The menace known as PCB

By Casey Bukro 12/28/75

PCB IS SOMETHING the Sorcerer's apprentice might have cooked up. Remember the fable?

Just when the lowly apprentice got the knack of casting a magic spell, things started going terribly wrong. He couldn't stop the forces he had unleashed.

And before he knew it, the frightened apprentice became a victim of powers too big for him to handle.

THAT'S EXACTLY how the U.S. Environmental Protection Agency feels about PCB, short for polychlorinated biphenyls, a widely used industrial chemical since 1930.

PCB is now the central figure in an ecological horror story.

"We believe that PCBs constitute a significant hazard to human health and the environment and must be immediately and effectively controlled with every means at our disposal," EPA administrator Russell Train said last week.

Casey Bukro is The Tribune's environment editor.

Train urged PCB manufacturers and users to voluntarily phase out the use of the chemical, adding, "we have absolutely no authority under existing law to stop or restrict uses of PCB."

Never in its five-year history has the EPA felt so helpless to cope with an environmental hazard on which the record is so complete and so frightening.

"Here we are with a highly toxic substance, sitting here wringing our hands and not knowing what to do about it," said James McDonald, the EPA's regional chief of enforcement in Chicago.

Like the Sorcerer's apprentice, the EPA is faced with a hazard that began 46 years ago as a technological blessing.

A syrupy, clear liquid resembling mineral oil, PCB is highly fire resistant, inert, and resists chemical decomposition. It resists temperatures up to 356 degrees Fahrenheit.

Manmade, it is forged of two chemicals. One is biphenyls, extracted from crude oil and similar to benzene. The other is chlorine, which can be made into bleach or a poisonous gas.

Together they formed a chlorinated hydrocarbon chemically similar to DDT, a pesticide that is an ecological villain banned in this country in 1972. There are 209 possible combinations of PCB with varying amounts of chlorine.

A bulk of the 40 million pounds of PCB produced each year in the U.S. goes into high power electrical transformers and capacitors, acting much like the coolant in your car's radiator. A large transformer might hold from 500 to 800 gallons of PCB fluid.

It also has been widely used in paints, printing inks, carbonless copy paper, sealants, adhesives, plastics, hydraulic fluids, and in heating and cooling systems.

The EPA estimates that some 700 million pounds of PCB have been produced and used in the United States over the last 46 years—setting the stage for an ecological nightmare.

As equipment containing PCB was junked, more than half of it soaked into the ground at garbage dumps or spilled into open waterways.

From there, as one scientist put it, PCB entered the environment "through the back door."

Finding its way into the air, water, and land, it contaminated the food chain in which lower forms of life serve as food for higher forms, all the way up the ladder to mankind.

Like DDT, PCB "biomagnifies" or collects in the body fat of animals, fish, and birds with effects that are now becoming alarmingly clear.

One of every two Americans have traces of PCB in their body fat, and nursing mothers have been found to be passing PCB to their babies.

PCB contamination is now global, reaching even to remote corners of North and South Poles. It is present in organisms all over the world.

PCB's accumulation in nature went undiscovered until 1966, when Swedish chemist Soren Jensen began analyzing enormous quantities of an unknown substance found in dead fish and birds. At first it was thought to be DDT because of its chemical similarity.

Japan outlawed PCB after 15,000 Japanese in 1968 suffered PCB poisoning by swallowing cooking oil contaminated rice oil. Ten died and 1,200 of the victims have been treated for symptoms ranging from acne, loss of hair, miscarriage, stillbirths, to stunted babies born to poisoned mothers.

Monsanto Chemical Co. in Sauget, Ill., near East St. Louis, manufactures 99 per cent of the PCB produced in the U.S. In 1971 it voluntarily restricted sales of PCB to those uses in which it would be contained, as in sealed transformers.

But since that time, federal environmental officials have noted that PCB contamination in the U.S. has not lessened.

The U.S. Food and Drug Administration in 1973 set a 5-parts-per-million limit on PCB in food, and has seized fish tainted with PCB.

Lake Michigan fish were found to have the highest PCB levels of Great Lakes fish, threatening the $8-million Lake Michigan commercial fishery and the $15-million sports fishing industry.

Lake Michigan sport fishermen are warned against eating more than one meal a week of salmon or lake trout. Tests show that these fish all violate the PCB pure food limit if longer than 12 inches, and are considered unfit for human consumption.

Alarmed by these developments which could have a serious impact on the Great Lakes economy, the EPA called a three-day conference in Chicago in November to review all that is known about PCB and how to combat it.

Recent tests linked PCB to reproductive failures in fish, birds, and humans, including a test that showed mink fed Lake Michigan salmon failed to reproduce. Tests on rats showed it might cause tumors.

PCB-laden fish surpass the pure food limits in various parts of the Great Lakes, the upper Mississippi River, off the southern California coast, the Gulf of Mexico, the Hudson River, and other New York state waterways.

For the most part, the experts admitted they were stymied.

Though favoring a ban on PCB, they pointed out there is enough PCB in the environment to keep contaminating the world for another 10 or 20 years.

One solution, asserts Train, is for Congress to adopt toxic substances control legislation that would empower the EPA to act in such cases.

Meanwhile, Train says, the best advice he can give to guard against the threat of PCB poisoning is "through no eating fish that exceed the limits prescribed by FDA."

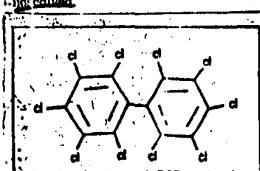
Train said he will meet in January with Monsanto and 37 PCB-using manufacturing plants to work out ways to control PCB, including tighter restrictions on the 10,000 pounds of PCB being flushed directly into the air, land and water each year in this country.

THERE ARE two rays of hope.

Dow Chemical Co. says it has developed a silicone liquid that can be used as a substitute for PCB transformer fluid.

And Dr. Donald Mount, director of the EPA's environmental research laboratory in Duluth, says this to fears that the environment has been hopelessly poisoned by PCB:

"We said the same thing about DDT and, boy, we sure were wrong. Since the 1972 nationwide ban on DDT, its pesticide levels in the environment have declined."



Atomic signature of PCB molecule.

Deadly molecule

Polychlorinated biphenyls (PCB) is a clear, thick liquid resembling mineral oil formed by linking chlorine atoms to biphenyls, a petroleum byproduct similar to benzene. Chemically, it is a chlorinated hydrocarbon similar to the pesticide DDT. Both are environmentally dangerous for the same reasons. They are poisons that collect in body fat. PCB has many industrial uses but its major use is as an insulating fluid in electrical equipment such as transformers and capacitors.

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