Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

Metals of Concern Fact Sheet Series

Mercury

Highlights

- Mercury is a natural element in the earth's crust.
- Forest fires, weathering, erosion and volcanic activity are the major natural sources of mercury in the Yukon environment.
- Coal and waste incineration are the major human-caused sources of mercury in the global environment.
- Mercury can evaporate from soils and surface water. Once in the atmosphere, mercury can travel to another location where it condenses in rain or snow. When conditions warm, mercury can once again evaporate. This repeating cycle of evaporation, transportation and condensation is called the grasshopper effect.
- Lower temperatures in the North cause mercury compounds to evaporate less from soils and surface water.
- Methyl mercury (an organic mercury compound) can build up in fish tissue, which is why the Northern Contaminants Program monitors the fish in Yukon lakes.Mercury is not found in Yukon country foods at levels of concern.

What is mercury?

Metallic mercury is a shiny silver-white element and the only metal that is liquid at room temperature. Mercury minerals are often found near copper deposits in rocks. Metallic mercury is used in thermometers, barometers, batteries, electrical switches, fluorescent bulbs and dental amalgams. Mercury is also released by the industrial production of caustic soda and chlorine. Mercury compounds were once widely used as pesticides in agriculture, and as fungicides in paint.

How does Mercury enter the environment?

Mercury may be released into the environment by natural weathering of rocks, forest fires, evaporation from soils and surface waters, and volcanic activity.

Human activity is adding to the release of mercury. Waste disposal and incinerators, smelting of mercury-containing ore and the operation of coal-fired plants are the major human-caused sources. Global air currents transport mercury into the Yukon environment.

It has been estimated that elemental mercury can stay in the atmosphere from two months to two years. It is unique among the metals because it is a liquid, and can evaporate from surface water and soil. Once mercury can be carried by air currents to cooler locations. Upon condensation and subsequent precipitation, mercury enters the surface environment. It can enter the atmosphere again through evaporation and continue to travel. This repeating cycle of evaporation, transportation and condensation is known as the grasshopper effect, which allows the transport of mercury over long distances. In the Yukon, rain and snow are the source of all mercury content found in lakes that do not receive it from geological sources.

Inorganic mercury is transformed into organic mercury by micro-organisms in the soil and water through a process called methylation. Methyl mercury can accumulate and biomagnify in the terrestrial and aquatic food chains. Generally, aquatic food chains are longer than terrestrial food chains, and as a result, levels of organic mercury in older predatory fish such as lake trout can reach levels dangerous for consumption. However, no consumption advisories have been issued for mercury in Yukon traditional foods. The monitoring of mercury levels in lake trout from Lake Kusawa and Lake Laberge is conducted under the Northern Contaminants Program.

Is mercury toxic?

Methyl mercury or organic mercury is much more toxic than inorganic mercury because it is absorbed into the bloodstream more quickly. Levels of inorganic mercury must be higher than organic mercury levels to cause toxic effects, because much of the inorganic mercury is cleared from the body through the kidneys and urinary tract. Inorganic

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mercury is a liquid; it may be absorbed through the skin, and when it is a vapour, it is absorbed easily through the lungs.

Mercury is considered a neurotoxicant. If toxic levels are reached, nerve tissue may be damaged or destroyed. Symptoms of mercury poisoning may include shyness, tremors, memory problems, changes in vision and hearing, mental retardation and liver and kidney damage.

Where to find more information on the web:

- **Health Canada**
  http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/mercur/index-eng.php
- **Environment Canada**
  http://www.ec.gc.ca/MERCURY/EN/lk.cfm?
  http://www.chemicalsubstanceschimiques.gc.ca/fact-fait/mercury-mercure-eng.php
- **Indian and Northern Affairs Canada, Northern Contaminants Program**
  www.inac-ainc.gc.ca/ncp/index_e.html
- **Arctic Borderlands Ecological Knowledge Society**
  www.taiga.net
- **Government of Yukon, Environment**
  http://www.environmentyukon.gov.yk.ca/monitoringenvironment/

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- R. Dietz, P.M. Outridge, K.A. Hobson, (December 2009), "Anthropogenic contributions to mercury levels in present-day", Science of the Total Environment, Volume 407:24, 13 pp.
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The Yukon Contaminants Committee co-ordinates the Northern Contaminants Program for the territory. Its members represent Canada, Yukon and the Council of Yukon First Nations, Yukon Conservation Society, and Yukon College.

Since its establishment in 1991, the Committee has acted as a link between the scientific community and Northerners on contaminants issues. Please direct any comments to the Yukon Contaminants Committee 867-667-3283 or toll-free 1-800-661-0451 ext. 3283

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