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(superceded by black binder 1/28/76)

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CAPACITOR ACTION PLAN - U.S.

The detailed events on the following pages are premised upon a "main line" course of action. At certain points in the program there are alternative routes that may prove better and, if they are taken, then some of the detailed action plans must be modified.

The "main line" can be summarized as follows:

1. Our choice of product for replacing PCB's in capacitors is MCS 1238, a blend of monoisopropyl biphenyl (MIPB) and tolyl xylyl sulfone (TXS).

2. We will move rapidly to establish a full scale blending and treating operation at Krummrich Plant. This project can readily be debottlenecked to permanently serve our needs, but may prove to be an interim installation if another site is chosen for self-manufacture of MIPB and TXS.

3. We will complete contracts for toll manufacture of MIPB and TXS blend components as soon as possible -- and sign them soon enough to begin shipments within time parameters defined by major customers.

4. We will cease manufacture of PCB's by 1/1/78.

5. Documents and activities leading to self-manufacture of TXS and MIPB will be timed to postpone major capital commitments until results of 2-year medical studies are known.

Alternative courses and circumstances which might lead to considering adopting them are discussed under "Alternatives - U.S.".

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II. C - Alternatives - U.S.

1. Products

From a technical standpoint, there probably are a number of hydrocarbon base stocks that could serve the role of MIPB, which was selected because it will be low in cost and supports the polyphenyl flow sheet. The role of TXS as an enhancer of dielectric constant is more unique. There may be slightly different sulfones that would work, but all should be covered by our patent. Another area of chemistry which has not been fully explored is in aromatic ketones, but they would be much more expensive.

From the standpoint of meeting our timetable for commercialization, we must remain with MCS 1238; if some unforeseen weakness is found in the product, at least one year will be lost in changing to something else. Therefore, if MCS 1238 fails, we would question the viability of a continuing effort in capacitor fluids.

2. Plant Sites

Most of the site evaluation work has concerned adaptation of Aroclor equipment at Krummrich Plant and phosphate ester/Santosol 100 equipment at Delaware River Plant. Capital requirements and available time favor Krummrich -- but at Krummrich we are faced with a potential problem of PCB contamination of at least the first few batches. The "main line" plan has assumed that the contamination can be held to a level that is low, temporary, and acceptable, and a blending project using PCB equipment is underway using pre-approved authority funds.

A third alternate, using potentially idle Santocel and plasticizer equipment at Everett Plant, has recently been added to the evaluation for both MIPB and blending (in this case TXS would be kept at Queeny by expanding the interim 00 Building facility) and may well prove to be lowest in cost and without the question of PCB contamination. Results of the evaluation will be available in February 1976.

If Everett is the preferred alternate, then a decision must be made as to continuing the Krummrich blending project. If an Everett blending project can be completed in time to satisfy customer needs above the amount Research can make (40 M lb/mo.), then the Krummrich project should be aborted, with write-off of ca $90 M design cost. This will depend on the time required for an Everett blending project to be completed, timing of customer needs as now foreseen, and the risk of an earlier need due to some unforeseen crisis.

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II. D - Alternatives - Europe

1. Products

Monsanto will totally follow the U.S. technical route in Europe.

2. Market Approach

While our basic thrust will be to improve market share by being first with a good non-PCB product, full conversion of the industry to hydrocarbon/sulfone technology would be speeded by existence of a second source. We thus would entertain a licensing proposal, but will let "them" make the first move from a bargaining strategy viewpoint. Prodelac would be the preferred licensee, since they are so committed to the dielectrics business that they are unlikely to drop out -- this is not true of Bayer. If Bayer drops out of dielectrics, we should offer them biphenyl for their DPO/biphenyl heat transfer fluid and shut down their obsolescent biphenyl furnaces.

[redacted]

3. Sites/Sources

Since biphenyl is made at Newport, it seems logical to consider installing dedicated facilities there for MIPB. We should first determine justification vs possible toll conversion. TXS volume is relatively small and probably should be supplied from the U.S. Blending in existing PCB equipment at Newport is probably feasible, but raises the same potential contamination problem as at Krummrich and should be similarly resolved. One alternate blending site would be an idle Pydraul blending unit at Antwerp.

4. Timing

European competitors are unlikely to abandon PCB's unless there is a governmental regulation to force the issue. European customers have done little testing of non-PCB fluid and G.E. has not released 1238 data to their licensees. For these reasons, we do not believe that Europe could be accelerated to the U.S. timetable by unilateral Monsanto action on PCB withdrawal without total loss of our European dielectric business. Therefore our timing considerations should be premised entirely on the rate of progress toward regulation by OECD.

Transformer Action Plan

The actions on the following pages are necessarily less detailed than those related to capacitors, since we are not certain that we have a viable product. We do have a candidate in a blend of MCS 1839, a highly alkylated biphenyl, with trichlorobenzene. The actions described are intended to bring us to go/no-go decisions at various steps toward commercialization; if the product survives them, it will be necessary to re-examine the plan and detail the further steps involved in justifying dedicated facilities.

