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PCB substitutes seen as less toxic, polluting

By RICK MASON

New and apparently environmentally safe substitutes have been found for a major chemical pollutant that has turned up, among other places, in the upper Mississippi River and in fish taken from it.

Known as PCBs (polychlorinated biphenyls), the dangerous chemicals are considered more environmentally harmful than the pesticide DDT and are used in high-voltage power capacitors (condensers) and transformers.

Dow Chemical Corp. developed the new fluid in conjunction with the McGraw-Edison Co., an electrical parts manufacturer which will begin marketing capacitors with the substitute around mid-1976, according to Roy Orens, a McGraw-Edison vice president.

Previously, the Dow Corning Corp. and the RTE Corp. announced a silicone-based substitute for PCBs in transformers.

The General Electric Co. (GE), a leading manufacturer of capacitors using PCBs, has repeatedly maintained that no acceptable substitute for PCBs has been discovered. Spokespersons for GE could not be reached for comment.

PCBs are heat and fire resistant particles that have been used in many manufacturing processes and products. In the late 1960's, however, scientists discovered that PCBs were causing serious environmental contamination.

Earlier this year PCB traces were found in upper Mississippi River fish. Levels in fish taken from Lake Pepin, a wide stretch of the river near Red Wing, were exceptionally high.

PCBs linger in the environment for an indeterminate period—for at least a decade, according to one estimate. The chemicals find their way into the food cycle through fish and wildlife. Deposits build up in fish and animal fats and cause a variety of ailments, including disruption of reproductive functions.

The only U.S. manufacturer of PCBs, Monsanto Co., voluntarily limited PCB production to amounts used in transformers and capacitors in 1971 because of their environmental hazard. No acceptable substitute insulator was available until the recent findings.

If the new fluids prove acceptable alternatives to PCBs, almost all U.S. production of PCBs could be stopped, according to Karim Ahmed, a scientist with the Natural Resources Defense Council in New York.

Some capacitors will still have to use PCBs, but David Wood, dielectrics manager of Monsanto in St. Louis, said his company is working on a substitute that will "cover the full range of capacitors." It will be "at least 12 months" before Wood expects any results, however.

Orens said the new power capacitor fluid is "environmentally safe by all known standards and has the same or better electrical properties as PCBs."

Although Dow Chemical's fluid has a lower flash point (the temperature at which it ignites) than PCBs, "it is approximately as safe as PCBs in capacitors" because of their low operating temperature, Orens pointed out.

The most significant characteristic of the fluid is its compatibility with the environment, according to Orens. Dow researchers, comparing the fluid to PCBs, found it

- significantly less toxic to fish;
- significantly less concentratable in fish tissues;
- less toxic to animals; and
- significantly more biodegradable (breaks down in nature).

A spokesman for Dow in New York said the tests were conducted in accordance with the Environmental Protection Agency's (EPA) standards.

Japan has been using a silicone PCB alternative for several years with no apparent problems, Don Duckett, chief products engineer of RTE Corp. in Waukesha, Wis., said.

"The silicone fluid to be used is very similar to the type of gelib implanted in people," he pointed out.

Richard Montgomery, new products market manager at Dow Corning in Midland, Mich., said tests conducted on that company's silicone substitute proved it a safe and effective insulant that can be used in existing transformers.

"We can substitute the fluid in most cases, but we don't know if we can do it in all of them," Duckett said.

Prices of both the new fluids are approximately equivalent to those of PCBs. Spokesmen for the companies, however said lower disposal costs could actually make the insulators cheaper.

Although no independent testing of the companies' findings has yet been done, environmentalists are initially—but cautiously—satisfied with the results.

"On the face the new fluid appears to be less persistent (in the environment) because of the chemical structure," Ahmed said.

James B. Elder, a biologist with the U.S. Fish and Wildlife Service at Fort Snelling, said, "It looks like it's going to be environmentally okay."

"Time will tell on long term usage and accumulation in nature," warned Steve Chapman, research director for the Minnesota Public Interest Research Group. "It's the long term load that counts."

Both Elder and Ahmed pointed out, however, that PCBs already in the environment are causing most of the current problems.

PCBs are still being produced abroad and continually find their way into the United States, Ahmed said.

The Toxic Substances Act, now pending in Congress, would give the EPA more authority to regulate PCB use in the United States as well as control imports.

In December, Russell E. Train, EPA head, announced the agency would try to eliminate direct discharges of PCBs within a year and a half by modifying water discharge permits.

The plan is expected to have little impact, however, because two-thirds of the nation's PCB users discharge their wastes into municipal sewage treatment systems that don't require discharge permits, according to an EPA assistant administrator.

Much of the water contamination is thought to come from PCB leakage from discarded electrical equipment in dumps, which would also be unaffected by the new permits.

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