MINUTES OF MEETING OF THE CORPORATE MANAGEMENT COMMITTEE

April 20, 1970

Present: Messrs.
E. J. Bock, Chairman
H. H. Bible
J. R. Eck
J. L. Gillis
E. J. Putzell
C. H. Sommer
M. C. Throdahl
J. N. Ehlers, Secretary

EXHIBIT
Farrar 4
8-7-97 SR

2. Organic Division - Report on PCB Status - Messrs. H. L. Hinckler, J. Mason, C. J. Smith, W. B. Papageorge, H. S. Bergen, J. E. Springgate, R. E. Kelly, E. P. Wheeler.

Total Aroclor business represents $21M sales returning $10M gross profit on $13M gross investment.

- Sales of non-degradable Aroclor (1260, 1254 and possibly 1248 isotopes) account for $18M sales - $15M in functional fluids and $3M plasticizers.

- Aroclor 1221 is degradable and there is no evidence that solid Aroclors pose a threat to the environment.

Division has maintained an aggressive program of customer education, and cooperative efforts with research organizations, governmental agencies and wildfire groups to identify the scope of the problem, eliminate discharges, improve analytical methods and conduct toxicity studies.

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- Concerned agencies and groups are appreciative of our efforts.

- FDA indicated it was contemplating a residue level of 0.5 ppm in milk and 5.0 ppm in food.

Publicity about PCB's has been limited to a few articles in scientific publications and newspapers until Congressman Ryan's press conference implicating Monsanto and the products.

Program has been established to curtail discharges from our plants and levels have already been reduced significantly. We are targetted to reach 50 parts per billion by year end with an ultimate target of 10 parts per billion.

Sales are being terminated to a number of industrial users where there are inadequate possibilities of control, for such uses as pesticide extenders, medicinal, dental and cosmetic, and cutting oils. In addition, we are terminating all sales through distributors to ensure better control of end uses.

Action is already in hand to replace $5M of sales for Fluids applications and $3M of sales for Plasticizer applications by alternative products. Target for completion is end-1970.

- Substitute products are being developed to replace the non-degradable Aroclors.

Sales will be continued for transformers, capacitors and heat transfer uses which are closed systems or sealed units and which permit reclamation or other control of material.

- Transformers are dependent upon Aroclors for reliable operation and no substitute product is available.

Conclusions:

The Committee felt that while the division had taken major steps to resolve this problem, more affirmative action must be taken. A replacement product should be developed on a crash basis for the NCR application.

It was decided that the affirmative action being taken should be communicated to concerned governmental agencies together with the reasons for continuing sales to the limited uses which would involve major public hardships if immediately discontinued. Mr. Putzell was asked to discuss the legal implications of these actions with counsel for NCR and electric equipment manufacturers. Messrs. Eck, Putzell and Gillis are to recommend actions to demonstrate the affirmative program being taken. The division is to report its specific plans to the Committee by June 1.
(Excerpt to Messrs. Minckler, Smith, Kelly and Harris.)

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PRESENTATION OF THE PCB MANAGEMENT PLAN

TO CMC on 4/20/70.

On November 17, 1969 we discussed with you the PCB problem and outlined a program for coping with it.

* (Show transparency on pounds-dollars-return)

On this chart we have summarized the total worldwide business. Our concern is great because of the $21 M worldwide business involved with gross profits of $10 M on a net investment of approximately $9 M.

* (Show transparency on non-degradable Aroclors)

The next chart summarizes the business which now depends on the non-degradable (persistent) Aroclors. Solid Aroclors, which are not an environmental problem and Aroclor 1221 which has been demonstrated in our laboratories to respond to degradation, have been excluded.

In November, the decision was made to develop a plan to phase out the manufacture of Aroclor 1254 and 1260. Since then, as you well know, the pollution hysteria continues to grow and specifically in the area of PCB's the number of laboratories,

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both governmental and university, involved continues to increase as we predicted.

At this meeting, I wish to bring you up-to-date on the latest developments, the progress we have made, the need for modifying our strategy, and our new strategy.

