



PCBs

POLYCHLORINATED BIPHENYLS

HIGHLIGHTS

- PCBs are synthetic organic compounds. They are not found naturally.
- PCBs are persistent, accumulate in the food chain and are toxic.
- PCBs accumulate in the fatty tissue of lower organisms and become more concentrated as they move up the food chain.
- The highest concentrations of PCBs in living organisms are in the fat of long-lived animals and in humans.
- PCBs have negative health effects. They can cause cancer in animals, and have other effects on the immune, reproduction, and nervous and endocrine (glandular) systems of animals.
- The North has few point sources of PCBs but receives PCBs as airborne global contaminants.
- Country food is not highly contaminated with PCBs. PCBs are in decline in fish and most mammals and, in the Yukon, are below Health Canada guidelines.

WHAT ARE PCBs?

Polychlorinated biphenyls are a family of synthetic chlorinated hydrocarbon compounds and were used for everything from paint to lubricants to electrical transformer fluid, especially during the post-World War II era. PCBs were excellent electrical insulators and fire-fighting compounds.

There are more than 200 types of PCBs. The less chlorinated compounds are clear and oily. A concentrated PCB product is yellowish brown, resin-like and smells like garlic.

Use of PCBs stopped when the health and environmental effects of the chemicals became well known in the late 1960s. It was banned in most countries, including Canada, in 1970, but PCBs are common in old landfills, sediments and wildlife.

PCBs are one of the most highly regulated organic compounds in the world. In Canada it is regulated through the Canadian Environmental Protection Act.

HOW DO PCBs ENTER THE ENVIRONMENT?

PCBs enter the environment from point sources such as leaks and spills from PCB devices. PCBs also enter the environment through global transport. The Arctic haze visible throughout the circumpolar world contains PCBs along with other POPs.

International agreements to control emissions are recognized as the only long-term solution to the problem of

contaminants in the Arctic. International agreements concluded in 1998 and 2001 pledge the reduction of key heavy metal and POP emissions into the environment.

The post-World War II era of “wonder chemicals” produced a large variety of PCBs. About 75 percent of the PCBs made in North America were used as cooling and insulating fluid for electrical devices. Other products included: fluorescent light ballasts, hydraulic oil, fire extinguisher fluid, dust suppressants, adhesive tape and paint. Current Canadian requirements prevent the use of PCBs in all of these products.

Over one million tonnes of PCBs were produced worldwide. A small amount has been safely destroyed, as was done at the DEW Line stations across the North in the 1990s, and some has been safely stored. However, a great deal remains in use or is contained in old equipment in landfills.

A small amount of PCB was brought to the Yukon after the construction of the Alaska Highway. The last significant PCB remediation project in the Yukon was in 1994, when 3,840 litres of liquid PCB and 183,200 kilograms of PCB-contaminated soil were shipped to the Swan Hills facility for disposal.

HOW ARE PEOPLE EXPOSED TO PCBs?

PCBs do not dissolve easily in water, and they stick to the surface of tiny suspended particles in water, air and soil. From there, PCBs are eaten by all sorts of animals,

including humans, along with their food. The PCBs then lodge in fatty tissue.

In the North, the Eastern Arctic has been most affected, with levels five times lower than those found in Greenland but up to eight times higher than those in the rest of Canada. Nearly half of the mothers in the Eastern Arctic have PCB levels of concern in their blood due to higher concentrations found in their traditional

diet. Research conducted on children born to women who ate a lot of contaminated fish suggests that PCBs can have serious prenatal effects on intellectual function.

In the Yukon, scientists have detected PCBs in fish and in caribou but levels are declining. Between 1993 and 2008, PCB levels in Yukon lake trout declined by 80 percent. PCB levels in the Yukon are below health-warning concentrations, and have been generally decreasing over time.

WHERE TO FIND MORE INFORMATION ON THE WEB:

Health Canada

<http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/envIRON/pcb-bpc/index-eng.php>
<http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/envIRON/pcb-bpc-eng.php>
<http://www.hc-sc.gc.ca/sr-sr/finance/tsri-irst/proj/persist-org/index-eng.php>

Environment Canada

<http://www.chemicalsubstanceschimiques.gc.ca/fact-fait/pcb-bpc-eng.php>
<http://www.ec.gc.ca/drgd-wrmd/default.asp?lang=En&n=D6F470F7-1>
<http://www.ec.gc.ca/CEPARRegistry/search/Search.cfm>

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/>

United States Environmental Protection Agency

http://www.epa.gov/safewater/contaminants/dw_contamfs/pcbs.html

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- Department of Indian and Northern Affairs. Canadian Arctic Contaminants Assessment Report II: Sources, Occurrence, Trends and Pathways in the Physical Environment. T. Bidleman, R. Macdonald., and J. Stow, eds. 2003.
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- Ryan, M., G. Stern, M. Diamond, M.V. Croft, P. Roach, K.Kidd, "Temporal trends of organochlorine contaminants in burbot and lake trout from three selected Yukon lakes", in *Science of the Total Environment*, 2005.
- G.A. Stern, "Trace metals and organohalogen contaminants in fish from selected Yukon lakes: A temporal and spatial study", in *Synopsis of Research, Northern Contaminants Program*, Department of Indian and Northern Affairs, Ottawa, 2008.

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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