

# Oregon Department of Human Services

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## TECHNICAL BULLETIN

# HEALTH EFFECTS INFORMATION

Prepared by:

ENVIRONMENTAL TOXICOLOGY SECTION

September 1993

**PCBs**  
Polychlorinated Biphenyls

**For More Information Contact:**

Environmental Toxicology Section  
(971) 673-0440

Drinking Water Section  
(971) 673-0405

## **SYNONYMS**

Arochlor, Phenochlor, Kanechlor, Chlorphen, Chlorodiphenyl, Chlorinated Diphenyls, PCB-XXX (where x's are three- or four-digit numbers)

## **USES**

Beginning in the 1920's, PCBs have been used industrially worldwide in electrical components, as lubricants, in hydraulic fluids, as heat transfer fluids, and in coatings, plastics and inks. PCBs are components of many industrial materials even today, though their manufacture and distribution was curtailed in the late 1970's.

PCBs were extremely useful because of their low electrical conductivity, heat absorption capacity and heat stability. For many years these compounds were considered harmless, because of their low acute toxicity.

## **CHEMICAL AND PHYSICAL PROPERTIES**

PCBs are a family of closely related chemicals having a complex but very stable molecular structure. There are 209 different chemical configurations included in this family. PCBs are seldom encountered in pure state, but the oil mixtures used in electrical components can have very high proportions (60% or more) of PCBs.

PCBs do not have distinguishing features that make them easily recognizable, and can be detected only by laboratory analyses. They are practically insoluble in water but are very soluble in fats, waxes and oils. They are not volatile so they do not evaporate and they do not degrade readily. The result is that they accumulate, particularly in animal fats and in sediments of lakes, rivers and streams.

## **OCCURRENCE AND SOURCES OF POLYCHLORINATED BIPHENYLS**

PCBs do not come from any natural source. They are all manmade and enter the environment as contaminants of water, air or other materials. Manufacturers, distributors and users of products containing PCBs can all contribute to environmental contamination. Contamination can occur through industrial discharges of contaminated air, water or waste; by industrial accidents and spills such as transformer fires and oil spills; and by residential contamination from fluorescent light ballasts, and other consumer products that may leak contaminated oil or may contain PCBs that are released at the point of disposal. Because of their stable nature, PCBs can exist in the environment in soil, water, groundwater and in

consumer products practically indefinitely.

## **HEALTH EFFECT**

PCBs do not generally degrade in the environment but tend to attach themselves to organic components in soils and other solids which are carried into water bodies and accumulate in sediments. PCBs that find their way into deep soils, deep sediments or into groundwater may persist indefinitely. This accumulation of PCBs in sediments plays an important role in the biomagnification process that results in food contamination.

## **DRINKING WATER STANDARDS**

The US Environmental Protection Agency and the Oregon Department of Human Services have adopted a maximum contaminant level (MCL) for PCBs at 0.0005 milligrams per liter of water (ppm). The MCL is designed to prevent measurable PCB exposure via drinking water. This is a very conservative standard compared to those applied by the Food and Drug Administration to food products in the US. Food tolerances for PCBs generally range from 0.2 ppm to as high as 5 ppm. Because of the unavoidable PCB residues in some foods it is prudent to avoid exposure via drinking water.

The MCL is based on what is believed to be the most sensitive health effect of PCBs, their possible role in cancer causation. It is believed that PCBs at levels of 0.0005 mg/L or less, for persons using 2 liters of water per day for a lifetime would pose a cancer risk of less than one in 10,000.

The major source of ongoing concern for PCB exposure to the general public will continue to be contamination in foods, especially fish, meat and dairy products which can have PCB levels as high as 5 ppm or more.

For more information about potential health effects contact the Department of Human Services, Environmental Toxicology section at 971-673-0405.

## **REMOVING PCBs FROM DRINKING WATER**

It may be possible to remove entirely or reduce the contamination of water with PCBs by detergent treatment or by activated charcoal filtration or by a combination of both. Persons interested in treating water for PCB removal are encouraged to contact the Oregon Department of Human Services for advice and assistance

before buying or installing any treatment equipment.