Since November, the press has been relatively quiet except for the recent flurry following Congressman Ryan's Press Conference. Two publications have appeared which implicate PCB. The January-February, 1970 issue of Environment published in St. Louis carried an article by Dr. Robert Risebrough and Virginia Brodine. The presence of PCB in samples of human milk is first publicly reported in this article. An article by Dr. David Peakall of Cornell University appeared in the April issue of Scientific American. In this article, the effect of DDT and PCB on egg shell formation and reproduction is described, and emphasizes that the problem has been apparent since the introduction of

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DDT to the environment. Three newspaper articles were noted, one in the Miami Herald, another in the Tampa Tribune, and the third in the Ann Arbor News, again describing the effects of DDT and PCB on the environment. The Florida papers referred to the effect on shrimp of hydraulic fluid which was traced to our Pensacola plant.

In March, we held discussions with Dr's. Risebrough and Olcutt at Berkeley, California. They are personally convinced PCB's are harmful and were pleased that Monsanto was concerned and cooperative.

Also in March, we participated with about 50 technical representatives representing State, Federal and Canadian Water, Fish, Wildlife regulatory agencies in a very objective discussion in Duluth, Minnesota. Analytical techniques, monitoring of the environment and toxicity of PCB were discussed. Absolute identification of PCB and its effect on the environment were identified

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as requiring considerable research. Concern was expressed by many present that some agency such as the FDA would take precipitous action before adequate information could be gathered; which was believed by many to require at least one year. Monsanto's presence and offer to cooperate was appreciated.

About two weeks ago, we received word from a Dr. Hill, Ohio State Health Department, that his laboratory had found PCB's in milk from an area around Columbus, Ohio. They believed they traced the source of PCB to deteriorating coating applied to silos in 1967. This coating was formulated using Aroclor 1254. We requested samples which our laboratory could analyze and our analytical work has confirmed that chlorinated compounds similar to our Aroclor 1254 are present.

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During our discussions with Dr. Hill, we were told that the FDA was considering establishing a PCB limit of 0.2 ppm in food. In pursuing this further, Dr. Kelly was subsequently told by

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the FDA personnel that the FDA will, in a few weeks, advise their offices that PCB contents exceeding 0.5 ppm in milk and 5 ppm in food would subject the milk or food to confiscation.

In the U.K. we are, of course, also experiencing considerable concern. The Ministry of Agriculture, Fisheries and Food has repeatedly requested Monsanto to divulge the names of our major customers. From the U.S. point of view, we were reluctant to divulge this information because of possible adverse consequences worldwide. From the U.K. point of view, divulging the customer's name with assurances that it would be kept in confidence is considered the wiser approach in the long run. We are receiving permission from NCR to divulge their name and will approach the Ministry on a confidential basis.

In Europe, we have assumed worldwide leadership and contacted the representatives of the European producers. Initially, their response was indifferent. Subsequently, Bayer, Germany

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and Prodelac, France have become more concerned, have initiated programs of their own, and are cooperating with information exchange. The Italian producer does not believe he has a problem. MMK, Japan, has been fully informed of our progress.

During our meeting with General Electric representatives in late January, we discussed our decision to discontinue the manufacture of Aroclor 1254 and 1260. GE immediately challenged the decision on the basis that information available was not adequate to incriminate these Aroclors for electrical use, since other non-degradable ingredients used in dielectric fluids have not been identified in the environment, and that the adverse consequences of fires and explosions far exceed the potential threat to the environment. They also indicated that at the proper time they would be willing to have an officer of their company go on record as stating that the unavailability of these materials would result in serious power blackouts. Without Aroclors the maintenance of existing equipment would be impossible.

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Replacement of this equipment would be extremely costly, primarily

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because of the increased space required by the replacement. The power companies could not provide the uninterrupted service expected.

As you can see, we are still very much on the defensive, however, considerable progress has been made. In our plants, control of emissions is progressing extremely well. After initial audits, all plants instituted programs for control of spillage, leaks and disposal. Our Newport plant installed and placed in service this month an interceptor pit to hold major spills. Anniston and the Krummrich plant are proceeding with similar installations. These should be in service by the end of the third quarter. Reduction in PCB contents of our plant streams below the solubility level in water (50-200 ppb) will be achieved only after research work now underway is completed and plant units are designed and installed. Completion of this work is expected to occur in late 1971.

