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The PCB ban wagon

It's not the worst pollutant, just the most notorious. And the uproar over PCB now prevents its disposal.

By HENRY F. DAVIDSON
Staff reporter

Once considered the "miracle drug" of the electric industry, polychlorinated biphenyl now is recognized as dangerous. There is no disagreement over that.

But there is reason to believe that the chemical one environmental official calls the "political pollutant" is accorded more fear than it deserves.

That fear is blocking what may well be the safest way to dispose of the chemical — incineration.

Most Americans who know something about polychlorinated biphenyl — popularly called PCB — believe it causes cancer, which has yet to be proven conclusively; and that it is highly toxic, which is not true — at least in the sense of causing instant death.

The major use for PCB has been in electrical equipment as an insulator. In its heyday, its second-largest use was in food processing.

Building codes across the country once demanded PCB insulation in transformers and capacitors in power systems in high-rise buildings because the then- available alternatives were explosive petroleum products. Faulty PCB equipment would occasionally blow up from overheating and internal pressure, but the PCB itself would not then produce chemical explosions and fire.

PCB also has been used as a dye carrier in "carbonless" carbon paper — some of which may still be on the market, with EPA approval — and in paints, adhesives, caulking compounds, televisions, microwave ovens, various sealants including highway coatings, and in dust control. Even with minimal leakage from electrical equipment, then, it is clear why the chemical group of PCB is found from pole to pole.

The fear of PCB is so intense in America that in 1976 Congress took the extraordinary step of banning it by name. The Environmental Protection Agency was given the massive chore of disposal.

The chief of the hazardous waste section at EPA's Atlanta Region,

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Has PCB been made an environmental scapegoat?

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John Dickinson, recently called PCB a "political pollutant" — a chemical that is banned but is politically impossible to dispose of.

Charles Sapp, toxic coordinator for EPA's Philadelphia Region, which includes Delaware, said, "I think it's been blown a little out of proportion. It's not as dangerous as it's made out to be. But it is a serious health hazard, especially if it gets into water."

One replacement chemical for PCB in electrical equipment already has turned out to be very carcinogenic — cancer causing. The replacement is dioctyl phthalate, more accurately called Di(2-Ethylhexyl) Phthalate.

Steve D'Arcaico of the National Toxicology Program at Research Triangle, N.C., said a study will be published in about six months that shows it to be carcinogenic in rats and mice. An April 1979 EPA report said, "Dioctyl phthalate has been used in capacitors manufactured in Japan since 1976. It is presently being used in most capacitors manufactured in the United States."

Some scientists feel the uproar over PCB has distracted the EPA from monitoring other, more dangerous chemicals.

Raymond D. Harbison, director of the toxic substances control laboratory at Vanderbilt University in Nashville, said benzyrene, for example, does cause cancer while PCB is immobile and not carcinogenic to humans. Benzyrene is one of the constituents of tobacco smoke and is believed to be an occasional inadvertent byproduct created when coal is used as a raw material in a chemical process. It is the classic carcinogen used as a control in rat-cancer tests of new chemicals.

By turning PCB "immobile," Harbison means that once attached to a flake of clay, a PCB molecule clings to it. This is why certain kinds of dumps are safe for PCB. It doesn't move around unless it is in a stream of groundwater.

The EPA's original regulation on PCB called for disposal of equipment that had been taken out of service for any reason, such as bankruptcy, obsolescence or because it was leaking. There was no plan to take non-leaking equipment out of service. In October, EPA lost a court case to an environmental group and now all PCB equipment will be scrapped, probably by mid-decade.

On Nov. 13, the EPA announced that PCB can be destroyed by burning in a standard high-performance industrial boiler, mixed with 90 percent of the regular fuel oil normally burned by such boilers.

One test at General Motors Chevrolet plant in Bay City, Mich., produced stack gases in which PCB could not be detected. Nor were any of the more toxic breakdown materials of PCB found.

The molecular structure of polychlorinated biphenyl consists of from one to 10 chlorine atoms attached to a pair of hydrocarbon rings. It will burn only at very high temperatures. But, when PCB is properly incinerated, the hydrocarbon adds to the heat of combustion and ends up as water and carbon dioxide. The chlorine goes up as hydrogen chloride gas which is scrubbed by water to make dilute hydrochloric acid, then neutralized and dumped.

The Monsanto Co., which introduced and was once the biggest manufacturer of PCB in the world, has insisted for years that incineration can do the job safely, but no such operation is licensed anywhere in the United States.

Despite the EPA approval of controlled burning as a means of disposal, applications for permits to incinerate the chemical group are frustrated everywhere by public outcries.

"It's your fault," said Richard S. Sarayak, meaning the media. "You have your readers so upset that, if someone had all the money in the world, it would take three years to fight the political battles to get a permit." Sarayak is a regional sales manager for Rollins Environmental Services Inc.

He claims Rollins has three of the few incinerators in existence that can do the job on PCB and, considering the temperatures and the scrubbers, said, "We have the best."

There are two laboratory-tested chemical processes for destroying PCB by tearing the molecule apart. But, with relatively inexpensive incineration already approved, there is not much interest in either. Despite that, EPA officials say a firm called Sunshine is seeking approval in all 10 EPA regions for a portable chemical process to be hauled around on a tractor-trailer. Sunshine is not part of the Sun Oil empire.

