

# Tritium Fact Sheet

## About Tritium

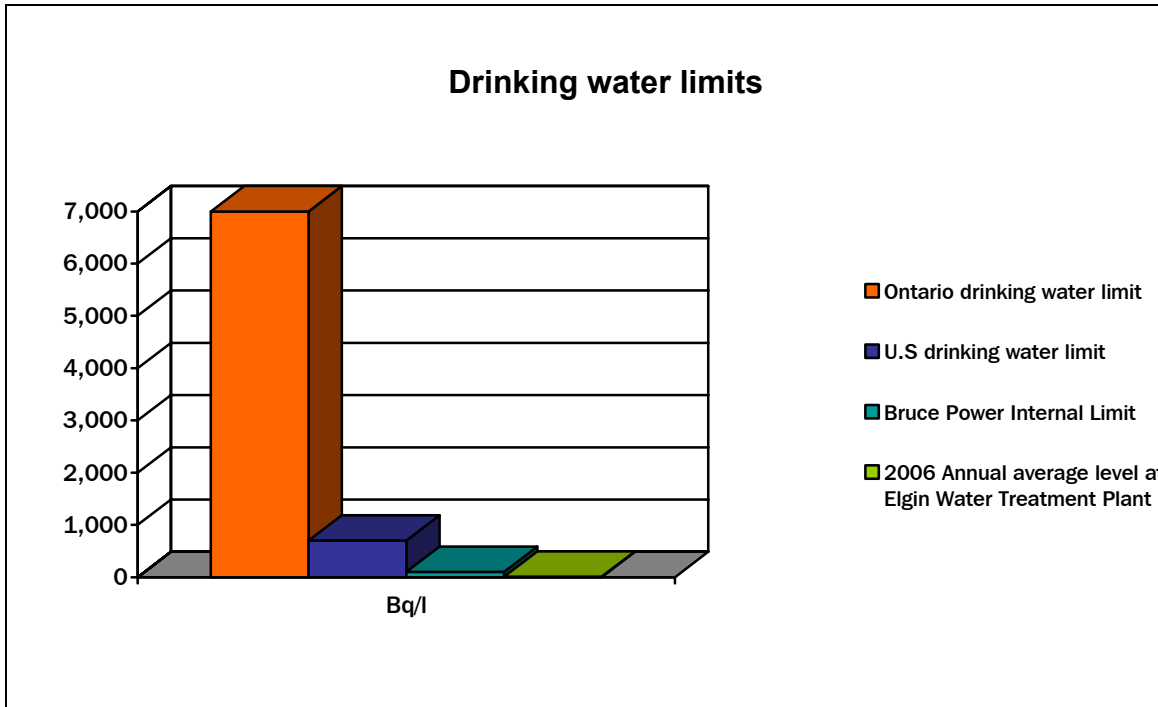
Tritium is a radioactive isotope of hydrogen that is found naturally in small concentrations in most surface water. It is found in more concentrated levels of water used in nuclear reactors and is periodically collected from Bruce Power's units and taken to a tritium removal facility operated by Ontario Power Generation.

Tritium is measured based on how much of it is present in a given litre of water (i.e. concentration), expressed in becquerels per litre (Bq/L). Canadian Drinking Water Guidelines recommend an annual average concentration in drinking water of no more than 7,000 Bq/L. However, Bruce Power has committed to our community to maintaining a level of no more than 100 Bq/L averaged over the year in local drinking water supplies. We have modified our procedures and practices to ensure this commitment can be met. Samples are taken at local water treatment plants twice daily to ensure the drinking water is safe.

Ingestion	Dose
Drinking 250 ml of Water (1 Cup)	0.0004 mRem
Drinking 250 ml of milk (which contains naturally occurring radioactivity)	0.006 mRem
Eating one banana (which contains naturally occurring radioactivity)	0.01 mRem

## Properties of Tritium

Tritium is a hydrogen atom that has two neutrons in the nucleus, in addition to its single proton. Although tritium can be a gas, its most common form is in water, because, like non-radioactive hydrogen, radioactive tritium reacts with oxygen to form water. Tritium replaces one of the stable hydrogen atoms in the water molecule, H<sub>2</sub>O, and is called tritiated water (HTO). Like H<sub>2</sub>O, tritiated water is colourless and odourless.



## Tritium and the Environment

Tritium occurs naturally in the environment in very low concentrations. Most tritium in the environment is in the form of tritiated water, which easily disperses in the atmosphere, water bodies, soil, and rock.

## Tritium and the World

In total, at any given time there is about 25 kg (about 5 large sacks of potatoes) of tritium in the world.

## Tritium Sources

Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced as a by-product in CANDU nuclear reactors.

## Uses of Tritium

Tritium is used in various self-luminescent devices, such as exit signs in buildings, aircraft dials, gauges, luminous paints, and wristwatches. Tritium is also used in life science research, and in studies investigating the safety of potential new drugs.

## **Tritium and Health**

Tritium emits only very low energy radiation that cannot penetrate human skin. Physically, it has a half-life (length of time for it to decay 50 per cent) of about 12 years. Tritium decays and eventually becomes harmless helium gas. The biological half-life (the time it takes the human body to excrete 50% of the originally ingested amount of tritium) is about twelve days, because of the gradual replacement of body water by fluid consumption.

As with all ionizing radiation, chronic exposure to elevated levels of tritium increases the risk of developing cancer by a very small percentage.

However, the U.S. Environmental Protection Agency describes tritium as one of the least dangerous radionuclides because it emits very weak (i.e. very low energy) radiation and leaves the body relatively quickly. Since tritium is almost always found as water, it goes directly into soft tissues and organs. In terms of short-term effect, tritiated water is not as hazardous as most other radioactive substances, or even many commonly used chemicals. Because of the low energy of its radiation, tritium in water is harmless unless taken inside the body, for example by being swallowed, absorbed through the skin or inhaled.