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Office of Toxic Substances
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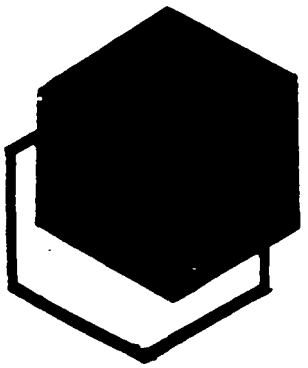

Polychlorinated Biphenyls

Polychlorinated biphenyls, also referred to as PCBs, belong to a family of organic compounds known as chlorinated hydrocarbons. PCBs were produced in the United States between 1929 and 1977, when the primary U.S. manufacturer voluntarily stopped making them because of mounting public concern over their harmful environmental effects. Most PCBs were sold for use as dielectric fluids (insulating liquids) in electrical transformers and capacitors. Although PCBs are no longer being made in this country for this use, many electrical transformers and capacitors once filled with PCBs are still in service. Today, a Federal law prohibits the manufacture of PCBs, controls the phase-out of their existing uses, and sees to their safe disposal. This information bulletin discusses the facts and the measures being taken by the Environmental Protection Agency (EPA) to safeguard public health and the environment from the hazardous effects of PCBs.

What are PCBs?

PCBs are part of the extensive family of organic chemicals known as chlorinated hydrocarbons. Virtually all PCBs in existence today have been synthetically manufactured. PCBs have a heavy oil-like consistency, high boiling points, a high degree of chemical stability, low flammability, low electrical conductivity, and weigh about 10-12 pounds per gallon.

How are PCBs Used?

As stated before, PCBs were primarily used in transformers and capacitors as dielectric fluid. Much of the PCBs previously marketed in the United States are still in service in these applications. PCBs manufactured as dielectric fluids were sold under several trade names, including: Aroclor, Askarel, Pyroclor, Sanotherm, and Pyranol. Askarel is also a generic name used for non-flammable dielectric fluids containing PCBs.

PCBs have also been used in a variety of other applications such as: heat transfer and hydraulic fluids; dye carriers in carbonless copy paper; plasticizers in paints, adhesives, and caulking compounds; and fillers in investment casting wax.

PCBs are currently being inadvertently produced as byproducts during the manufacture of certain organic chemicals. PCBs may be formed when chlorine, carbon, elevated temperatures or catalysts are present together in a process stream.

Why are PCBs Harmful to Our Health and Environment?

PCBs are harmful because once they are released into the environment, they tend not to break apart into other substances. Instead, PCBs persist and take several decades to slowly decompose. By remaining in the environment, they can be taken up and stored in the fatty tissues of all organisms from which they are slowly released into the blood stream. Therefore, due to storage in fat, the concentration of PCBs in the body tissues can increase with time even though PCB exposure levels may be very low. This process is called bioaccumulation. Further, as PCBs accumulate in the tissues of simple organisms, and as they are consumed by progressively higher organisms, the concentration increases. This process is called biomagnification. Through bioaccumulation and biomagnification, the cumulative quantity of PCBs consumed by man, who is at the end of the food chain, can be quite significant.

These two factors, bioaccumulation in organisms and biomagnification in the food chain, are especially significant because PCBs are harmful to health at low levels. Specifically, PCBs have been shown to cause chronic (long-term) toxic effects in some species of animals and aquatic species. Well-documented tests on laboratory animals show that various levels of PCBs can cause reproductive effects, gastric disorders, skin lesions, and cancerous tumors. PCBs may, even at low concentrations in water, reduce the supply of commercial fish, either through direct adverse effects on their development and juvenile growth or through reduction in populations of aquatic animals and plants which are the food sources for the fish.

PCBs may enter the body through the lungs, the gastrointestinal tract, and the skin. After absorption, PCBs are circulated in the blood throughout the body and are stored in fatty tissues and a variety of organs, including the liver, kidneys, lungs, adrenal glands, brain, heart, and skin.

PCBs pervade the environment. Measurable amounts of PCBs have been found in soils, water, fish, milk, and human tissue. PCBs have been found in fish from the Hudson River and the Great Lakes, in fish meal used as feed (as a result of a leaking heat exchanger), and in animal feed (as a result of a leaking transformer).

What is EPA Doing About PCBs?

