PCB substitute is safe for environment

Removing polychlorinated biphenyls (PCB's) from the environment altogether may have moved a step closer last week as Dow Chemical and McGraw Edison announced development of a less environmentally hazardous substitute for PCB's in high-voltage capacitors. The compound will begin replacing PCB's in McGraw Edison's capacitors in mid-1976.

The new substitute material, butylated monochlorodiphenyl oxide, was developed by Dow and extensively tested by McGraw Edison in a four-year joint program. It shows dielectric losses as low as or slightly lower than PCB mixtures while showing superior performance in corona discharge testing at most temperatures. In addition, it is expected to be safe from fire hazards at the normal operating temperatures of capacitors, the company says.

Environmentally, the new compound performs substantially better than PCB's, Dow says. Its major component is 45 times more biodegradable than PCB's, 30 times less bioconcentratable, and 20 times less toxic to fish in company testing. The material probably will cost 50 to 75% more than PCB mixtures, according to Dow, but since it will require less special handling and monitoring than PCB's do, the difference in cost for capacitors will be considerably less.

PCB's have been used for the past 40 years in electrical equipment because of their excellent dielectric properties and low risk of explosion or fire. The evidence of their environmental hazard has led to strong opposition to their continued use (C&EN, Dec. 1, page 7). Since 1971 Monsanto, the only U.S. manufacturer of the compounds, has restricted their sales to closed-system electrical applications where no acceptable substitute material has been available.

High-voltage capacitors of the type McGraw Edison makes probably are the second largest market for PCB's, after electrical transformers. They represent about 20% of the estimated 40 million lb of these compounds consumed each year.

The Dow-McGraw Edison material joins several other PCB substitutes already being tested or marketed. Among them are Exxon Chemical's diisononylphthalate for capacitors, Dow-Corning's polymethyl siloxane fluid for transformers, and an experimental fluid for transformers being developed by RTE Corp.

Dow says it will have manufacturing capacity to produce 1 million lb per year of the new material by the first quarter of 1976. Should the fluid prove acceptable to the industry, Dow is willing to make a commitment to produce the fluid in multimillion lb-per-year quantities by the end of 1976. □

MONS 032527