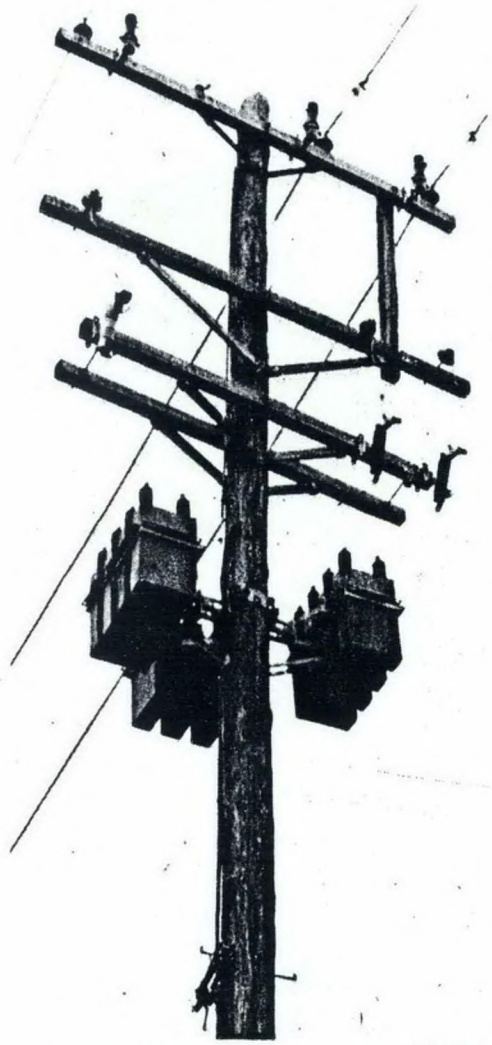
FEB 25 1982

LGW Sites Ooze Indestructible Chemical



—Staff Photo

UTILITY POLES WITH CAPACITORS, SOURCES OF PCBs

By CHARLES THORNTON
Press-Scimitar Staff Writer

Once or twice a month, somewhere in Memphis and Shelby County, one of the more than 3,100 electrical capacitors owned by Memphis Light, Gas & Water Division or TVA ruptures, spilling chemicals known as PCBs.

The capacitors contain 1½ to 2 gallons each of the chemical.

Depending on which literature one reads, or the expert talking, PCBs — polychlorinated biphenyls — are either the apocalypse straining at its chains, or only slightly more threatening than grandmother's sugar cookies.

But:

- PCBs are virtually indestructible.
- Wherever researchers have looked for PCBs in animal life forms, the chemicals have been found.
- They have been shown to cause miscarriages and stillbirths in animals.
- PCBs can cause a painful skin ailment.
- PCBs have been shown to cause cancer in rats.
- Some humans who inadvertently consumed PCBs developed liver cancer.

The capacitors, plus 211 200-gallon capacity transformers in the midtown and downtown areas, use PCBs as an insulating fluid. Some of them may still be in use 35 years from now, said an LG&W engineer.

Because PCBs are almost indestructible, they at first appeared to be an ideal fluid for industry, as insulation and coolant in high-voltage transformers and capacitors, heat exchange fluids and hydraulic fluids, to name just a few uses.

For years after PCBs were developed in the 1920s, health and industry officials hailed them as wonder chemicals. When they were unveiled by Monsanto Chemical Co. in 1929, the industry gave them rave notices, even to the point of proposing them for use as binding agents in chewing gum.

Since then the electrical industry have used PCBs as insulation, and they were incorporated into parts for household appliances — color TV sets, microwave ovens and fluorescent light fixtures. Industry used them in paints, plastics, printing inks and marine caulking.

Nobody paid much attention in 1936 when a team of American scientists reported that 23 of 24 workers involved in making PCBs at one plant were found to have developed chloracne, a persistent and unsightly skin disease caused by some chlorinated hydrocarbons, the chemical family that includes PCBs and DDT.

Between 1940 and 1948, various scientific investigations linked PCBs to liver damage, impotence and digestive disturbances in workers who were involved in the manufacture and use of PCB-based insulating waxes.

The first indication that PCBs might be dangerous to unborn children came in 1963 when a team of scientists found that injections of small doses of PCBs into fertilized chicken eggs caused stillbirths and deformities.

In experiments in rhesus monkeys, often used for experimentation because their reproductive system is similar to that of humans, Dr. James Allen of the University of Wisconsin found that PCBs in doses of only 2.5 parts per million caused stillbirths, miscarriages, skin lesions and hair loss.

In 1966, Swedish scientist Soren Jensen was checking for DDT contamination in fish. He found PCBs in tissue taken from a fish. Later, he began to find PCBs almost everywhere in the environment, including the hair of his entire family.

