MEMO TO D. R. Dill
M. E. Gibbs
J. F. Herber
A. J. Lauck
M. V. Merchant
D. R. Miller
[redacted]. H. Munch
L. R. Stark
Q. E. Thompson

Re: Research Review 2/23/73

As promised in our meeting this morning, attached is some additional data for your use.

W. R. Richard
2/16/73

FROM

MONS 029466

FUNCTIONAL PRODUCT GROUPS

Specialty Products Group - Domestic
Top Ten Accounts Report

Sales in $M

	Customer	Year 1972 Actual	Year 1972 Budget	Year 1971 Actual
1.	General Electric	2488	1743	1667
2.	Koppers Company	2434	2567	1996
3.	International Paper Company	2367	2705	3104
4.	National Cash Register	2172	2037	2207
5.	Champion-International Corp.	1688	1879	1711
6.	Westinghouse Electric	1356	902	1193
7.	Weyerhaeuser Company	989	1040	1052
8.	Mead Corp.	835	840	833
9.	Nekoosa Edwards Paper	774	782	669
10.	Federal Paper Board	762	595	633
	Total	15865	15090	15081

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FUNCTIONAL PRODUCT GROUPS

Specialty Products Group - Domestic
Top Ten Gross Profit Contributors - $M

	Product Grouping	Year 1971 Actual	Year 1972 Actual	Year 1972 Budget	Year 1973 Budget
1.	Rosin Size	2277	3142	2325	3099
2.	Capacitor Fluids	991	1939	1234	1830
3.	Therminols (Heat Transfer)	1141	1045	493	463
4.	Transformer Fluids	891	999	1062	795
5.	Surface Additives (Scripsets)	893	669	756	984
6.	Solvents (MIPB-Santosol)	790	530	572	498
7.	Biphenyl	621	507	519	527
8.	PCT-Pydrauls	1305	436	188	-
9.	PCT-Plasticizer Aroclors	1059	345	-	-
10.	Coolanols	266	298	155	186
	Total	10234	9910	7304	8383

MONS 029468

FUNCTIONAL PRODUCT GROUPS

Specialty Products Group - Domestic
Key Raw Material Report
Year - 1972

	M lbs. Volume	Price $/lb. Actual	Price $/lb. Budget	Gross Profit Effect
PURCHASED				
Benzene	72975	.0291	.0272	139*
Chlorine - Anniston	10945	.02720	.02937	24
Hydrogen[1]	290	.7429	.043	203*
Water Glycol Conc.	551	.1421	.1400	1*
Raney Catalyst	23	3.292	3.370	2
Sub Total				317*
MANUFACTURED				
Tora	40562	.095	.098	122
Santicizer 140	1432	.190	.183	10*
Phenol	7508	.068	.068	-
KOH	2744	.0350	.0580	63
Fumaric Acid	2424	.1605	.13074	72*
Chlorine	65343	.0274	.0298	157
Sub Total				260
Grand Total				57*

[1]Purchased hydrogen used in HB-40 to meet production requirements, Santosol shipments to UK, and reduced level of biphenyl production requirements.

*Denotes loss

FLUIDS

SUMMARY STATEMENT

Continue strong emphasis on high technology energy transfer fluids. This will continue to be a viable specialty chemical business with gross profit in excess of 30%. Maintain leading position worldwide in dielectric fluids, aviation fluids, and in paper encapsulant solvents. Continue to build a specialty product business in the dye carrier field. Market all products worldwide, achieving greater M/I penetration into heat transfer and hydraulic applications.

Capitalize on high level of polyphenyl technology by developing lowest cost manufacturing site and developing non-halogenated specialties for additional uses such as a heat transfer product, dye carriers and encapsulants. Technology on tractive lubricants will be directed toward several attractive specialty applications, while retaining a long-term view toward potential conversion to tractive drives in automobiles.

