GH - Aroclor

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Pollution cop's lot not 'appy

Despite complaints from government and customers, Monsanto is pushing ahead with $2-million plan to curb pollution by PCB

William Papageorge, manager of environmental control for Monsanto's organic chemicals division, is in a spot few would envy. He has the ticklish job of guiding the company's $2-million research and control program aimed at halting pollution of the environment by its polychlorinated biphenyls (PCBs).

The trouble is, the government doesn't think the program goes far enough—but some of Monsanto's PCB customers (who have been asked to pitch in and help) think the company has overreacted.

Despite the headaches, Monsanto is pushing ahead with its program, which has four main objectives: (1) eliminating open-system applications of PCBs, such as in coatings and plasticizers; (2) controlling spillage or other loss from closed-system operations; (3) developing a less-persistent type of PCB; (4) eliminating loss or contamination during manufacture.

Latest step: next month at Monsanto's Sauget, Ill., plant a new, $500,000 incinerator will begin complete destruction of more than 500,000 lbs. of contaminated Aroclor, the company's tradename for PCB used as an insulating and heat-transfer fluid. The material, recalled from customers, is now being stored in several 10,000-gal. tanks at the plant.

Sole Supplier: As the lone U.S. manufacturer of PCBs (at Anniston, Ala., as well as Sauget), Monsanto was the only company that had to respond to evidence presented early in '70 that these materials are in the family of persistent chlorinated hydrocarbons that build up in animals and affect their reproductive cycles. (Among other things, PCBs were linked with thinning of peregrine falcon egg shells.)

Papageorge says: "We don't know how serious a hazard PCB is to the environment—no one really does." But he adds that the company recognizes that PCBs are turning up in the environment and has decided to do something about it.

Long History. PCBs were originated by Swan Chemical in '29 in response to the electrical industry's need for an explosionproof insulating fluid for transformers. Mineral oils (still used in more than 85% of electrical insulating applications) have a stability problem that makes them potentially hazardous.

Power surges in electrical equipment causes arcs—and enough of them can vaporize mineral oil so that the next arc can ignite the vapor. It's not a big risk, but it is enough to warrant use of stable PCBs (which can withstand temperatures up to 1,600 F) in substations located in populated areas and around expensive industrial equipment.

Monsanto, which makes biphenyls as a basic commodity, took over Swan in the early '30s, now is sole supplier for the U.S., England and Canada. PCBs are also made in France, Germany, Italy, Japan and the Soviet Union.

Soon after Monsanto took over, new applications opened up for PCBs as industrial heat-transfer media. The next major push for new markets was in '60, when a Monsanto technical bulletin was published to promote the use of PCBs in sealants, chlorinated rubber, adhesives, printing inks and insecticides.

The insecticide use has drawn fire in recent years, but Monsanto says the U.S. Agriculture Dept. originally suggested that PCBs could be used to extend the life of some pesticides if added as inert material.

Pulling out of the open-system market does not appear to be a big loss for PCBs. Some 200,000 lbs. of material destined for such use has been bought back by the company, will be shipped for use in closed systems. As a service to former open-system customers, Monsanto has prepared a list of suggested replacements for PCBs in adhesives and coatings—some more expensive, some cheaper. The PCB insulator market, though limited, seems secure. But as heat-transfer media, PCBs are being challenged by several new competitors, who are stressing environmental safety (*see, p. 39*).

Early Concern: The first signs of trouble for PCBs turned up in '66, when a Swedish biologist, Soren Jensen, identified these materials in the bodies of fish.

In '68 Monsanto began studying the Swedish work. One problem: separating PCB from the other chlorinated hydrocarbons like DDT and DDE that were known to be prevalent in the environment. To identify PCB (present in parts per billion quantities) gas chromatography, electron capture and mass spectrophotometry methods had to be refined.

Plant Practice: Monsanto's PCB manufacturing operations have experienced an equal tightening of standards. "You get a feeling of bone dryness in the plant," says Papageorge. "There is none of the hosing down you find in most chemical plants."

Other measures include complete monitoring of all vents and traps for leaks at all sample points. All tanks are "buttoned up" so that operators don't have to look in. And all of the air and gas that escapes the plant is passed through a Brink mist eliminator. In addition, process temperatures were lowered to prevent vaporization.

Monsanto even provides clothing for all the workers, and after the clothes are cleaned all the cleaning fluid is collected for destruction in the incinerator.

For PCBs used in capacitors, the little boxes on poles that boost electrical power, Monsanto is installing a distillation column, scheduled to go on-stream in June, to produce a PCB without the persistent isomers. The material can then be further chlorinated for transformer use. The problem with capacitors is that they are small, hard to collect after they have been replaced. They could easily end up in a land fill, crushed so that the material inside leaks onto the ground.

Seeking Substitutes: Monsanto admits to looking for some substitutes for PCB. What the company has primarily gained from the PCB furor was an awareness that it must test all new products for environmental effects.

"We don't yet know what tests will be required, what data will be acceptable, or even what animals to test on," says Papageorge, "but we have worked out a checklist approach for all new chemicals. We hope we'll be batting 1.000 when the federal government details its toxic substances act."

Meanwhile, Monsanto feels it is well on its way to providing an effective program for controlling PCB. It still questions some of the identification procedures under which PCB has been indicted. But the company is betting that closing the open-system market will end the threat.

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