The shocker that eventually led to global concern about the health effects of PCBs took place in Japan in late 1968.

During a period of a few weeks, it was discovered that more than 1,000 residents of Yusho, Japan, had eaten rice oil accidentally contaminated with PCBs that had leaked into the oil during a heating process at one factory.

Within five years, five of the Yusho victims had died of liver cancer — six times the normal death rate for Japanese liver cancer victims.

Others who ate the rice suffered severe chloracne, swollen eyes, stillbirths and miscarriages. Japan immediately banned all trade in PCBs.

The Toxic Substances Control Act of 1976 banned all PCB manufacturing in the United States, but products containing PCBs, primarily electrical components, are still being assembled.

"Due to a quirk in the law," said Ralph Jennings of the Environmental Protection Agency in Atlanta, "manufacturers are not required to tell you that electrical components contain PCBs. They are supposed to tell you if they don't."

Many scientists now believe that PCBs, a close relative of DDT, are among the most subtle and tenacious toxic substances known to man.

PCBs have been identified as capable of causing an awesome array of health defects, including liver damage, miscarriages, birth defects, impotence, jaundice, digestive disturbances, throat and respiratory irritations, severe headaches and chloracne.

PCBs also are suspected of causing cancer because laboratory animals given PCB doses of 100 parts per million in their food developed malignant tumors.

Jennings, hazardous waste expert for the Environmental Protection Agency, said during an interview that scientists have not been able to show that pure PCBs are harmful.

The key phrase is "pure PCBs." Most persons in the chemical industry believe that once PCBs have been put into use and escape their containers, they are no longer pure and constitute an environmental hazard.

Jennings said PCBs can be changed by the heat generated in electrical equipment so that they are no longer "pure."

As an example, he said that PCBs found on utility poles have been found to cause changes in bacteria. Generally, any substance that causes a change in the genetic structure of bacteria is regarded as potentially harmful to man.

C.E. Merryman, manager of LG&W's central shops and the man charged with handling LG&W's PCB-containing transformers and equipment, said industry tests show that when PCBs are heated but not to the point that they are destroyed — such as when 12,500 volts arc through them creating an explosion — the normal PCB structure can be changed.

When PCBs are heated to 410 degrees Fahrenheit they are changed to a dangerous family of chemicals known as PCDFs — polychlorinated diphenylfurans — according to power industry reports to LG&W.

Merryman said there also is some evidence that PCBs change slowly with the passage of time and become more dangerous.

He said that LG&W is gradually phasing out equipment that contains PCBs, but that the process could take another 30-35 years because the equipment, especially transformers, is long-lived.

He said, however, that LG&W is not able to repair or replace leaking PCB-laden transformers as quickly as EPA would like because of technical problems.

"It takes several days to replace a transformer, which means that customers would have to be without power for a long period of time."

The problem of the transformers is compounded because they are all underground and have pumps that automatically operate when fluid is in the vault.

Merryman said that LG&W is preparing to modify all its PCB-equipped transformer vaults with special pumping switches that can tell the difference between PCBs and water so that if an explosion occurs, the PCBs will not be pumped into the environment.

Only one of the PCB-containing transformers has exploded since EPA began requiring reports on PCB incidents. That was late last year when the switching element of an underground transformer exploded at 969 Madison seriously injuring one LG&W worker and dumping 20-30 gallons of PCB fluid into the transformer's vault.

Merryman said PCB contamination has never been known to make an LG&W employee ill.

EPA records in Atlanta show that only two PCB incidents have ever been reported by LG&W — the transformer explosion at 969 Madison and a capacitor explosion last year in Germantown.

Jennings said EPA did not follow up on the Madison incident but did follow up the Germantown capacitor explosion because it contaminated the soil.

Merryman said LG&W crews went to the Surrey Lane site after the capacitor exploded and removed all the soil and foliage that appeared to have been splattered by the PCB fluid.

"We didn't take any soil samples during our inspection," Jennings said, "because LG&W had re-sodded the area." No one knows how contaminated the area may be.

Usually, he said, "If the PCB oil falls on soil, we dig up the soil and put it in cans for disposal in an approved landfill. If it falls on the street or on concrete, we wash the area with solvent, then use a material that absorbs the solvent. Foliage is cut back."

The fluids are packaged in spill-proof containers and shipped to one of two EPA-approved landfills — one in western Arkansas, the other in Alabama.

Merryman said that while LG&W does not consider the PCB-loaded transformers and capacitors a hazard, he said that if persons notice oil around either, they should not touch anything, but should notify LG&W.

"We'll know about it if a transformer breaks down, but we might not know very quickly when a capacitor goes out. If one explodes, LG&W should be notified immediately," he said.