SUMMARY OF THE MICHIGAN WATER RESOURCES COMMISSION PCB MONITORING EFFORTS

The Michigan Water Resources Commission began monitoring for polychlorinated biphenyls (PCB's) early in 1971. Investigations were first aimed at determining the extent of contaminated waters throughout the state and at isolating the problem areas. Samples were obtained from all major tributaries to the Great Lakes on a seasonal basis, from 36 interstate water intakes, and from a small number of groundwater sources. The emphasis was then switched toward identification of point sources of contamination. This has involved sampling of representative sanitary and industrial landfills, all major municipal wastewater treatment plant discharges, and discharges from a cross section of industries believed to be potential sources of PCB losses.

A special intensive study has been conducted on the Saginaw River, the stream where the highest levels were detected in the tributary sampling phase of the program.

Search for Problem Areas

Great Lakes Tributary Water Samples

During 1971, 98 water samples (mostly 30-hour composites) from 30 major tributaries to the Great lakes were analyzed for PCB concentrations. The results indicate that PCB contamination of surface waters is widespread throughout the state with 71 percent of all samples having detectable (greater than 10 ppt) concentrations. In only 7 streams, however, have concentrations been detected at greater than 100 ppt, the level which is being considered as an environmental water quality standard (Fetterolf, Personal Communication): Black River (Port Huron), Flint River, Tittabawassee River, Saginaw River, Clinton River, River Rouge, and River Raisin. All of these streams are located in the southeastern portion of the Lower Peninsula. The Saginaw River has consistently had the highest concentrations with as much as 2,900 ppt on one date.

Great Lakes Water Intakes

Analyses of 36 Great Lakes water intakes in 1971 indicate lower PCB concentrations in the Great Lakes and connecting waters than in tributary streams. Only 3 of the 36 samples contained detectable concentrations (greater than 10 ppt). The highest value detected was 301 ppt at the Escanaba water intake. Since no drinking water standard for PCB's has been established, we requested information from EPA on what they would consider hazardous levels of PCB's in drinking water supplies. It is probable that a standard will be set for PCB's in drinking water supplies similar to the limits established for DDT since these compounds are closely related chemically and in biological activity. The drinking water standard for DDT is 42000 ppt, much higher than the concentrations detected at any of the water intakes. As a further check, however, those water intakes where PCB's were found present have been scheduled for

resampling in the immediate future.

Groundwater Sampling

Limited sampling of groundwater drinking supplies in the southern Lower Peninsula has indicated that groundwater has not been significantly contaminated with PCB's. One of the 4 samples tested contained 19 ppt while the other 3 were less than 10 ppt.

Search for Point Sources

Sanitary and Industrial Landfills

Analyses of surface water runoff from sanitary and industrial landfills in Michigan suggest that these are a minor source of environmental contamination. Five of the 9 samples collected had PCB concentrations ranging from 40 to 300 ppt while the others contained less than 10 ppt.

Municipal Wastewater Treatment Plants

Discharges from municipal wastewater treatment facilities appear to be a very significant source of PCB losses to the waters of the state. Twenty-eight of 32 WWTP discharges sampled contained greater than 100 ppt PCB's. Eight of those had concentrations in excess of 1,000 ppt:

WWTP	Date	PCB's (ppt)
Kalamazoo	10- 5-71	1,300
Flint	10- 5-71	1,300
Saginaw	10- 6-71	1,100
Detroit	10-14-71	3,600
Benton Harbor	10-20-71	1,000
Bay City	11- 4-71	336,000
	11-22-71	175,000
	11-23-71	60,000
Portage	11-15-71	1,900
Mount Clemens	11-15-71	1,400

Those municipal wastewater treatment plants sampled include the majority of all plants in Michigan serving populations greater than 20,000. The Bay City discharge contained by far the highest PCB concentrations. By sampling at key points along the Bay City sewer interceptors, we have defined the local area in the city where the major PCB input to the city system originates. Subsequent samples have been obtained (analyses not yet available) which should pinpoint the major source or sources.

Detroit WWTP discharge had the second highest PCB concentration of any of the municipal treatment plants. Plans have been initiated with Detroit City officials to begin a systematic sampling program of interceptors within the city system in order to isolate significant points of input.

Industrial Discharge Sampling

Discharges from a cross-section of industries throughout Michigan were sampled for PCB concentrations. PCB losses from industries is apparently very widespread. Thirty of 58 industrial discharges tested had PCB concentrations greater than 100 ppt. Eleven industries had discharges containing PCB's in excess of 1,000 ppt:

	PCB's (ppt)
Buick Motors, Flint	6,600
Bohn Alumnimum & Brass, Holland	8,100
Amway Corporation, Ada	2,300
Chevrolet Saginaw Nodular Casting	1,200
Dow Chemical TCC Plant, Bay City*	1,200
Dow Chemical Bay Refinery, Bay City*	2,300
Dow Chemical Petroleum Division, Bay City*	2,100
Consolidated Packaging Corporation, Monroe	3,200
Fletcher Paper Company, Alpena	2,600
Port Huron Paper Company, Port Huron	3,900
Chevrolet Parts Plant, Bay City	120,000

* Water intakes for these plants have at one time had concentrations as high as the value shown for the discharge.

Letters requesting immediate inventories of PCB usage have been sent to all industries found to have more than 1,000 ppt in their discharge. All of the above industries have responded to our request either verbally or in writing. Only three knew of any PCB use in any of their process and these will soon have replaced hydraulic fluids containing high concentrations of PCB's. Most of the industries, who were not aware of any use of PCB's in their plants, have initiated questionnaire surveys of all their suppliers.

Saginaw River Survey

Because the Saginaw River was identified as having the highest PCB concentrations of any major tributary to the Great Lakes within Michigan, an intensive survey effort has been conducted to isolate the major sources of PCB contamination in that basin. Water samples collected at key locations ranging from each of the four major tributaries of the Saginaw down to the mouth of the river indicated that the primary increase in PCB concentrations occurs in a short zone in the immediate vicinity of Bay City and Essexville. More intensive sampling in that zone revealed two major sources of PCB losses to the river:

1. Bay City Wastewater Treatment Plant
2. Chevrolet Parts Division of General Motors

Actions taken in regard to these two sources have been mentioned earli this report.

Monitoring Plans for the Future

The Bureau of Water Management will continue to sample industrial dis throughout the state in the search for additional sources of PCB cont We will do follow-up studies on municipal wastewater treatment plants significant levels of PCB's have been detected. Studies on the Bay C Detroit systems have already been initiated. As has been done with t Saginaw River, more intensive surveys will be conducted on the strea where high concentrations of PCB's have been detected during the tri sampling phase of the program.

Prepared by: John L. Hesse
Aquatic Biologist
Water Quality Control Division
Water Resources Commission
Bureau of Water Management
Lansing, Michigan

JLH/mf
12/15/71