

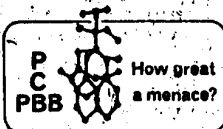
PCB, PBB feared as causes of cancer, defective births

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Monsanto
This is the final article in a series dealing with two related groups of chemicals — known as PCB's and PBB's — which have had a disastrous effect on Michigan fish populations and farm livestock in recent years, and the efforts of scientists worldwide to determine what threats they pose to humans.

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PCB's and PBB's — nearly identical sister chemical compounds which have contaminated Great Lakes game fish and thousands of Michigan cattle, respectively



— may be capable of causing cancer and birth defects.

But the possible public health consequences to Michigan residents who have picked up the chemicals through beef, dairy products and fish are so speculative that some experts feel excessive fear might prove to be more damaging than

the contaminants themselves.

More is not known today because government scientists — alarmed about PCB in 1970 — admit they mistakenly concluded the problem would go away.

But it got worse and was joined by PBB.

The evidence for PCB is based on two ominous but far-from-conclusive laboratory experiments.

In one, high doses of PCB — polychlorinated biphenyl — were fed to rats for 21 months. It produced 26 liver cancers in 184 test animals while another 146 had what were diagnosed as having precancerous liver changes.

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The second test involved feeding PCB to a special strain of bacteria which has been 90 percent accurate in spotting mutation-causing chemicals, most of which later test as cancer-causing in higher animals.

The bacterial test showed PCB to be "mildly carcinogenic" (cancer-causing). The Detroit News has learned.

Neither test is direct evidence that the same thing necessarily will happen in humans, who often do not develop cancer until one, two or even three decades after exposure to a chemical carcinogen.

The theoretical danger of PBB — polybrominated biphenyl — is a scientific educated guess based on its close similarity to PCB.

"It is reasonable to assume that, if PCB is carcinogenic, there is a good chance PBB may be as well, although this is still speculative," said Dr. Herman Craybill, an environmental cancer expert with the National Cancer Institute in Bethesda, Md.

But even if both compounds are proven to be cancer-causing in laboratory animals, there is some evidence to suggest that it might require such high doses that the real-world risk to Michigan residents is negligible.

On the other hand, the widely held "one-hit" theory of cancer contends that a single molecule of a carcinogen can damage a gene in a single cell and — under the right circumstances — set off a chain of events leading to full-blown cancer.

The more hits, the more cancer.

The Michigan Department of Public Health estimates that 10,000 to 12,000 people may have been directly exposed to PBB from contaminated farms, mainly in the western part of the state.

The Health Department has a still-secret study of PCB blood levels among Lake Michigan area fish eaters which found comparable levels of PCB to the PBB found in farm families. The News has learned.

PBB, a mixture of several different brominated biphenyls, is manufactured as a flame retardant by the Michigan Chemical Co. in St. Louis, Mich.

Three years ago, approximately 700 pounds of the poisonous chemical was mixed accidentally with livestock feed and sold to hundreds of farmers.

An estimated 32,000 cattle have been condemned because their fat tissue contained more than the three-tenths of one part per million PBB allowed under Food and Drug Administration standards.

The Michigan Department of Agriculture estimates that only about four tablespoons of the chemical remain in Michigan livestock herds.

However, an unknown amount of PBB-contaminated milk was sold throughout much of the state in diluted form before the chemical was identified.

The same spread is true with PCB, a mixture of chlorinated biphenyls manufactured in the United States by Monsanto for use in electrical transformers and similar

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But before Monsanto slapped restrictions on its chemical in 1970, it had broad application in such "open uses" as a plasticizer, in epoxy paints, printing inks, adhesives, cement coating, fluorescent fixtures, sealants and other products.

Environmental Protection Agency chief Russell Train estimates that 300 million pounds of PCB are still in use while another 400 million pounds have escaped into the environment since the chemical first was used in 1929.

There was no public health concern about PCB until 1968, when it accidentally contaminated a supply of rice oil in Yusho, Japan, killing five and poisoning 1,400 people who experienced such problems as severe acne-like skin eruptions, liver damage and some nerve damage.

Dr. David P. Rall, director of the National Institute of Environmental Health Science, recalled that the government called together an inter-agency panel of experts in 1970 to assess the PCB potential in the United States.

"The summary of that meeting indicated a number of clear needs," he said. "One was more concern with the reproductive effects. Two was more concern about

whether it was carcinogenic. There was a better understanding of its metabolism and persistence in the body (what new chemicals our liver converts it into and how long it lasts)."

The research done following up the 1970 report has been disturbing, government officials concede.

Dr. James Allee of the Wisconsin Regional Primate Center — supported by Rall's institute — fed low levels of PCB to rhesus monkeys and produced high rates of stillbirths.

Dr. Rosane Kimbrough at the Center for Disease Control did the work which spotted such a high level of cancer in the test rats.

Meanwhile, one possible explanation of the cancer caused by PCB in Dr. Kimbrough's experiment was advanced by Dr. Gary Flamm, the Cancer Institute's assistant director of cancer cause and prevention.

"Since we see significant levels of liver tumors often only at high concentrations of PCB," Dr. Flamm said, "it may be related more to the physical damage done to the animal livers than a direct action on the DNA."

If PCB and possibly PBB do cause cancer — but only after physical damage to the liver — it is good news for Michigan residents, the researchers said.

There is no firm evidence that even the high-exposure beef and fish eaters in the state have taken in enough of the two chemicals to do that kind of damage, says the Michigan Public Health Department.

Dr. Kimbrough, who linked PCB to cancer, currently is feeding PBB to rats to see what long-term poisoning effects may develop.

Also, the National Cancer Institute's Craybill said the institute has approved PBB for full-scale testing in lab animals and will begin long-term PBB feeding experiments in about two months.

Meanwhile, the FDA has thus far resisted beginning a formal evaluation of either its three-tenths of 1 part per million temporary guideline for PBB or its much stiffer 5 parts per million temporary standard for PCB.

And while PBB is getting the full treatment as a suspected carcinogen, the institute is not planning similar animal tests on PCB even though the preliminary evidence for cancer is stronger.

"We're not putting PCB out for this because of Dr. Kimbrough's work in Atlanta," Craybill said.

The type of research — which would lead to major policy changes if PCB was proven to be cancer causing — is not being done.

Even where it is being done — with PBB — it will take at least two years to get the results back, Craybill said.

The Michigan Legislature may not wait. Pending now is a bill which lowers the PBB safety standard from its present level of three-tenths of 1 part per million to 2 parts per billion — the lowest concentration scientists are able to detect.

Craybill is critical of trying to go that low. "If you tried to apply that severity of standard to everything which might cause cancer, you simply couldn't live," he said.

The scientist said even smelling the fragrance of pines in a forest, burning a wood log in the fireplace, or eating charcoal broiled steaks exposes people to traces of carcinogens.

Gov. Milliken, seeking outside advice on which way to go on upcoming legislation, has appointed a six-member panel of independent scientists.

The panel met in secret session for two days last month and again last Friday in Chicago.

The governor hopes to get their report in about two weeks.