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WHY PCB SPELLS DANGER

A chemical used in a wide range of electrical equipment could be a source of danger to thousands of people. Robert Schofield, Environmental Correspondent, in the first of a three-part investigation, looks at the threat posed by the chemical known as PCB, which is to be found in schools, hospitals, offices, factories and homes throughout the country and reveals widespread ignorance of the dangers.

Thousands of people are at risk from chemical timebombs standing in schools, hospitals, colleges, factories and offices throughout the country.

They are electrical transformers filled with a chemical called polychlorinated biphenyl or PCB - a poison and suspected carcinogen which is known to cause liver disease, bronchitis, skin disease and retard children's growth.

There are an estimated 20,000 PCB-filled transformers in Britain, each containing up to 300 gallons of the chemical.

Experts estimate that 90 per cent of these units are leaking now and several spills have already occurred including one in Leeds which could have killed all life in the River Aire.

Once released into the environment, PCB is there to stay. The natural processes which break down most chemicals rendering them harmless, leave PCB unaffected.

The only sure way of destroying it - and anything it contaminates, such as concrete, machinery or earth - is by burning at temperatures higher than 1.100 degrees centigrade.
The health threat is both immediate and long term.

If swallowed, inhaled or touched even relatively minor amounts can cause anything from death to debilitating chronic bronchitis, liver and nervous system disorders, acne-like eruptions of the skin, nausea, vomitting, headaches and changes of skin colour.

When widely dispersed by the action of wind, rainfall, the rivers and oceans, the threat from PCB becomes more insidious because the chemical is a cumulative poison.

Once inside the body it cannot be excreted and minute quantities - harmless in themselves - can build up in the liver and fatty tissue and cancers are suspected to form.

The total amount of PCB made in Britain since production began in the 1950s may never be known, but what is certain is that PCB in transformers is only the tip of the iceberg.

Massive quantities have been used in the manufacture of a huge range of products from washing machines and refrigerators to fluorescent lights and hairspray.

Alsmost all that has been made, if not still in the products, still survives because of PCB's resistance to destruction.

PCB in transformers remains the major problem because of the volume of the chemical in each one and the resulting risk from spills.

But the future threat may prove greater. Under average operating conditions, PCB is estimated to take about 30 years to eat through the welds and seals of a transformer.

In Britain, production of PCB-filled transformers peaked in the 1950s and 1960s so the likelihood is that major problems will occur in the course of this decade and the 1990s.

But isolated leaks are occurring now among older transformers or ones used in a corrosive atmosphere such as found in petro-chemical plants.

In a small number of cases these transformers have not merely leaked but exploded.

Mr. Fred Waddington, the head of GEC's Micanite division, which manufactures a non-toxic substitute for PCB,and one of the researchers who first identified PCB's corrosive nature explained:

"PCB transformers contain a small amount of a chemical scavenger, the job of which is to absorb impurities created by the action of electricity on the PCB.

"After a time, the scavenger is used up and the breakdown of the transformer fluid can continue unhindered."

One of the breakdown products is hydrogen chloride, which becomes hydrochloric acid on contact with water.

"Hydrochloric acid is very conductive and electricity from the core of the transformer will arc to the casing along the pathway created by the acid.

"This power arc builds up until hundreds of thousands of volts are arcing to the casing and the transformer blows its side out", he said.

Mr. Waddington knows of half a dozen cases where this had happened. "The only remedy is regular maintenance".

The advice given by Monsanto - the sole UK manufacturers of PCB - on transformer maintenance was "install and forget". Indeed one of the fluid's main selling points was that it was completly maintenance-free.

Another major selling point was PCB's resistance to fire. This feature led it to be used where fire hazard is greatest - places like schools, hospitals, mines, offices, factories and so on.

But PCB is not non-flammable, it is fire resistant. It does burn and when it does, gases possibly more dangerous than the liquid itself are given off, including dioxin.

Mr. David Bowers, managing director of R.F. Winder Ltd. of Leeds, one of the world's formemost specialists in dealing with PCB problems, is concerned by widespread ignorance of the range of hazards presented by PCB, especially among the emergency services.

"In our experience, the over-whelming majority of fire brigades, for example, are not aware of the hazards of PCB and, if presented with a spill, will simply flush it into the nearest drain," he said.

"When PCB leaked from a transformer in Leeds, if the site engineer had not read his manual and stopped the fire brigade flushing the PCB away, the entire River Aire downstream of the city would have been heavily polluted," he said.

"And very few of the organisations who own PCB units are aware of the danger. Many do not even know if they have PCB-filled equipment on their site," he added.

Specialist teams from R.F. Winder called in to examine transformers passed as sound by other inspectors almost invariably find at least one leak, sometimes as many as five.

"I would say that 90 percent of all PCB-filled units are leaking now," said Mr. Bowers.

"There is no doubt that the ignorance surrounding PCB means we could have a major disaster on our hands, it may only be a matter of time before we do," he said.

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In Japan in 1968, Kanechlor 400, a trade name for PCB, leaked into rice oil which was later used for cooking by some 15,000 people. Major symptoms reported in 1,000 patients studied by researchers were: liver and nervous system disorders; abnormalities in the reproductive organs; chronic bronchitis; impairment of the immune system; bone disease; gland disorders; growth retardation in children and severe skin eruptions.
PCB was also found to collect in the milk of nursing mothers to be passed on to their children. In the five years following the first outbreak, 22 of the 1,000 patients studied had died - 41 per cent of the deaths resulting from cancer.

In New York in 1976, the City's Department of Environmental Conservation closed the upper Hudson River to all fishing after fish there were found to have 70 times the "safe" level of PCB in their flesh. Consumers were advised to eat no more than half a pound of river fish a week.