* (Show transparency on plant effluent)

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A major development has been achieved by our research department in refining our analytical procedures to the level that we now possess capabilities far exceeding many laboratories and unsurpassed by any. We are actively communicating our methodology to other laboratories to improve the type of information being generated and published. Our objective is to be considered experts with relaible results.

Toxicity studies are now in the tenth month. Data to date indicate that Aroclors are mildly toxic to mammals, however, it is highly unlikely that this will be a significant factor in any decision regarding the banning or restricting of the use of Aroclors.

Biodegradation studies have, thus far, confirmed our initial beliefs that the lower chlorinated biphenyls would degrade easily. We were disappointed in the resistance to degradation of some of the isomers in Aroclor 1242. This would tend to

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confirm the belief that some of the 5 and 6 chlorinated biphenyls being found in the environment could be residue from degraded Aroclor 1242. We are actively pursuing the possible use of distilled Aroclor 1242 with degradable components as a possible substitute with minimum loss of other favorable characteristics; e.g. fire resistance.

* (Show transparency on Aroclor Applications)

This chart is a summary of the major uses of the Aroclors which have shown resistance to degradation. Solid Aroclors are not included.

A critical review of these uses was completed. We have classified these uses into three categories. Business we discontinue, business we retain and business we retain with product substitution.

Uses in which control to prevent environmental contamination is virtually impossible are being immediately discontinued as shown on this chart.

* (Show transparency)

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The use of Aroclors to extend pesticide persistence, a use developed by the U.S. Department of Agriculture, is not one we have been recommending, however. We still have some extremely minor sales through distributors which we are discontinuing.

We have recommended to the U. S. Department of Agriculture to reject Aroclors as an approved inert material when pesticide reregistrations occur this year.

We are taking immediate steps to terminate the use of Aroclors for cutting oil, medicinal, dental and cosmetic applications.

We don't know where our distributors are selling Aroclors. To obtain better control of the end uses of Aroclors, we will immediately take steps to terminate distributor selling arrangements as soon as possible.

There are many applications which are extremely difficult to control which we will discontinue, but we will retain the business with acceptable product substitutes.

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(Show transparency)

This chart is a summary of those applications for which we either have or will have substitutes. The formulations for sealants, coatings and Industrial Fluids consist of biodegradable Aroclors, chlorinated terphenyls (Aroclor 5000 Series) or phosphate esters.

In the NCR paper application, we are applying considerable pressure on NCR to accelerate the conversion to products we manufacture or propose to manufacture. At present, HB-40 appears promising in the U.K. after one month of plant trials. Alkylated biphenyl appears promising for the U.S. application. We can at present satisfy the HB-40 needs for U.K. by sacrificing some low profit plasticizer business. However, capital funding will be required to expand our production capabilities. We do not at present manufacture alkylated biphenyls, but we have the technology. Facilities must be designed and installed to provide for this application.

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Successful control to prevent contamination is possible in systems in which Aroclors are sealed. We are working very closely with our customers to educate and motivate them and have offered technical assistance on their disposal and effluent problems.

Aroclor business which we will retain is shown on this chart.

* (Show transparency)

In summary, we have assumed worldwide leadership in facing the PCB problem. We have educated and pressured our customers and co-producers to fully appreciate the problem. We are leaders in analytical methodology. Our plants are effectively reducing the PCB content of their effluent. We have without waiting for any orders from any agency, selectively and voluntarily discontinued the sale of Aroclors for some uses. We are aggressively developing and introducing product substitutes for uses difficult to control. Where control is possible, we are working hard at making it effective and keeping the business.

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We are doing this and at the same time, maintaining the image of Monsanto as a responsible member of the business world genuinely concerned with the welfare of our environment.

