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TOXICOLOGY
ENVIRONMENTAL SCIENCES
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August 29, 1975

Dr. George Roush, Jr.
Medical Director
Monsanto Company
800 North Lindbergh Boulevard
St. Louis, Missouri 63166

Dear George:

The enclosed article from the August 1975 issue of "Environment Midwest" which is a Region V publication of the EPA is of direct interest in the PCB issue.

The marked paragraphs present views which are in agreement with those we discussed at our last PCB meeting.

Very truly yours,

Joe

J. C. Calandra
President

JCC:AR

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Would be restricted to essential uses

Study group calls for "ban" on PCBs

By Francine Zeldman

Polychlorinated biphenyls (PCBs) — a mixture of compounds only slightly soluble in water and highly soluble in fats and oils. Used primarily as an insulating fluid in electrical and heat transfer equipment and in the manufacture of plastics. Highly toxic to aquatic and biological life. Highly resistant to heat and biological degradation. Biologically accumulative.

A report issued by the Lake Michigan Toxic Substances Committee (hereafter referred to as the Committee) has recommended a near-total ban on all domestic and imported polychlorinated biphenyls (PCBs).

The report, "Statement of Concerns of the Lake Michigan Toxic Substances Committee as Related to Polychlorinated Biphenyls," evolved from a meeting held at the U.S. Environmental Protection Agency offices in Chicago on May 22-23, 1975.

The Committee based its decision, in part, on the non-occurrence of results anticipated in a 1972 study conducted by the Interdepartmental Task Force on PCBs (hereafter referred to as the Task Force).

The Task Force felt that the use of PCBs should not be banned entirely. It was thought that their continued use in transformers and capacitors in the near future was necessary because of the significantly increased risk of fire and explosion and the disruption of electrical service which would result from a ban on PCB use.

The Task Force also believed that PCB use in those instances would present a minimal risk to the environment, and that the Monsanto Industrial Chemical Co.'s voluntary restriction of the distribution of PCBs to all except the manufacturers of the electrical equipment would bring a decrease in the amount of PCBs in the environment.

The Committee, composed of representatives from Indiana, Illinois, Michigan and Wisconsin; the National Oceanic and Atmospheric Administration; the U.S. Fish and Wildlife Service; and, the U.S. Environmental Protection Agency (Region V), feels that the Task Force drew the best conclusions it could based on the available information and technology in 1972.

"The decision to distribute PCBs for 'closed systems' use," according to the Committee, "was practical and it was anticipated that PCBs in the environment would decline."

The Committee, however, has not observed a decline in PCB residuals in Lake Michigan and its basin from 1971-75.

PCBs have remained at high levels in fish and industrial and municipal effluents in spite of programs to locate sources, eliminate discharges and recommend proper handling and disposal procedures for PCBs.

In addition, the foreign import of PCBs, and the impact of PCBs related to human health have added to the concerns of the Committee.

Here in the United States, PCBs have been manufactured by a single producer, the Monsanto Industrial Chemicals Co., which markets the PCBs under the tradename "Aroclor," but PCBs are also manufactured in Great Britain, France, Germany, the USSR, Spain, Italy and Czechoslovakia.

Committee Chairman Dr. Donald I. Mount



Central Regional Laboratory Photo

How Hazardous Are These Fish to Your Health?

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(Director, National Water Quality Control Laboratory, Duluth, Minn.), believes that "If you can't take it (PCBs) out, don't put any more in. That's about all that's left."

Background to the decision

Prior to 1966, the major concern surrounding the synthetic chemical had been limited to occupational exposures sustained by PCB workers, which brought on acne-like lesions caused by the chlorine.

In 1966, however, Swedish scientist Soren Jensen discovered PCBs in eagle tissue and PCBs thus became an envirnomental issue.

In 1968, approximately 1,000 people in Japan were affected when they consumed rice oil which had been contaminated by PCBs that leaked from a heat exchanger.

Typical symptoms brought on by the ingestion include the same type of acne-like lesions found in the PCB workers, vomiting, edema, jaundice, baldness, liver disturbances, increased skin pigmentation and visual impairment brought on by an abnormal eye discharge.

Reproductive effects included some cases of stillbirths, abortions and transplacental transfers. The infants that were born to exposed mothers were small, had brownish-gray skin and suffered from an abnormal eye discharge.

