FUNCTIONAL FLUIDS

AROCLOR TOXICITY

JANUARY - APRIL

1970

HS.B.

MONS 098438

From the desk of
HOWARD S. BERGEN, JR.

3/4/70

→ 1/ John Mason
2/ H.S. Bergen

FYI

I doubt if this will cause much of a problem.

HS

MONS 098439

CONFIDENTIAL

REPORT ON TELEPHONE CONVERSATION WITH C. CAPPS, WIGGINS-TEAPE, April 28TH, 1970

cc.: JW Barrett, London
HS Bergen, St. Louis
HN Dahlström, Brussels
K Fletcher, London
BT Garland, London
JC Garrels, London
F Macdonald, Newport
HR Newman, Newport
RA Onians, Brussels
WB Papageorge, St. Louis
RE Soden, Brussels
JE Springgate, St. Louis
KA Summerside, London
RG Veldeman, London
HA Vodden, Ruabon
EP Wheeler, St. Louis

I spoke with Capps to get his summary of their meeting at the Ministry of Technology on the 24th April. Dr. Rance (Wiggins-Teape Technical Director) and Capps met Mr. Rampton, Deputy Secretary, and one of his Assistants, Mr. Charlish. Capps felt the meeting was reasonably successful and that Rampton will have to react since it was pointed out that NCR paper is the largest export earner of the entire UK paper industry. The objective was to inform the Ministry openly and frankly, and to appeal for a rational approach to a problem that should be kept in perspective.

The only reference to Monsanto was as the PCB supplier. Wiggins-Teape voiced their concern about the likelihood of publication of Bailey's finding and this provoked sympathy but little positive response (Bailey's name was not mentioned but his laboratory was identified). However, when considering the hypothetical situation of a possible ban on NCR paper imports by another country, the Ministry expressed a willingness to help.

The Ministry approved of the steps already taken by Wiggins-Teape to improve the situation. These were stated to be:-

1. Tighter housekeeping at the Treforest mill,
2. Control over sales of Treforest broke - these have now been stopped,
3. Decision made to switch from Aroclor to an alternative solvent.

Rampton endorsed all these moves, and states he expected the climate over environmental pollution by chemicals would continue to worsen from the manufacturers/users standpoint.

MONS 098440

- cont'd -

Timing of the switch from Aroclor was mentioned and Wiggins-Teape again made the point that it would be a pity if unfavorable publicity was to occur while the change was in progress. The Ministry reaction was again sympathetic.

Capps feels they have now established good lines of communication that they would be able to use effectively in the event of any unforeseen crisis developing. He will be in Japan for the next two weeks and if we need to talk to Wiggins-Teape on this subject while he is away, the contact should be AE Burroughs at Gateway House.

Finally, Dr. Lister (Arthur D. Little, Edinburgh) has visited the Tolworth laboratory and his information indicates Bailey intends publishing a note on his findings in "Chemistry in Industry".

DS Cameron

Brussels,
April 29, 1970
DSC/ls

From the desk of

HOWARD S. ERGEN, JR. 4/70

→ 1. ~~Don Olson~~

2. ~~[illegible]~~

~~3. Bill Papageorge~~

3. ~~H S Bergen~~

→ MS

Arvidor Toxicity P/

MONS 098442

April 28, 1970

Hon. William F. Ryan
House of Representatives
Washington, D. C.

Dear Congressman Ryan:

Mr. Book has asked me to respond to your letter of April 9 concerning PCB's. Please accept my sincere apoligies for the delay in responding.

Mr. Sam Pickard and myself are extremely grateful for the opportunity of meeting with you to discuss this matter and I hope that we were able to convey to you Monsanto Company's deep concern about the environment and responsible actions we are taking towards pollution abatement.

I can assure you that our commitment to pollution abatement has not been generated by recent public interest in this subject. Our record shows we have always attempted to conduct our operations in a manner consistent with the best interest of the public. We implemented positive pollution control programs long before the word ecology became fashionable.

In view of our activity in total pollution control programs and the special measures we have taken and are continuing to take to regulate PCB, we feel any accusation or implication of irresponsible action by Monsanto is unjustified.