In October 1976, Congress passed the Toxic Substances Control Act (TSCA) and, in section 6(e) of that law, specifically directed EPA to regulate PCBs. It should be noted that this was the only chemical substance specifically named in TSCA, because Congress believed that the chemical and toxicological properties of PCBs posed a significant risk to public health and the environment.

Section 6(e) of TSCA requires the proper disposal of PCBs, and prohibits their manufacture, processing, distribution in commerce, and use. EPA has issued regulations implementing these provisions. The following is a summary to date of these actions.

On May 31, 1979, EPA issued regulations effective July 1, 1979, to implement the Congressional ban on the manufacture, processing, distribution in commerce and use of PCBs, and to control the disposal of PCBs. EPA was sued by the Environmental Defense Fund

(EDF) over certain provisions of these rules, which were subsequently remanded to EPA for additional rulemaking by the U.S. Court of Appeals for the District of Columbia Circuit. Specifically, EPA needed to issue additional rulemaking dealing with the use of PCBs in electrical equipment, and rulemaking on the manufacture, processing, distribution in commerce and use of low concentrations of PCBs (PCBs in concentrations below 50 parts per million (ppm)).

On August 25, 1982, a final rule amendment covering the use of PCBs in electrical equipment was issued. The major provisions of the rule allow the continued use of electrical equipment containing PCBs according to certain use and servicing restrictions. The use of transformers and electromagnets containing at least 500 ppm PCBs requires inspection and maintenance for leaks of dielectric fluid. However, these uses are prohibited after October 1, 1985 wherever the equipment also poses an exposure risk to food or feed. The use of capacitors containing three or more pounds of PCB dielectric fluid is prohibited after October 1, 1988, except when located in restricted access electrical substations or restricted access indoor installations, where they may be kept in service for the remainder of their useful lives.

Although PCBs are no longer being manufactured for use as a dielectric fluid, certain chemical manufacturing processes result in the inadvertent production of PCBs as impurities or byproducts. Another final rule amendment to the May 1979 regulations, released on October 21, 1982, covers those situations where PCBs are produced inadvertently but either are not released (closed processes), or are released only to wastes which are then properly disposed of (controlled waste processes). The rule sets up a voluntary exclusion for certain types of extremely low exposure manufacturing processes. The major provision of this rule provides an exclusion from further regulation to those processes that do not release PCBs into the air, water, or products in concentrations above levels that can be practically measured, as stated in the rule. Manufacturers who qualify, and desire exclusion, must keep records and notify EPA of their excluded processes.

One provision of the comprehensive 1979 PCB rule was an authorization permitting the use of PCBs in railroad transformers until January 1, 1982. On January 3, 1983, the May 1979 rule was amended by EPA to extend the use authorization with certain restrictions. The performance deadlines were changed to allow affected railroad organizations to service their transformers consistent with commuter transit needs. These extensions were particularly important because it had not been determined until October 1981 that an adequate PCB substitute for railroad transformers had been sufficiently tested. The amended schedule runs from July 1, 1983 thr July 1, 1986.

In addition, under the January 3, 1983 amendment transformers containing PCBs in concentrations equal to c 1,000 ppm may continue to be used for their remaining us

Where Can More Information on PCBs Be Obtained?

To get additional copies of this PCB Fact Sheet or copies of the FEDERAL REGISTER notices highlighted in this publication call toll-free, 800-424-9065 (in Washington, D.C., dial 554-1404).

The information is provided by the TSCA Industry Assistance Office which is mandated by section 26 of TSCA to provide nonfinancial technical-compliance assistance to industry and others on TSCA's implementation actions.

To date, over 40 FEDERAL REGISTER notices, dealing with the control of PCBs under TSCA, have been published by EPA. However, the most important of these notices are listed here, and will be sent to you by calling the toll-free number mentioned above.

- o May 31, 1979 ..... PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions Final Rule (includes Disposal Requirements).
- o May 1, 1980 ..... Expiration of the Open Border Policy for PCB Disposal.
- o August 25, 1982 .... PCB Use in Electrical Equipment Rule.
- o October 21, 1982 ... PCB Use in Closed and Controlled Waste Manufacturing Processes.
- o January 3, 1983 .... PCB Amendment to Use Authorization for PCB Railroad Transformers.

Also, helpful in understanding the PCB regulatory actions and their requirements is a 'PCB Question and Answer' Booklet. Call the above toll-free number to have a copy sent to you.