MITSUBISHI MONSANTO CHEMICAL COMPANY

FROM LOCATION : Tokyo

DATE : June 15, 1971

SUBJECT : FUNCTIONAL FLUIDS

REFERENCE :

TO : Dr. J. R. Durland
Tokyo

CC: K. Hoshino
K. Murakami
T. Katayama

MKZC FILE
46.6.15

As you know well, our functional fluids project has not attained the anticipated results, affected by the recent environmental pollution problem. We have re-examined the economics of our functional fluids operations for the past two years, 1970 and 1971, and discussed how to cope with the situation. We would like to explain an outline of our study and ask for your assistance.

1. Economics of our functional fluids operations

Economics in 1970 & 1971

(Unit: ¥1,000)

	1970 (actual)	1971 (estimate) 1 - 6	7 - 12	1 - 12
Profit and Loss	Δ77,227	Δ68,000	Δ67,000	Δ135,000
Sales Volume (T)	897	606	867	1,479
Average unit price (¥/kg)	145	163	158	160
Amount	130,232	100,000	137,282	237,282
Manufacturing Cost	109,841		112,939	
Packaging and Shipping Cost	14,353		12,992	
Royalty	4,744		4,972	
Variance	17,692		2,000	
SARE etc.	60,829		71,800	
Total Cost	207,459		204,703	

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* Breakdown { Manufacturing variable Cost 52,021
Manufacturing Fixed Cost 60,918

It is forecasted that the fields of usage for chlorinated biphenyl are likely to narrow down because of the alleged pollution. Even from an optimistic point of view, the sales will level off in 1972, registering a loss almost the same as in 1971.

2. Present sales and sales target for better than break-even in 1972.

(T/M)

	Unit ¥/kg	Sales target	Present sales	Variance
D P H	90	100	25 *1	75
C P H	120	150	60 *2	90
H P H	100	100	55 *3	45

*1 MIPB and others

*2 Electrical use 35
Plasticizer 10
Heat-transfer 15

*3 Heat-transfer 45
Others 10

To make up for the variance of 75T/M of DPH, we will promote the sale of MIPB and do our best to develop new DPH derivatives.

Concerning CPH, we expect we can possibly encroach on consumers of Kaneka's product for electrical use, if we can substitute MCS-1016 for the conventional CPH.

Note: Present electrical use market for CPH in Japan 350 T/M
Kaneka's share 90 %
MMK's share 10 %

As for HPH, efforts will be concentrated on extending the heat-transfer market.

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3. Development of new DPH derivatives

A) P-phenyl phenol

Taoka Dyes Co. is planning to use this as a raw material of resin for carbonless paper manufacture, for which the supply of our DPH is under contemplation.

B) O-phenyl phenol

This material is exported for the uses of disinfectant and antiseptic. The price remains stable, and this outlet looks promising, if this can be synthesized from DPH.

C) MIPB

We will continue promoting its sale to carbonless paper manufacturers.

D) Development of new heat-transfer agents

(i) Alkyl diphenyl

(ii) Diphenyl + Cl⬡ (Toray's PNC caproluctum byproduct)

(iii) S-77 ⬡-O-⬡-⬡-O-⬡

*E) Sale of bipheuyl to Asahi Denka for its deca-chloro-diphenyl (refractory agent) project

*F) Sale of biphenyl to Hitachi Kasei for its Hexa-Bromo-diphenyl

G) Others.

OH⬡ - ⬡OH (antiseptic, disinfectant)

H_2NHNSO_2⬡ - ⬡SO_2NHNH_2 (foaming agent)

* The projects listed in E) and F) are slowed down due to pollution problem.

4. MMK's plan for the future

A) Development of new DPH derivatives

It would be appreciated, if you would make information on these new derivatives available to us.

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B) Sales promotion of MIPB

MMK will urge carbonless paper manufacturers in Japan to use MIPB, and for this, any data on comparative tests between MIPB and other solvents as run at NCR, Dayton, and also information on further progresses of this product would be very helpful to us.

C) MCS-1016 and others (in substitute for conventional PCB)

MC data on toxicity, degradation, bioresidue, etc. are needed for our decision making on whether MMK takes up these products on a commercial scale.

(i) We would appreciate having any information keeping us most up-to-date.

(ii) We are interested in having your comments on if MC thinks that MC will be able to solve the PCB pollution problem by using these products instead.

D) Exemption from, or deferral of royalty payment

Economics of this project is forecasted to continue in a very depressed state for two or three more years, which would place a heavy burden upon MMK and force us to give up our CPH business in the worst case. We will do our best to tide over the worst years to come. We would greatly appreciate it, if you would take consideration of exemption from, or deferral of royalty payment till CPH business turns for the better.

5. MCS-1016 in substitute for conventional PCB
(Outline of MC report by Mr. Papageorge's letter dated March 29, 1971)

A)

Cl No.	1254		1242		MCS-1016		1221	
0	0.05		0.01		0.02		19.00	
1	0.06		0.70		1.00		54.10	
2	0.32	24.20	15.50	90.41	19.70	99.22	20.40	99.70
3	0.78		49.40		57.30		3.90	
4	22.99		24.80		21.20		2.30	

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Cl No.	1254		1242		MCS-1016		1221
5	47.38		8.70		0.80		0.25
6	19.75		0.85		0.05		-
7	4.62	75.71	-	9.55	-	0.85	-
8	-		-		-		-
9	3.96		-		-		-
10	-		-		-		-

The report says, "PCB's containing 5 - 8 chlorine atoms are the most refractory toward degradation, so MCS-1016 containing less than 4 chlorine atoms would be approximately ten times as refractory as 1242 toward degradation."

B) Accumulated Bacterial Degradation
(Oxidation by biphenyl degrading organism, C_2)

Long term exposure tests of MCS-1016 and Aroclor 1242 to C_2 indicated that the order of degradability is MCS-1016 > Aroclor 1242

C) Natural Bacterial Degradation

i) River die-away exposure (RDA)

Aroclor 1221

PPb 1221 Content

Weeks	0	1	3	5
River water	246	121	77	28
Distilled water	269	167	152	101

Neither Aroclor 1242 nor 1254 disappeared at a measurable rate.
Data on MCS-1016 was not available.

Problem,

Cl Content	MCS-1016	1242	1221
3 Cl	57.30	49.40	3.90
4 Cl	21.20	24.80	2.30
Degradation	⊘	X	○

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ii) Semi-continuous Activated Sludge Tests

Test Material	Exposure Level	Disappearance Rate (24 Hrs)
Dodecene 1	20 Mg	> 99 %
Biphenyl	5	> 95
MIPB	10	79
HPH	10	49

Significant evidence of biodegradability was found for MCS-1043. Significance level used 95%.

MCS-1016 and Aroclor 1242 showed evidence of biodegradation but neither was significant at 95%.

Aroclor 1254 showed no evidence of biodegradation.

D) Determination of PCB Residues in Rats Fed Aroclor 1242, 1254 and 1260.

The distribution of the PCB isomers that were not retained in the composite tissue extracts is shown in the Table.

Cl Content	Distribution of Identifiable PCB Isomers absent in Tissue extract
0	1
1	3
2	9
3	4
4	-
5	-
6	-

S. Uneho

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