As you know, only recently tremendous strides in science and technology have perfected analytical techniques which make it possible to detect and measure extremely minute quantities of an item in other substances. Our own scientists have made a significant contribution in these developments and we are constantly working to utilize these techniques to further the degree of control exercised by our plants and those of our customers. Monsanto Company fully recognizes its responsibility and will continue to develop and produce products which contribute to the public well being, but at the same time we

will take every precaution to protect the environment in which we all live.

We have been investigating the relationship of PCB to the environment since 1968. We can only assume that the other manufacturers of PCB materials are doing likewise. We have contacted scientists and agencies around the world. Most recently, we attended a U. S. Department of the Interior meeting where some 40 scientists from throughout the country gathered to exchange information on PCB's and recommend actions. On April 29, we are participating in a meeting of the Office of Science and Technology of the Executive Office of the President to discuss the toxicity of PCB's. When we first became aware of the possible threat to the environment by PCB, our immediate action was to cooperate fully with scientists and government agencies to properly identify and measure PCB in the environment. Since then, we have taken other major steps directed toward strictly monitoring the manufacture, use and disposal of PCB-containing products which could possibly build up in the ecological system.

It should be emphasized that the apparent PCB problem relates only to the possible effects on some species of birds. Manufacturing and use experience for thirty years, earlier animal toxicity studies, and the interim reports on current extensive toxicological studies with various species of animals indicate that there is no threat to the public health.

You will recall that during our meeting with you we discussed the very important distinction between various Aroclor® products and the fact that not all Aroclors® are PCB's. Scientific evidence indicates that only the higher chlorinated biphenyls--those containing more than 54 percent chlorine--are being found in the environment. These materials appear to be presenting a possible threat to certain species of birds. As we also discussed, Monsanto manufactures several products under the trade name Aroclor® which are not polychlorinated biphenyls and which pose no threat to the environment.

References to the toxicity of the Aroclors® made in your press release were of course extracted from our safety instructions directed towards the protection of the health and safety of workers using large quantities of these materials in industrial processes, often at elevated temperatures. As you will appreciate, there are many chemicals which require careful handling during processing operations, and such instructions and definitions of possible hazards are standard practice in the chemical and allied industries. When used in other products the Aroclors® are usually present in only very small quantities or when used

alone they are normally in closed systems and consequently represent no hazard to human health. It is therefore incorrect to assume that the PCB's presently being found in the environment in parts per billion or parts per million represent a health hazard to the public.

In my opinion, to release a complete list of uses for Aroclor®, names of products and manufacturers, as you suggest, would only cause undue alarm to the public and would make no contributions in this area.

We have repeatedly stressed the major markets for PCB-containing products are in electrical applications, where the fluid is sealed into an electrical component, and in closed system heat-transfer usages. In the early stages of market development for the Aroclors®, we recommended many usages for these products based on their chemical properties. Not all of these proposed applications proved satisfactory, however. In addition, we have become much more selective in recommending usages for those products bearing in mind the additional information now available to us due to the recent developments in analytical techniques and technology.

Recently it came to our attention that PCB was being used as an inert carrier by two small insecticide formulators. We have notified our distributors to discontinue all sales of our products for this usage and we have also requested the U. S. Department of Agriculture to refuse to register any insecticide formulation containing PCB as a component.

In a related action, we have already alerted our customers to the possible environmental problem and are assisting them in switching from PCB-containing compounds to other Monsanto products in applications where we believe that the chemical could be a threat to the environment.

With regard to our manufacturing operations, we have stated clearly our total commitment to pollution abatement. Production of polychlorinated biphenyls came under even stricter scrutiny when it appeared as a possible environmental hazard. We have improved production techniques and are continually upgrading pollution abatement devices in our plants. In the very near future all of our PCB-containing products will carry a new shipping label stressing the possible environmental hazard.

Finally, Congressman Ryan, I am sure you are aware that Monsanto's production and sales figures are confidential information, as they are in most companies. We are ready to cooperate fully

with you or any responsible government agency when we receive assurance that these figures will be kept confidential.

I hope you will consider this letter a responsive reply to your questions. In my opinion, Monsanto Company is taking a responsible position and is using corrective action in dealing with the PCB situation.