In 1973-74, Dr. James Allen and others conducted a PCB study on rhesus monkeys at the University of Wisconsin, using varying amounts of PCBs.

The monkeys also developed the acne lesions, edema and baldness, and, depending on the amount of PCBs ingested, sustained reproductive problems such as difficult or non-existent conceptions, stillbirths, abortions, reabsorptions and undersized infants.

Allen noted that the PCBs were not readily excreted and that infants born to mothers taken off PCBs three months prior to conception had relatively high levels of PCBs in their systems at birth.

Current data for 1974-75, according to the Committee, indicates that PCB concentrations in Lake Michigan coho salmon, lake trout and chubs exceed the U.S. Food and Drug Administration's (FDA) "temporary tolerance" level of five ppm (parts per million).

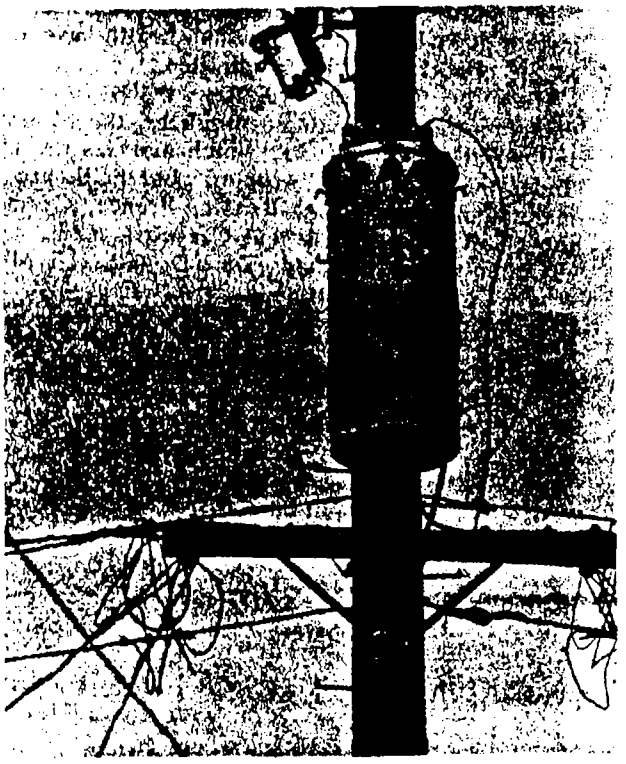
These concentrations have not decreased since 1972, although Monsanto has indicated that it has limited its sale of PCBs to manufacturers of sealed electrical equipment since 1971.

An analysis of the liver and brain of a dead herring gull taken from Grand Traverse Bay in 1973 indicated the presence of 2,600 ppm of Aroclor 1254.

On Jan. 30, 1974, Donald C. Healton, Regional Director of the U.S. FDA, indicated that the FDA was prepared to take legal action against all shipments of fish in interstate commerce which exceed the five ppm temporary tolerance.

The total value of commercial fishery (all species) in Lake Michigan was in excess of $6 million in 1974, and this total did not include sport fishing or the cost of capital equipment.

Although all species are not affected by PCBs, the potential exists for a significant portion of this fishery being curtailed. In view of recent restrictions and FDA actions with respect to the fishery, a large economic loss to the Lake Michigan sport and commercial fishery is imminent.



Environmental risks from PCB usage in transformers and capacitors were considered minimal

How Hazardous Are PCBs to your Health?

Section 406 of the Federal Food, Drug and Cosmetic Act established five ppm of PCBs as "temporary tolerances" that would help protect the public from PCB hazards in possible sources of future consumption.

It was to be understood, however, according to Healton, that these tolerances were not to be used as "guidelines" permitting the consumption of foods containing these amounts on a regular and consistent basis, and that the tolerances would be further lowered as experience indicated that lower levels could be attained.

PCBs: How do they get here from there?

According to the 1972 Task Force, "Given the diversity of uses of PCBs and their chemical characteristics, it is not surprising that the residue is widespread."

While the largest amount of PCBs circulating in the environment probably reach it through industrial and municipal discharges to inland and coastal waters, PCBs are also spread by:

- Open burning or incomplete incineration of municipal and industrial wastes. Incineration at 2,000 degrees Fahrenheit or above for two seconds

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will destroy PCBs, but poorly operated incinerators or open burning may result in PCBs being released to the atmosphere unchanged.