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MONSANTO WORLDWIDE AROCLOR BUSINESS

POUNDS/YEAR	104 M	(70 M in Functional Fluids 34 M in Plasticizers)
SALES/YEAR	$21 M	($15 M in Functional Fluids $ 6 M in Plasticizers
GROSS PROFIT/YEAR	$10.0 M	($7.5 M in Functional Fluids $2.5 M in Plasticizers)
GROSS INVESTMENT	$13 M	($8.8 M net investment)
ROI	10.5%	
WORLDWIDE M/I	62%	
MONSANTO PRODUCTION LOCATIONS:	USA (2 plants, Anniston, Alabama Sauget, Illinois)	
	U.K. (Newport)	
	JAPAN (Yokkaichi)	
OTHER PRODUCERS:	Bayer, Prodelec, Caffaro, Flick, Kanegahuchi, and several Eastern European producers (all ex-USA)	

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WORLDWIDE AROCLOR BUSINESS

PRODUCTS CONTAINING NON-DEGRADABLE AROCLORS

POUNDS/YEAR	92 M	(70 M in Functional Fluids 22 M in Plasticizers)
SALES/YEAR	$18 M	($15 M in Functional Fluids 3 M in Plasticizers

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PCB CONTENT

PLANT EFFLUENT

Anniston

June, 1969	50 pounds per day	(5,000 ppb)
Present	5 pounds per day	(500 ppb)
October, 1970	2 pounds per day	(200 ppb)
January, 1971	.5 pounds per day	(50 ppb)
September, 1971	.1 pounds per day	(10 ppb)

Sauget

April, 1969	700 pounds per day	(3,500 ppb)
March, 1970	200 pounds per day	(1,000 ppb)
Present	65 pounds per day	(325 ppb)
September, 1970	55 pounds per day	(275 ppb)
October, 1970	10 pounds per day	(50 ppb)
September, 1971	2 pounds per day	(10 ppb)

Newport

Present	30 pounds per day	(3,000 ppb)

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AROCLOR APPLICATIONS

APPLICATION	M DOLLARS/YEAR
Industrial Fluids	5,000
Transformers	6,000
Capacitors	3,000
Heat Transfer	1,300
NCR Paper	2,000
Coatings	200
Emulsion Adhesives	200
Sealants	200
Wax Modification	200
Miscellaneous Plasticizers	200

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AROCLOR BUSINESS TO BE DISCONTINUED IMMEDIATELY

APPLICATION	SALES M DOLLARS/YEAR	COMPLETION DATE
Pesticide Extender	$10	Completed
Medicinal, Dental, Cosmetic	90	June, 1970
Cutting Oils	50	June, 1970
Distributor Sales - Plasticizers		September, 1970

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AROCLOR BUSINESS TO BE RETAINED WITH PRODUCT SUBSTITUTES

APPLICATION	SALES M DOLLARS/YEAR	COMPLETION DATE
Sealants	$ 200	December, 1970
Coatings	200	December, 1970
Adhesives	200	December, 1970
Wax Modification	200	December, 1970
Miscellaneous Plasticizer	200	December, 1970
NCR Paper	2,000	April, 1971
	$3,000	
Industrial Fluids		
Pydraul AC	$ 300	September, 1970
Pydraul AC-WG	5	September, 1970
Pydraul 625	300	September, 1970
Pydraul F-9	700	December, 1970
Pydraul A-200	800	December, 1970
Pydraul 540	50	December, 1970
Pydraul 280	150	December, 1970
Pydraul 135	500	June, 1971
Pydraul 150	500	June, 1971
Pydraul 230	50	June, 1971
Pydraul 312	1,600	June, 1971
Santosafe 100, 150, 300	50	June, 1971
	$5,005	

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AROCLOR BUSINESS TO BE RETAINED

APPLICATION	SALES M DOLLARS/YEAR	REMARKS
Transformers	$3,000	In sealed systems. Can exercise tight control at customer plants and repair shops. Contaminated material to be reclaimed or safely destroyed.
Capacitors	$6,000	In sealed units. Can exercise tight control at customer plants and repair facilities. Contaminated material to be reclaimed or safely destroyed. Disposal of old capacitors presents problems. Development of degradable Aroclors is underway.
Heat Transfer	$1,300	Used in closed systems. Control can be exercised. We will discontinue the sale of Aroclors for heating systems used in food preparation.

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