Sincerely,

John Mason
Assistant General Manager

JM/gd

bcc: Messrs. E. J. Bock
J. R. Eck
E. V. John
W. B. Papageorge
P. S. Park
S. Pickard
E. J. Putzell, Jr.
F. C. Rehfeld
E. P. Wheeler
H. S. Bergen
J. E. Springgate

FUNCTIONAL FLUIDS

April, 1970

ENVIRONMENTAL AROCLOR PROJECT

It appears that disposal of PCB's can be accomplished successfully by thermal oxidation. This conclusion was made after analysis of gas samples from John Zink Company. They were analyzed for PCB, chloride, chlorine, and total organic chlorine. Data were sent to CED and a report is being issued. Additionally, heats of combustion of the PCB's were estimated for CED evaluations.

Water and sediment samples from 6 Pydraul customers were analyzed for PCB's. It is concluded that PCB's are finding their way to sewers, streams and lakes inasmuch as amounts ranging from low ppb to high ppm were determined.

EC/GC determinations for PCB's showed low levels of materials in muriatic acid from Monsanto's central drumming facility. These contaminants appear to be lower chlorinated biphenyls. Confirmation studies are underway.

Paint scrapings from silos and raw milk extracts showed presence of PCB by GC/Mass and EC/GC analysis. The paint scrapings contained 2.87% Aroclor 1254. The raw milk contained an estimated 0.6-0.7 ppm PCB, probably originally Aroclor 1254 but with an altered isomer distribution.

Analytical methods and data collected to date were discussed with Westinghouse in an informational meeting on the PCB problem.

A preliminary report on biodegradation of Aroclor was written. Tentatively, Aroclor 1221 degrades in river die-away experiments. Higher Aroclor products may not. More conclusive experiments are underway. A current study involves removal of certain fractions from Aroclor products which might be intractable to biodegradation. Electron-capture chromatograms suggest that most refractory materials can be separated by distillation.

We are continuing to assist the WGK Plant in monitoring bromine content of chlorine they use to make Aroclor products. Seven samples, collected in the past month, were shown by XRF to contain 250-400 ppm bromine.

We are preparing to determine the presence of dioxins in the presence of other chlorinated materials. GC studies show that octachlorodibenzo-p-dioxin can be determined but that the tetrachloro isomer will have interference from the components in Aroclor 1260.

A better method to determine percentages of various components in undistilled Aroclor is necessary. A suitable GC method appears to have been developed as a consequence of studies made on 60 distillation cuts from 4 Aroclor samples.

SKYDROL 500

MONS 098447

Flight tests are currently being performed on Skydrol 500C by various airlines. Only tests involving at least 80% Skydrol 500C will be

Monsanto

FROM (NAME & LOCATION): R. E. Keller - R&D Laboratories - South Second Street

DATE: April 28, 1970

SUBJECT: AROCLOR ANALYTICAL PROGRAM

REFERENCE:

TO : W. B. Papageorge
General Offices

cc R. E. Kelly - GO
E. P. Wheeler - GO
J. T. Garrett - GO
J. Mason - GO
C. W. Roos - Res. 1
T. M. Patrick - Res. 1
H. S. Bergen - GO
W. R. Richard - GO
J. E. Springgate - GO
M. W. Farrar - Res. 1
R. H. Munch - Res. 2
O. E. Thompson - GO

This memo will confirm recent action we have taken to speed up Aroclor analytical projects. Effective April 27, two teams will be working concurrently, backed up by a third team for mass characterization work and dioxin studies.

Team	Projects	Personnel
I	Environmental Residue Analyses Biological/Toxicity Studies Customer and Outside Service Waste Disposal Studies	Tucker* Litschgi Westenberger
II	Biodegradability Studies Product Composition	Emery* Saeger Kinast Gasser
III	Characterization Studies Regulatory Agency Work (Dioxin)	Dietrich* Mieure

Actions relative to the division objectives have been assigned to these teams as shown on the attached. New projects will be assigned when possible to the team responsible for that type of work. Communications should be made through the team coordinator denoted by an asterisk. Please copy me in on all communications.

