

Monsanto Backgrounder

POLYCHLORINATED BIPHENYLS (PCBs)

Production History

June 1, 1983

Monsanto Company became a manufacturer of polychlorinated biphenyls or PCBs in 1935 when it acquired Swann Chemical Company and its product lines.

PCBs are compounds consisting of carbon, hydrogen and chlorine atoms. They are chemically inert, stable and fire resistant. These properties made them invaluable for their principal use -- as cooling and insulating fluids in heavy-duty electrical equipment, including capacitors and transformers.

For more than 40 years, the use of PCB electrical fluids was required in most high-rise buildings, schools, hospitals and industrial operations where the risks of fires or explosions were major concerns.

In 1970, following confirmation that PCBs were present in the environment, Monsanto voluntarily began to phase out sales of PCB products for "open applications" that could lead to uncontrollable environmental release. These uses, which represented about 65 percent of the company's PCB sales, included heat-transfer fluids, hydraulic fluids, plasticizers and other miscellaneous applications.

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By 1972, Monsanto was limiting PCB sales to selected customers solely for use in "totally encased" electrical equipment. This action was endorsed by a federal task force which recommended that Monsanto continue production for these uses until effective substitute products could be developed. This view was again reinforced in 1975 by the then administrator of the U.S. EPA, who cautioned that massive power disruptions would occur if Monsanto were to cease production before suitable replacement fluids became available.

In October of 1976, following indications from the electrical industry that replacement products would soon be in hand, Monsanto announced that it would voluntarily cease PCB production in its entirety and exit the business by October 31, 1977. In fact, Monsanto was completely out of the PCB business prior to October 1, 1977.

It is important to note the following: 1) Monsanto's decision to withdraw from the PCB business was based on concerns about environmental persistence rather than health effects; 2) In switching over to substitute products, the electrical industry was forced to accept lower fire resistance, and 3) PCBs continue to be manufactured today by other firms in Germany, France, Spain, Italy and eastern European countries for use in many areas of the world.

Health Effects

PCBs have been widely and mistakenly regarded as among the most toxic compounds known. They frequently have been incorrectly labeled as "deadly toxins" and "cancer-causing agents."

The weight of scientific evidence, however, including many health effects studies done in the last few years, indicates that PCBs are neither extremely toxic nor carcinogenic.

For example, a 1982 review of current scientific literature on PCB health effects by independent consultants (Drill, Friess, et al, Arlington, Va.) and submitted to the EPA noted: "At human exposure levels as high as those previously encountered in occupational settings, PCBs can cause chloracne and increases in the levels of one or more liver enzymes. Neither effect represents a serious or life-threatening health problem. From present evidence, no firm associations can be made between PCB exposure and any other human health effects, even after long-term occupational exposures."

Similarly, an April 1982 review of PCB epidemiologic studies by Monsanto Company's Dr. William R. Gaffey concluded: "All studies agreed that there was no relationship between reported illnesses and symptoms and PCB exposure."

Recent Human Exposure Studies

Since 1976 when PCBs were singled out for regulation in the Toxic Substances Control Act, about two dozen human exposure studies have been published. These studies show no relationship between any specific type of cancer and PCBs, nor any increase in overall cancer mortality as a result of PCB exposure. Neither do they show a connection between PCBs and other serious illnesses or death.

The studies include data on large numbers of industrial workers who, over many years, were occupationally exposed to PCBs at significantly higher levels than are presently allowed in the workplace or usually found in the environment. For example, one study by the National Institute of Occupational Safety and Health, involved more than 2,500 electrical equipment manufacturing workers, more than half of whom were exposed to PCBs on the job in excess of 20 years (some for up to 40 years).

A November 1981 review of toxicity studies done by the consulting firm, Ecology and Environment, Inc., and submitted to the U.S. EPA, stated: "There is no evidence of an excess in total mortality or in mortality due to cancer, cardiovascular disease, or nervous system disease associated with occupational exposure to PCBs. PCBs have not been linked to any human cancer, and studies to date indicate it is highly unlikely that future studies will establish such a link. Therefore, it appears that PCBs are not a remarkable toxicant, but a chemical which requires high doses to produce harmful effects."

Other Health-Effects Research

1. The National Cancer Institute concluded from a 1978 lifetime rat feeding study that PCBs were "not carcinogenic...under the test conditions." Three similar rat studies sponsored by Monsanto found that PCBs were not cancer agents. To date, only one animal feeding study -- using rats and done by the Center for Disease Control (CDC) in 1975 (Kimbrough et al) -- concluded that PCBs caused liver cancer. A subsequent review of both the Monsanto and CDC tests by an independent research institute found that none of the tests demonstrated cancer-causing effects.

2. Based on acute, subchronic and chronic studies of PCB effects in test animals, it can be stated that PCBs have a low order of acute toxicity similar to that of mineral oil or motor oil. PCBs would not even be considered poisonous using the medical or statutory definition, i.e., 50 milligrams per kilogram of body weight.

Yusho Incident

During 1968 in Yusho, Japan, about 1,000 people became ill after eating cooking oil contaminated with up to 3,000 ppm of a Japanese-manufactured heat transfer fluid (Kanechlor 400). This product was a blend of several Japanese-made chemicals including a PCB. Symptoms included skin discoloration, acne-like conditions, eye discharges, and central nervous system irregularities. Since PCB was present in the fluid, it was initially blamed for these maladies. Scientists now generally agree that this unfortunate industrial accident was not caused by PCBs but rather toxic impurities later identified as having been present in the Japanese mixture.

Environmental Effects

Recent data indicate that environmental levels of PCBs are declining. A May, 1983 report from the U.S. EPA found a "sharp decline" in the level of PCBs in the general public. The percentage of Americans with more than three ppm of PCBs in fat tissue dropped from eight percent to one percent between 1977 and 1981. (EPA said use of the three ppm level was "arbitrary" and not associated with some health-effects level.) The agency attributed the decline of PCBs in fat-tissue to decreasing levels of PCBs in the environment.

Other data show that PCB levels in fish from three different geographical regions -- the Great Lakes, New York State, and Alabama/Georgia -- ranged from one to five ppm in 1980-81 as compared to levels of 60 ppm in 1973 and 18 ppm in 1975.

Two publications -- one in 1980 by the New York State Department of Environmental Conservation, the other in 1979 by the Sport Fishing Institute, Washington, D.C. -- report that PCB persistence in the environment, as measured by the "half-life" in fish tissue, ranges from 4 to 5 years, not hundreds of years as sometimes claimed.

A 1979 National Research Council study found significant reductions of PCBs in air over the North Atlantic Ocean.

Our Position

Monsanto has no intention or desire to re-enter the PCB business. However, company policy dictates that PCBs, like other industrial chemicals, receive proper handling and disposal to minimize environmental release. Also, the company is concerned that PCBs be accurately understood and fairly portrayed. This often has not occurred in the past, and the result has been needless public panic and overzealous, costly regulation.

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