EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Torch Lake Abandoned Mining Wastes Project, Houghton County

Polychlorinated Biphenyls (PCBs)

Background

Polychlorinated Biphenyls (PCBs) are present worldwide, but are of particular interest in Torch Lake sediments, water, and fish as well as in wastes and soil of former industrial areas along the shoreline. This fact sheet is intended to help Abandoned Mining Wastes (AMW) Project stakeholders understand what PCBs are, how they came to be present in the environment, and how they may affect human health.

What are PCBs?

PCBs are mixtures of up to 209 individual chlorinated compounds (known as "congeners"). PCBs can be oily liquids or solids and are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. Manufacturing of PCBs began in the 1920s but was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures, electrical devices containing capacitors and hydraulic oils.

There are no natural sources of PCBs. Although their current commercial use is restricted in the U.S., they continue to be a common environmental contaminant because they are extremely stable and don't decompose easily.

How do they enter the environment?

PCBs were used in the Torch Lake area in electrical generation and other industrial processes. They were also introduced through the import and recycling of PCB and copper containing equipment and scrap. PCBs likely entered the air, water and soil near Torch Lake during their use and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.

PCBs can still be released to the environment from old waste sites; illegal or improper disposal of industrial wastes and consumer products; and leaks from old electrical transformers.

They do not readily break down in the environment and may remain for very long periods of time, with reported half-lives[1] in soil and sediment ranging from months to several decades - dependent upon the congeners (types of PCBs) present. The congeners found in Torch Lake are known to have half-lives at the longer end of the range.

[1] Half-life: the time required for the concentration of PCBs to decrease by half.

In water, only a small amount of PCBs may dissolve, while most of the material will stick to organic particles, bottom sediments, and soil, which serve as reservoirs from which PCBs may continue to be released over a long period of time.

How are humans exposed to PCBs in the environment?

Humans may be exposed to PCBs by:

- ***Eating contaminated food***. The most common route of exposure to PCBs is from eating contaminated food. The main dietary source of PCBs is fish (especially sportfish caught in contaminated rivers or lakes). PCBs in lake water are taken up by small organisms and fish and are passed on to other animals that eat these aquatic animals as food. As the PCBs move up through the food chain, they are successively concentrated and may reach levels thousands of times higher than found in the surrounding lake water.[2]
- ***Using old fluorescent lighting fixtures and electrical devices and appliances***, such as television sets and refrigerators that were made over 30 years ago. These items may leak small amounts of PCBs into the air if they get hot during operation and could also be a source of skin exposure.
- ***Breathing air near waste sites or drinking contaminated well water***. PCBs have a strong affinity for soil where they have been found along the western shoreline. PCBs have been found in only one monitoring well on an industrial property. No potentially hazardous air or drinking water PCB exposures have been identified in the project area.
- ***Working with or repairing PCB-containing equipment***; accidents, fires or spills involving transformers, fluorescent lights and other old electrical devices; and disposal of PCB materials.

How can families reduce the risks of exposure to PCBs?

The Michigan Department of Health and Human Services "Eat Safe Fish" Program has issued consumption guidelines for fish from Torch Lake and other area and statewide waters. You can reduce your family's exposure to PCBs and other chemicals by following these guidelines.

- Children should not play with old appliances, electrical equipment, or transformers, which could contain PCBs.
- Discourage children from playing in the dirt near waste sites and former industrial areas along the Torch Lake shoreline. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths and should wash hands frequently.

[2] A small fish may consume PCBs by eating plankton and these PCBs are stored in its body fat. When a larger fish eats the small fish, it also acquires all the PCBs that were built up in the small fish. In this way, larger fish and animals can build up higher concentrations of PCBs.

More Information

EGLE Torch Lake Abandoned Mining Wastes

EPA Superfund Site

Agency for Toxic Substances and Disease Registry

Michigan Department of Health & Human Services – Eat Safe Fish Guidance

United State Environmental Protection Agency: .epa.gov/pcbs