The only other activity in the Philadelphia region is a pilot incinerator waiting for trial approval in Jessup, Md. It is owned by E.O.I. of Washington, the company that hopes to build a big PCB incinerator in Chester, Pa., if the Jessup plant passes its tests.

Invented in 1968, PCB is a highly stable molecule. Because of that, it is found half a century later in every living organism in the world. It rises through the food chain and is biologically accumulative. In 1977, with evidence of its dangers mounting, Monsanto — the only U.S. manufacturer of PCB — stopped producing it.

For some reason, neither the legitimate concern nor the hysteria about PCB has spread to many other countries. It cannot be sold in Japan and a few European countries, but is still legal in most of the world.

American industrial companies, especially electric utilities, have spent hundreds of millions of dollars in the last year to remove transformers and capacitors containing PCB. A liquid, often diluted with other oils, PCB is used in capacitors as insulating material. It is often used for insulation in transformers, but its primary use in these is to transfer heat from the core to the outer metal case.

Dickinson of EPA's Atlanta region, speaking at a recent seminar in Tampa, Fla., said the concern about PCB comes because it doesn't break down into simpler and less harmful chaparrals in the environment. Practically all PCB consumed by mammals or fishes is retained in tissues and builds up to levels that may be harmful.

Sapp of EPA's Philadelphia Region agrees that the biggest problem is that PCB doesn't break down, but says this is also why it is not nearly as poisonous as the public believes.

PCB is not "acutely toxic." That is, it is not poisonous in the sense that arsenic and cyanide salts kill quickly. The lethal dose in "The Toxic Substances List of the National Institute of Occupational Safety and Health" is higher than the lethal dose of table salt.

Consequently, if someone is accidentally sprayed with a few gallons, he's not going to die. But, if some gets in his mouth or eyes or nose, he may months later develop a serious skin rash, liver disease and a host of other ailments that are associated with many chlorinated hydrocarbons such as insecticides.

PCB is a known cause of birth defects and occasional sterility when fed to rhesus monkeys. Similar results have been found in ranch mixts fed salmon contaminated with 12 to 30 parts per million of PCB, and in cows and dogs. Though it is not known how much would have to be consumed by a pregnant woman to cause a birth defect, the possibility is enough to justify the ban.

There is some evidence that PCB in the body does break down to produce small amounts of known cancer-causing agents, but again there has been no conclusive study to prove PCB ever has caused cancer.

In a study of rats, for example, liver damage — but not cancer — becomes apparent at high concentrations.

Some PCB was manufactured with contaminants that could be blamed for many health problems. That showed the results of one major cancer study of human consumption in Japan. And under very high temperatures in a defective

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Some fear more toxic pollutants are being ignored

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transformer, PCB will break down into possibly more harmful chemicals.

Still, oldtimers in the electrical business were taken by surprise when PCB came under a cloud. There was an inconclusive cancer study at a Mobil Oil refinery in New Jersey and PCB had long been linked in the equipment-manufacturing industry with a serious skin disease called chloracne but, at the utility end, it was considered harmless.

David W. Weston, substation foreman at the Delmarva Power & Light Co. in Delaware, said, "I've worked with PCB for 30 years. No one I know who worked with it had cancer or any problem. When I was working with tools, I was up to my elbows in it. It saved a lot of lives and I doubt that anything as good will be invented."

This kind of anecdotal testimony would have no scientific value if it weren't for a half-dozen studies in the utility industry workplace that came up with the same negative results. This is why most of the public worry about being sprayed with PCBs from leaking equipment seems pointless.

The real danger of PCB is that it is everywhere in the environment and can build up slowly in human tissue over many years. Even this isn't much of a worry compared to, for example, cigarette smoking. Still, it would be foolish to eat contaminated fish seven days a week, as some Connecticut River commercial fishermen apparently do, even though the PCB content of the fish is below the EPA 5 parts per million level.

When it was used in food processing, hot PCB would be circulated through a jacket around a big pot of frying oil and such things as fish sticks and french fried potatoes would be cooked with only a quarter-inch of steel between the cooking oil and PCB.

In Japan, that led to a major PCB disaster which was to become the rallying point of those who worked to ban the chemical.

In early 1968, a processor of cooking oil heated his product at a relatively low temperature in a jacketed PCB cooker. This was done to drive off odors in the cooking oil. The jacket leaked and the oil became contaminated with up to 3,000 parts per million of PCB.

By July, the first of many persons sickened by eating food cooked in the oil were reported and the ailments were called collectively "Yusho" or rice-oil disease.

There were cases of jaundice and pigmented skin and many other problems. By May of 1975, 29 of the Yusho population of 1,300 being studied had died of accidents, suicides, heart problems — and a statistically high rate of nine cases of cancer.

This made it look as though PCB caused cancer. But a second look, ignored by most of the American press, showed that the cooking oil also contained polybrominated biphenyls, asphaltalenes and dibenzofurans, which effectively muddied the scientific waters.

The only other study that, for a time, showed that PCB caused cancer was done at the U.S. Center for Disease Control in Atlanta, and this is still used as documentation by the EPA — even though many scientists believe reviews of that work by other scientists effectively shot down the conclusions.