R. E. Keller

db
Attachment

MONS 098448

IM-10 REV. 11-65

ANALYTICAL PROGRAM (4/70)

FOR

POLYCHLORINATED BIPHENYL ENVIRONMENTAL PROBLEM

The Applied Sciences program for the 3/31/70 Aroclor Environmental Management Plan is outlined by actions shown below. The projects indicated are supportive to the objectives given in the Management Plan. The actions represent work currently in hand. It is expected that this program will be revised continuously on a priority basis consistent with the changing needs of the Management Plan.

		Man Weeks	Target Date
Objective 1 -	Reduce and effectively control the PCB content of all effluent from Monsanto plants.		9/1/70
TEAM I Action 1)	Monitor WGK Mississippi River water, sediment and plant effluent for PCB.	8	
I 2)	Transfer GC methodology to WGK.	1	
I 3)	Determine PCB residues in fish from Choccolocco Creek at Anniston.	4	
		13	
Objective 2 -	Inform customers of the PCB problem and the importance of preventing environmental pollution both at their plants or by their products.		5/1/70

TEAM			Man Weeks	Target Date
	Objective 3 -	Develop products to replace Aroclors for those uses in which Aroclors have been demonstrated to be harmful to the environment and cannot be prevented from escaping into the environment.		12/1/70
II	Action 1)	Develop techniques needed for purity or composition measurements and for biodegradation studies of replacement candidates.	6	
		- More accurate method for isomers in distilled Aroclor 1130 and 1142.	2	
			8	
	Objective 4 -	Develop reliable analytical procedures for determining PCB content of liquids, gases, or solids.		7/1/70
I	Action 1)	Develop improved isolation and GC techniques for more specific and accurate measurement of PCB's.	4+	

TEAM			Man Weeks	Target Date
I	Action 2)	Develop and issue method for PCB's in air.	3	
II	3)	Produce PCB reference materials by preparative gas chromatography.	6	
II	4)	Show if there is Aroclor product composition change over 40 year manufacturing period.	1	
—	5)	Estimate analytical methodology and program needed for chlorined terphenyls - 5425 and 546D.	-	
			14	

Objective 5 - Develop methods for effective disposal of wastes containing PCB without contaminating the environment. — 10/1/70

I	Action 1)	Examine gas samples from John Zink Co. incineration study.	2

TEAM			Man Weeks	Target Date
H	Action 2)	Evaluate Vapo-Coupled sand and glass wool for absorption of PCB from water.	3	
H	3)	Set up biodegradability laboratory for semi-continuous activated sludge treatments.	2	
H	4)	Carry out biodegradability studies of Aroclor products per se, HB-40, monoisopropyl biphenyl and potential substitution products.	18	
			25	

Objective 6 - Develop methods for reclaiming and reusing off-grade fluids containing PCB. — 9/1/70

Objective 7 - Determine effects of PCB's on birds, aquatic life, animals and humans. — 6/71

			Man Weeks	Target Date
TEAM I	Action 1)	Correlate PCB residues in tissues with Bio-Test toxicity data -		
		- Rat, chicken and dog feeding studies.	30	
		- Fish studies.	8	
I	2)	Confirm type and amount of PCB in wildlife (fish and birds) from different geographical sources.	6	
			44	
	Objective 8 -	Establish and maintain favorable relationships with customers, the press, governmental agencies, the public and the universities.		Continuous
I	Action 1)	Appleton Paper Co. - PCB in scrubber solutions from air samples from NCR coating operations.	2	
I	2)	GMC Foundry, Bedford, Indiana - PCB in water settling ponds.	2	

			Man Weeks	Target Date
TEAM II	Action 3)	N. Johnson - Major Industrial Fluids Users (Johnson Motors, Wisconsin, Lester Casting) - Water samples for PCB levels discharged.	4	
I	4)	Wisconsin Alumni Research Foundation - PCB in Lake Michigan fish from Lake Michigan pesticide investigations.	1	
I	5)	Ohio FDA - PCB in milk from dairy herds.	1	
I	6)	Inorganic Division - PCB in detergents and components thereof.	5	
II	7)	Determine if commercial DDT, et al, contains trace PCB as contaminant.	3	
III	8)	Determine presence of dioxin and/or related toxic materials in PCB products.	2	
			20	
		4/1/70 Grand Total =	124	

124 X $600/Week = $74,400

R. E. Keller

db

MONS 098454