

Water Contaminant of the Month

PCBs, (Polychlorinated biphenyls) are man-made organic chemicals of the chlorinated hydrocarbon group. The compounds are composed of a biphenyl molecule (made up of two benzene rings) with multiple chlorine atoms attached. PCBs may be odorless or mildly aromatic liquids or vapors, or may be oily solids. They are nonflammable and are often found in mixtures with other organic compounds.

PCBs are very long-lived in the environment. Due to toxicity their production was banned in the US in 1977, and most uses were banned by the EPA in 1979. Former uses included coolants, lubricants and flame retardants in electrical equipment, hydraulic fluids, sealants, paints, pesticides and many others. Current releases of contamination are largely due to cycling between soil and the air and back again. Contamination sources may be leaks from landfills, waste chemical discharge and illegal disposal sites.

Short-term exposures to elevated PCB levels potentially cause acne-like eruptions and pigmentation of the skin, hearing and vision problems, and spasms. Long-term exposure can also lead to irritation of the nose, throat and gastrointestinal tract, changes in liver function, immune deficiencies, problems with the thymus gland, and reproductive or nervous system problems. The US EPA has listed PCBs as a primary drinking water contaminant with a maximum contaminant level (MCL) of 0.0005 milligrams per liter (or 500 parts per trillion). The maximum contaminant level goal (MCLG) is zero.

Treatment methods for the removal of polychlorinated biphenyls include point of use (POU) filtration by reverse osmosis or nanofiltration, and activated carbon adsorption. Some types of oxidation treatment have been shown to break down the PCB molecule.

(Source: *Water Technology* 32:9; September, 2009)