One step in the plan is firm -- U.S. production of the present PCB-based transformer blends will cease by 1/1/78, whether a replacement has been qualified or not.

The most serious obstacle to success of 1839 is that it has only exhibited the needed low-temperature viscosity when blended with trichlorobenzene (TCB). TCB has been used for the same purpose in blends with PCB for many years and also is widely used as an intermediate and a solvent. While TCB has not yet acquired any environmental notoriety, there is a good probability that it will do so in future years -- being a chlorinated aromatic, it may well exhibit biomagnification, persistence or other unfavorable characteristics.

The only U.S. source of electrical grade TCB is Hooker, who make it as a by-product of Lindane. They do not appear ready to spend the effort and money needed to assess and defend its environmental acceptability.

We conclude that the current program should continue for the time being on the basis of blends with TCB, but before significant investment is made, a full resolution of the TCB issue is mandatory -- preferably by finding a non-chlorinated diluent.

No separate European Events Chart has been prepared. For now, the only appropriate plan is for periodic communication as to status, with more detailed plans firmed up when we conclude that we do have a viable product. Final shutdown of Newport askarel production is set for 1/1/79, one year later than in the U.S., for the reasons described in the capacitor section.

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3. Timing of Major Investments

The main line plan calls for deferral of commitments to major investment until results of 2-yr. feeding studies are known, specifically the Capital Investment Program calls for approval of a $10.5M project in December 1977. However, if evaluation shows that capital for the Queeny site for TXS is low (< $1M), then earlier implementation should be considered. To get adequate quantities of TXS at acceptable cost through toll manufacture, we must commit to a lump sum of $600M to set up facilities. If the capital for internal manufacture is not much more, it seems more desirable to spend the money to build our own unit rather than someone else's, provided payback time on the increment is short. A recommendation on this point is scheduled for February on the Events Chart.

TIMING	ACTIONS	DECISIONS/APPROVALS
Jan. '76		
Feb. '76	2/12 Recommendation on European approval to OCED March 15 meeting. 2/15 Complete Europ product evaluation plan.	2/28 Approval of European product evaluation plan.

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TIMING	ACTIONS	DECISIONS/APPROVALS
Mar '76	3/7 Completed action for OCED meeting. 3/15 -Complete technical training of European personnel. -Support technical documentation. -Including 3 sets of slides.	0207371
Apr '76		

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TIMING		ACTIONS	DECISIONS/APPROVALS
May '76	5/1	Evaluation program agreed with 7 (?) customers.	
	5/12	Development forecast for Europe for balance '76.	
June '76			

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TIMING		ACTIONS	DECISIONS/APPROVALS
July '76	7/1	Recommendation on USSR approach and required resources (and Rumania).	
	7/30	Environmental data presented to European Agencies.	
Aug. '76			

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TIMING	ACTIONS	DECISIONS/APPROVALS
Sept '76	9/1 Key customers have capacitors on test.	
Oct. '76		

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TIMING	ACTIONS	DECISIONS/APPROVALS
Nov. '76		0207375
Dec. '76	12/15 Evaluate government attitudes towards PCB replacements.	

TIMING	ACTIONS	DECISIONS/APPROVALS
Jan. '77	Report completed results and confirm schedule (customer).	
Feb. '77		

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TIMING	ACTIONS	DECISIONS/APPROVALS
Mar '77		
Apr '77		

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TIMING	ACTIONS	DECISIONS/APPROVALS
May '77		
June '77		

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TIMING		ACTIONS	DECISIONS/APPROVALS
July '77	7/1	Source evaluation complete for MIPB/TXS	
Aug. '77			

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TIMING	ACTIONS	DECISIONS/APPROVALS
Sept. '77		
Oct. '77	10/1 Key Customer Commitment. 10/7 Volume forecast for Ex-U.S.A. sales.	

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TIMING	ACTIONS	DECISIONS/APPROVALS
Nov. '77		
Dec. '77		

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TIMING	ACTIONS	DECISIONS/APPROVALS
1st Qtr. '78	1/1 European inventory (3 mo. sales) in place. 1/1 AR approval for European blending plant.	0207382
2nd Qtr. '78		

TIMING	ACTIONS	DECISIONS/APPROVALS
3rd Qtr. '78	7/1 Issue shutdown and decontamination plan for Newport PCB.	8/1 Approval of shutdown and decontamination plan.
4th Qtr. '78	12/31 Newport UK Aroclor production ceased.	

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TIMING	ACTIONS	DECISIONS/APPROVALS
1st Qtr. '79		
2nd Qtr. '79		

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TIMING	ACTIONS	DECISIONS/APPROVALS
3rd Qtr. '79		
4th Qtr. '79	10/1 Demonstrate blending plant at rated capacity.	

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TIMING	ACTIONS	DECISIONS/APPROVALS
1st Qtr. '80	1/1 Assume exclusive supply from European blending facility.	
2nd Qtr. '80		

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TIMING	ACTIONS	DECISIONS/APPROVALS
3rd Qtr. '80		
4th Qtr. '80		

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