D R A F T

POLYCHLORINATED BIPHENYLS

Monsanto Company's program
of restricted sales and controlled
manufacturing practices.

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History and Background

The chemical structure of polychlorinated biphenyls (PCBs) has been known for nearly 100 years. It was not until the late 1920s that a use for PCBs was found -- as a dielectric fluid in transformers. The properties of PCB -- inertness, fire resistance and a non-conductor of electricity -- are perfectly suited to those electrical applications where high-voltage arcing could occur; possibly resulting in serious fires, damage to the equipment or a hazard to people. When PCBs are used in capacitors it has a major effect in reducing the electrical current which otherwise would have to be generated to serve industrial and public needs.

Commercial production of PCBs began in 1929. As the unique properties of the material became known, new uses were found. For example, their fire-resistant nature made them excellent choices for use in heat-transfer fluids. Their inertness gave long-lasting qualities to lubricants. Their use in surface coatings improved waterproofing characteristics.

Handling of the product at the manufacturing level has not presented any problems as long as normal industrial hygiene practices are followed. PCBs have always been considered less hazardous than many other chemicals in everyday use.

Therefore, it appeared that PCBs were a unique product which met important needs of industry.

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It was in the late 1960s that the first sign of potential problems turned up when a Swedish biologist, using a new and totally unique technique, reported that he had identified PCBs in the bodies of fish. Monsanto and others began to study the Swedish work.

Analytical methods had to be refined in order to separate PCBs from the other chlorinated hydrocarbons (like DDT) that were known to be present in the environment and to identify PCBs in parts per billion.

When these scientific investigations first confirmed the presence of PCBs in the environment in the United States in the early 1970s, and long before information regarding their potential hazard was available, Monsanto voluntarily began its program of terminating sales of the materials to those open applications which could result in loss to the environment. At the present time, PCBs manufactured by Monsanto Company are sold only to the electrical industry where they are used as a dielectric fluid in "closed systems" such as transformers and capacitors. There is no known alternate fluid available for these applications possessing the fire resistant characteristics virtually mandatory for these uses.

It has been calculated that if PCBs were not used in capacitors, an additional 68 million barrels of oil per year would be required to make up for the resultant energy losses.

Thus the situation today is drastically different from conditions which existed only four years ago. Today the 40 million pounds per year of PCB, produced by Monsanto, is carefully used in the United States by less than 50 Monsanto customers in the manufacture of sealed electrical equipment. Prior to 1971, Monsanto sold approximately 80 million pounds per year which was used by thousands of customers.

Our manufacturing and sales reduction program was a unilateral action taken by Monsanto and was based on our evaluation of developing environmental data. Monsanto is most sensitive to potential harm to the environment from its products and takes great care to control their entry.

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The Program

Limited Sales

Today, PCB manufactured by Monsanto Company is sold only to the electrical industry, where it is used as a dielectric fluid in such closed systems as transformers and capacitors -- applications where there are no known acceptable substitutes.

In addition, representatives of the transformer and capacitor industries, utilities and governmental agencies (under the initial auspices of the National Electrical Manufacturers Association) formed the American National Standards Institute Committee C-107. This committee issued guidelines for handling and disposing of dielectric fluids. They reflect the industry's understanding of the need for proper control.

Manufacturing Practices

Since 1969, we have invested more than 22 man years of work and millions of dollars in this program.

In our manufacturing area, we have taken a number of significant steps to prevent loss of PCBs to the environment. In essence, we have made the department a "concrete bathtub." Drainage is directed to trenches and piping, and then to one of two 3,000-gallon settling basins. This insures PCB containment in case of accidental spill or equipment failure.

We have also installed an incinerator to safely dispose of PCBs. This is accomplished through incineration at or above 2000° +F. Use of the incinerator and other technical assistance is available to our customers on a continuing basis.

When small quantities of PCBs are collected into the settling basins in the manufacturing area they are later pumped into drums, and eventually incinerated. In the incinerator area itself, drainage is directed to trenches and piping which flow into a 10,000-gallon basin. Recovered PCBs are periodically pumped to storage, or incinerated.

In the manufacturing area, we have also rerouted relief valve lines and atmospheric vents through catch tanks, or redirected them to settling basins.

We also provide nitrogen blanketing on storage tanks to eliminate any "breathing" of the tanks and resultant PCB escape.

We have installed mist eliminators in vapor lines - once again to eliminate the possibility of PCBs leaving the manufacturing area through these lines.

Finally, we have replaced underground sewers with above-ground sewers, and repaired or combined others, so that we can monitor the effluent from the department. In addition, this will prevent any unknown buildup of PCBs in our sewer systems or any contamination of PCBs into other sewers.

Much of the success of our efforts also depends on maintaining a high housekeeping level in the department itself. Among the housekeeping responsibilities our operators have assumed are these:

--All pumps are checked for leakage on every shift. Drip pans that collect leaks are emptied into scrap PCB drums.

--All leaks are reported and documented so that corrections can be made and settling basins observed.

--"Floor Dry" is used to absorb any PCBs that have spilled or leaked. If it becomes necessary to flush PCBs to the settling basin, a minimum amount of water is used.

--Sampling drums and scrap-PCB drums are quickly palletized, labeled and transferred to the incineration area.

Through these kinds of programs, we feel we have literally built a "concrete bathtub" to catch and safely dispose of PCBs at our manufacturing location.

In addition to our voluntary policy of restricting sales worldwide, on-going research activities are underway to develop and evaluate potential replacement dielectric fluids. We are confident that the dielectrics industry which represents both capacitor and transformer manufacturers and users, will continue to support and maintain strict environmental control of PCBs.

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