
If the anion exchange unit is not properly maintained, the arsenic contained on the resin bed may rapidly detach, leading to higher levels of arsenic in the treated water than the untreated water. It is important to follow instructions for resin regeneration and replacement.

Arsenic may be in a form that is not readily removed by anion exchange. When this is the case, pre-treatment by oxidation may be required.

# Arsenic

# Arsenic

**Figure 1**  
Areas in Nova Scotia with naturally occurring arsenic in groundwater



■ Well water in these areas frequently exceeds the Canadian drinking water quality guideline for arsenic.  
*Testing highly recommended.*

■ Well water in these areas is less likely to exceed the Canadian drinking water quality guideline for arsenic.  
*Testing recommended.*

## FOR MORE INFORMATION

Contact

Nova Scotia Environment at  
1-877-9ENVIRO  
or 1-877-936-8476

[www.gov.ns.ca/nse/water/](http://www.gov.ns.ca/nse/water/)

  
**NOVA SCOTIA**  
Environment