- Vaporization from paints, coatings, plastics, etc.
- Municipal and some industrial sewers (PCBs present in treated as well as untreated wastes.)
- Accidental spills or improper waste disposal practices.
- Dumping of sewage sludge, municipal and industrial solid waste and dredge spoil at sea.
- On-land sewage sludge disposal.
- Migration from surface coatings (paints, etc.) and packaging materials into foods and feeds.
- Direct application to the environment as ingredients of pesticides or as carriers for pesticides (now prohibited).

PCBs: Where are they now?

During the past 45 years, PCBs have been used in three broad types of applications:

- "Open-ended" — such as paints, specialty inks, paper coatings, plastics, etc.;
- "Nominally closed" — such as the working fluid in hydraulic or heat transfer systems; and,
- "Closed electrical system" — specifically, as the insulating fluid in certain kinds of transformers and capacitors.

What does this mean?

PCBs have been or may be used as filling agents or impregnants in transformers and power capacitors; hydraulic fluids, diffusion pump oil, plasticizers and in heat transfer applications.

When used as an adhesive, PCBs may be used as a laminating adhesive in the preparation of safety and acoustical glass; a laminate of ceramics and metals; an addition to washable wall coverings and upholstering materials; and, an additive to adhesive compositions used to manufacture envelopes.

In textile coatings, PCBs may be used as a coating for ironing board covers; a de-lustering agent for rayons; a treatment for polyamide (nylon-type) yarns — used as a flame proofer; and, an additive to sealing formulation to waterproof canvas.

As surface coatings, PCBs may be used as an additive in paints and varnishes; an additive to plastic bottles; and, an additive to epoxy resins for protective coating of metals.

When utilized as sealants, PCBs may be used as an additive in sealants for concrete and asphalt and as an additive in sealing and caulking compounds and in putties — yielding a non-hardening compound resistant to moisture and frost.

In the printing industry, PCBs may be used in carbonless carbon paper; as a coating in papers used in thermographic duplicating processes; as an additive in xerographic transfer processes; and, as a plasticizer in printing plates and flexographic plates.

Other sources or products that contain PCBs which have recently been identified by state agencies or the U.S. EPA include: waste paper destined for recycling, toilet soaps, primer paints, coloring compounds, degreasers, glass sealant, corrugated cardboard used in packaging and fluorescent light ballasts.

You can't eat any of those things.

You can eat meat, fish, poultry, milk and dairy products, eggs and infant and junior foods. According to Healton, all of them may contain PCBs.

Letter to the editor

I always read with interest your Region's *Environment Midwest* and obtain much useful information from that publication. Thanks for including me on your mailing list. Among the newsworthy items in the June, 1975, edition was an article on page 13 concerning a possible link between polyvinyl chloride and birth defects. While the potential birth defects would of course be tragedies, of equal importance is the possible mental attitude toward the cause-effect relationship which may develop in a situation such as this.

I realize this is a sensitive subject, but less than candid treatment could be tragic. With relation to this problem, I would like to refer your office to a situation concerning mercury poisoning and birth defects which occurred in Minamata, Japan. After having read the full report, painstakingly, and at great personal risk compiled by Eugene and Aileen Smith, the point is clear to me that anything less than a concerted effort by government and the responsible industries to adequately and openly evaluate similar situations would not display adequate concern for human health.

That report indicates that up to early 1975, the Japanese chemical company involved, having been found legally responsible for the deaths and birth defects, had paid out a total of 80 million dollars in indemnities. In the brief excerpt from the judgment published in that report, the Japanese judge held that even though a company meets government established regulations, it has a duty beyond that to make sure that its discharges are safe and do not cause the sort of injury to humans which resulted in Minamata. The judge then stated that anything less than that would be negligence, and on that basis held the company responsible.

The thing that concerns me is that the parties involved would do less than actively pursue the cause-effect relationships for reasons of self interest. As the Smith report pointed out, this approach ultimately was extremely expensive for the Japanese company. I am enclosing a copy of a magazine article which summarizes the Minamata report. I would encourage your staff to obtain the full report as an important study of attitudes related to pollution and responsibility. In the Minamata case, this evasive attitude led to tragic human consequences, and probably far greater costs to the company than proper early analysis and control would have incurred.

Very truly yours,
Robert M. Lindholm
Assistant Attorney General
State of Missouri

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