PLYMOUTH, WIS.
REVIEW
TP 8 20D

AUG 8 1978

A little of that PCB family goes a long way

ACE ONE

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For several months now, area newspapers and radio and television stations have been explaining that the fish in the M mile stretch of the Sheboygan river and several tributaries are unsafe to eat.

Their bodies are contaminated with a substance called PCB, a toxic chemical which could be harmful to the human system if digested.

But what exactly are these PCBs and what is a safe level that can be absorbed by the human body with no harmful effects?

PCBs, or polychlorinated biphenyls is a name given to a group of 209 chemical compounds, all having the same general characteristics.

But not all PCBs are the same and some are more harmful than others. Some last longer in the environment, while others can show symptoms sooner.

They are highly stable, nonflammable, resistant to heat, acids and bases, and therefore, they had many industrial uses.

They were used in dielectric fluids in transformers and capacitors, electrical wiring insulation, plasticizers and hydraulic fluids.

Other uses were for lubricants, sealants, moulding waxes, epoxy paints and carbonless paper, which was the major PCB pollution source in the Fox river.

While they work well for industrial uses, they proved harmful to humans. And because of their long life, pose a threat to future generations.

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The problems associated with PCBs first were discovered in a Japanese village called Fukuoka Ken in 1968 when about 1,000 people received a skin disease after being exposed to PCB contaminated rice oil.

Later testing in animals showed that death could be a result of high exposure. Other effects were liver tumors, loss of hair and reproductive disorders resulting in still births, aborted pregnancies or birth defects.

The sole manufacturer of PCBs, Monsanto Company in St. Louis, began to restrict its sales in the early 70s and later stopped manufacturing entirely.

The US food and drug administration (FDA) studied the situation and, based on the information available in 1973, set five parts per million (ppm) as the tolerant level of PCBs in fish.

The tolerant level is not the same as the safe level, and FDA officials are quick to point that out. It is that level that is adequate for the protection of public health, the FDA believes.

There may be other levels that are safe, but in 1973 the FDA thought that the human body could tolerate five ppm of PCB in fish.

No fish having larger amounts can be sold.

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Now, after more research, the FDA has changed its stand on that and found that PCBs may be more toxic than originally thought.

It has proposed that the tolerant level be tightened to only two ppm, based on the data compiled since 1973.

That proposal might be acted on as early as this year, once comments from concerned parties are analyzed.

Fish tested in the Sheboygan river between Sheboygan Falls and Kohler had PCB levels more than 180 times higher than the tolerated level proposed by the FDA.

That is the main reason there has been such an urgency in cleaning up the source of the contamination at the Diecast Division of Tecumseh Products Co. in Sheboygan Falls, DNR officials say.

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Studying the PCB situation can be a complex and confusing adventure, since there are about 209 different compounds each having somewhat different characteristics.

Generally, PCBs vary from having

Please turn to P. 9

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A little PCB goes a long way

Continued from P. 1 A

between one and nine chlorine atoms, Stan Kleinert, Wisconsin DNR director of surveillance, said.

The lower chlorinated forms are more toxic immediately, while the higher chlorinated forms have a longer life, he said.

But most PCBs are sold in a mixture, and it's difficult to determine what chlorinated PCB was originally used, Kleinert said.

The Sheboygan river variety was probably Aroclor 1242, a brand name given by Monsanto, Kleinert said.

The last two digits in the number show the percent of chlorine in the PCBs. Thus Aroclor 1242 had 42% chlorine.

The highest percentage, other than the solid PCB which was used sparingly, is Aroclor 1254 or 54% chlorine.

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A PCB compound with 42% chlorine will cause a more acute reaction in people being exposed, while the 54% compound will last longer in the environment.

The higher chlorinated compounds pose the greater problem because of their longer life, Elizabeth Campbell, FDA consumer safety officer, said.

Kleinert said the lower chlorinated compounds usually weather and disappear from the environment, Stan Kleinert, DNR chief of the surveillance section, said.

Fish tested often show only the higher chlorinated forms, Kleinert added.

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Not everyone agrees that PCB is the lone culprit in posing a threat to public safety, however.

Some researchers claim that dibenzo furan, an extremely toxic chemical, poses the real health threat, Kleinert said.

Dibenzo furan is present in minute parts in manufactured PCB, but has not been found in fish.

Campbell said the FDA testing equipment is not sophisticated enough to detect the dibenzo furan in fish.

Since the PCB is only present in parts per million in fish, the dibenzo furan may be in parts per trillion, too small to test.

Kleinert said that even a small trace of dibenzo furan may be harmful to humans.

"It's a heck of a controversial area," he added.

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Kleinert also said that not all the data points to PCBs being as harmful as suspected.

A test by the Michigan department of health found no difference between people exposed to PCBs and those that weren't, Kleinert said.

The tests involved people in Traverse City, MI. who eat much fish, and a control group who did not.

"The test was unable to show any difference between the two groups," Kleinert said. "Except that those that ate PCB fish had PCBs in their blood."

And what effect that will have on future generations is still unkown.