DEPARTMENT of the INTERIOR

FISH AND WILDLIFE SERVICE

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CHEMICAL BY-PRODUCT OF PCB'S FOUND IN U.S. FISH FOR FIRST TIME

Little-known contaminants called polychlorinated dibenzofurans (PCDF's) have been detected in fish from U.S. waters for the first time, an international team of scientists report in papers scheduled for presentation September 11.

PCDF's are chemical by-products of widespread, toxic industrial chemicals known as polychlorinated biphenyls (PCB's). They were detected by Dr. David Stalling of the U.S. Fish and Wildlife Service's National Fisheries Research Laboratory in Columbia, Missouri, and Dr. Ralph Dougherty of Florida State University, Tallahassee. Dr. Christopher Rappe of the University of Umea, Sweden, and Dr. Douglas Kuehl of the Environmental Protection Agency are also collaborating in the investigation.

Although the occurrence of PCDF's in the aquatic environment in the United States has been suspected previously, this is the first time it has been confirmed. PCDF's were detected in carp, catfish, lake trout, and coho salmon collected in areas of the North Central and Northeastern United States where PCB pollution historically has been a problem. The detection was possible now only through the scientists' use of sophisticated new techniques of negative-ion high resolution mass spectrometry.

Drs. Stalling and Rappe emphasized that they are not yet certain whether the contaminants in their samples are hazardous to fish or other aquatic organisms. Some PCDF compounds are considered far more toxic

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than the parent PCB's--a few up to 500 times more toxic than the most potent PCB's. Studies at the National Institutes of Environmental Health Sciences and several universities have shown certain PCDF's to be highly toxic to guinea pigs and rats.

"There are 135 possible PCDF compounds," Dr. Stalling said. "We have not yet identified the individual chemical structures of the PCDF's in our samples, so we cannot be sure which of the 135 are present or whether they might have toxic effects."

The extent of PCDF's presence in the environment is not known. It is known, however, that the parent PCB compounds have been used in a wide variety of industrial equipment and products over the past 50 years. Use of PCB's is now tightly controlled by the Environmental Protection Agency through the Toxic Substances Control Act of 1976.

PCDF's are known to be produced by oxidation of PCB's and thus can be formed when materials containing PCB's are burned, especially at low temperatures.

"We know that very high temperature burning, if done for long enough, will completely destroy PCB's," Dr. Stalling said. "However, Dr. Rappe has demonstrated that low temperature combustion in the 400° to 600° C range can convert 25 percent of PCB's to PCDF's."

Stalling and Rappe are currently working to identify the chemical structures of the PCDF's in their samples. "Once specific PCDF's in fish are identified," Stalling said, "laboratory scientists will have a better idea how they are formed and which structures should be tested for possible toxic effects in fish and other aquatic organisms."

EDITORS: The scientists will be presenting formal papers on their research at a symposium on Environmental Health Chemistry sponsored by the American Chemical Society, to be held September 9-14 in Washington, D.C. A press conference is scheduled. For details, contact the American Chemical Society in Washington, D.C., 202/872-4450.

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