Tucker Dep. Exhibit 22

The handwritten notes and underlining in this exhibit were made by OMC's counsel.

For a clean copy of the exhibit, see the produced documents.

(M2)

M2-17

4/70

Analytical Chemistry
Special Study 70-11
Job No. 1630346

DETERMINATION OF PCB RESIDUES IN FISH FROM LAKE MICHIGAN

INTRODUCTION

Upon ammendment of the WARF Institue Lake Michigan pesticide investigation to include analysis of selected samples for apparent polychlorinated biphenyls (PCB's), Monsanto as an industrial sponsor agreed to carry out collaborative analysis of a limited number of selected samples for PCB's. The results of our analysis of sample extracts supplied by WARF are reported.

SUMMARY

~~Four fish extracts and one human biopsy extract~~ were analyzed by EC/GC and GC/mass techniques. The presence of all chlorinated hydrocarbons as reported by WARF in two of the samples were confirmed with the exception of BHC which was not analyzed for. Additionally a sample (#9070652) contained lower levels of two unidentified chlorinated compounds observed by GC/mass. PCB's typical of Aroclor 1254 were found in all of the above samples.

MONSANTO COMPANY
Organic Chemicals Division
Applied Sciences Section
St. Louis, Missouri

4-70 - E. S. Tucker, J. Litschgi, R. E. Keller

DEFENDANT'S EXHIBIT
22 for ID
MBR 4/15/82

HARTOLDMON0013189

NRF number lb.	Sample Type & Location	Sample Wt (g)	ppm DDE Wet	ppm DDE Moist	ppm DDD Wet	ppm DDD Moist	ppm DDT Wet	ppm DDT Moist	ppm Dieldrin Wet	ppm Dieldrin Moist	ppm PCB Wet	ppm PCB Moist	ppm PCB Calculated Wet	ppm PCB Calculated Moist	PCB GC Confirm
070876	Liver Hepatic Fish Extracts Manistee R., Mich., Sample Point No. 52	12.0	2.90	2.54	1.17	—*	1.31	—*	0.13	0.08	0.034	—**	4.37	2.31	?
070770	Newife, Perch Extracts Burns Ditch, L. Mich., Sample Point No. 37	12.0	1.56	1.28	1.64	—*	0.13	—*	0.14	0.16	0.030	—**	2.33	2.73	+
070652	Chub Extracts Manitowoc R., Wis, Sample Point No. 18	12.0	2.34	3.46	0.52	—*	1.31	—*	0.17	0.34	0.021	—**	0.87	1.56	+
070639	Chub Extracts Kewaunee R., Sample Point No. 15	12.0	2.08	3.05	0.35	—*	1.07	—*	0.12	0.17	0.021	—**	1.35	0.75	?
3120924	Human biopsy Fat Extracts	0.13	293	548	<0.01	—*	0.21	—*	0.21	—***	0.31	—**	10.1	7.69	+

* Observed by EC/GC Not Analyzed For.
** Not Analyzed For
*** 2nd Edition not sent

TLCC TABLE I

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HARTOLDMON0013190

TABLE II Relative Gas Chromatographic Retention Times, R_x (DDE = 1.21)

Aroclor 248	Aroclor 1254	Aroclor 1260	# 9070 876 1st Elution	# 9070 876 2nd Elution	9070 770	# 9070 770 2nd Elution	9070 652 1st Elution	#9070 652 2nd Elution	9070 639 1st Elution	#9070 639 2nd Elution	9120 924
0.21	0.43	0.69	0.27	~~0.79~~ 1.21*	0.27	1.21*	0.27	0.79	0.27	0.78	0.26
0.27	0.52	0.75	0.35		0.35		0.35	1.21*	0.35	0.98	0.34
0.31	0.54	1.00	0.43		0.43		0.43		0.43	1.06	0.42
0.32	0.60	1.12	0.53		0.53		0.53		0.53	1.21*	0.49
0.35	0.66	1.29	0.54		0.55		0.54		0.56		0.52
0.40	0.70	1.51	0.60		0.61		0.62		0.62		0.55
0.41	0.79	1.66	0.68		0.68		0.68		0.69		0.62
0.52	0.85	1.72	0.72		0.71		0.71		0.72		0.67
0.54	0.94	1.93	0.82		0.81		0.81		0.82		0.71
0.60	1.03	2.13	0.88		0.89		0.88		0.88		0.82
0.68	1.19	2.22	1.00		1.00		1.00		1.00		1.00
0.72	1.41	2.43	1.12		1.14		1.12		1.13		1.12
0.82	1.60	2.66	1.22		1.24		1.24		1.24		1.14
0.87	2.03	3.00	1.31		1.48		1.32		1.34		1.23
0.94	2.18	3.54	1.46		1.53		1.46		1.47		1.45
1.04	2.51	4.31	1.50		1.64		1.65		1.66		1.66
1.21	3.34	5.50	1.63		2.24		2.26		2.26		2.26
1.59			2.25		2.48		2.46		2.47		2.65
			2.46								

*Dieldrin

FM-402 Biomedical G.C./Ni^{63} ECD
6mm x 6' Glass Column, 4% XE-60 on 80/100 mesh Chromosorb W, HP, AW-DMC
Inj. Port – 205°C Column – 195°C Detector – 300°C

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II GC/Mass Results

Sample No 9070876 — Sample lost due to punctured septum.

Sample No. 9070770 — tetra- and penta-chlorobiphenyl homologs detected.

Sample No. 9070652 — DDE, tri-, tetra, penta and hexa-chlorobiphenyl homologs detected.
Two un-identified chlorinated hydrocarbons with molecular weights of 370 and 404 respectively and 7 and 8 chlorines per molecule detected.

Sample No. 9070639 — Ion beam of mass spectrometer de-focused during GC/Mass run the large amount of extraneous material present in the sample extract.

Sample No. 9120924 — Amount of chlorinated hydrocarbons below the present detection capabilities of our GC/Mass system.

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