IV. PROCESS FLUIDS

Business Parameters

	1973 Sales	1973 % G.P.	Current % M/I	Projected 10-yr Annual Growth Rate Spec. Prdts.	Industry
Heat Transfer	$ 1.7M	46%	30%	14%	3%
Solvents	$ 3.2M	31%	90%	11%	11%
Dye Carrier & Other	$ 2.3M	32%	20%	15%	4%

A. Current Situation

The process fluids family orignated as a diversification effort for the polyphenyls flowsheet whose main function was to supply biphenyl for Aroclor. Hydrogenated terphenyl is a major result of this effort and is sold as a plasticizer (HB-40), as encapsulant solvents for carbonless copy paper (Santosol 300 and 340) and a heat transfer fluid (Therminol 66). Biphenyl is sold as a commodity and opportunistically, with significant sales, as a dye carrier for polyesters.

Markets which were originally entered this way have proven to have needs which cannot be served by the polyphenyl flowsheet and it has been necessary to broaden our chemical base. Thus, when NCR demanded better performance in an encapsulant solvent than our first-generation PCB replacement (monoiso propyl biphenyl) could deliver, a benzyl chloride derivative

(Santosol 100) proved to be the best cost performer. In heat transfer the product line has been broadened to include an ester (Therminol 44) and an alkylbenzene by-product (Therminol 55), and now we are developing a low-cost diphenyl oxide process to give us a vapor-phase heat transfer fluid. In dye carriers, we are building toward the ability to sell performance, rather than a chemical, through differentiation.

The above evolution, together with the phase-out of many applications of Aroclor due to the PCB problem, has created overcapacity in polyphenyls. This, together with a poor location for freight, poor fuel cost and availability, and an imbalance in hydrogen supply, has added up to a cost-of-goods problem of million-dollar magnitude. Nevertheless, with diverse markets and good products, this is a profitable product area.

B. Objectives

1. Retain 90% M/I in solvents to the carbonless copy paper market (U.S. and Europe).

2. Increase our participation in dye carrier market by introduction of more proprietary and environmentally acceptable products; two new products by mid-1974 and $.750M new sales by 1978.

3. Achieve a cost/market position in polyphenyls that will enable the flowsheet to profitably survive the further decline of Aroclor usage of biphenyl.

4. Broaden heat transfer line to include vapor phase; sell $ 1.7M by 1978. Achieve 14% growth rate in heat transfer.

C. Strategy and Plan

The cost problems in polyphenyls will yield only to drastic action; we will attempt to reduce costs by developing a viable proposal for relocation of a smaller system to a Gulf Coast site.

In heat transfer, we will build a diphenyl oxide plant and sell a vapor phase product. Dye Carriers will be differentiated via emulsifiable or liquid products, some biphenyl-based.

The Newport biphenyl plant will be viable if Aroclor remains the dominant European dielectric or if terphenyl-based encapsulant solvents remain strong and other biphenyl/terphenyl markets are exploited; otherwise, there will be an optimum time to retire it and supply from the U.S.

Potential competitive sources for encapsulent solvents are strongest outside the U.S. (Japan and Germany) so worldwide market intelligence and coordination will be maintained, and new models developed if required, with satisfaction of NCR and Wiggins-Teape (NCR licensee) requirements the prime consideration.

D. Resources

1. Increase Heat Transfer marketing effort by 3 men to increase share when vapor phase fluid becomes available (1974).

2. Establish polyphenyl know-how within Research to replace Anniston resource.

3. Capital:

   (a) $1.5M Diphenyl Oxide - 1973 - 1974

   (b) $3.0M Polyphenyl relocation - 1974

   (c) $ .6M Santosol 100 expansion - 1975

V. HYDRAULICS AND LUBRICANTS

Business Parameters

	Sales	% G.O.	Current % M/I	Projected 10-yr Annual Growth Rate	
				Spec. Prdt.	Industry
Pydraul	$ 3.9M	14%	40%	6%	6%
Skydrol - U.S.	$ 0.9M	38%	40%	7%	7%
Worldwide	$ 2.1M	36%	50%	4%	4%

Introduction:

Our Skydrol was the original fire-resistant aircraft hydraulic fluid. The Pydraul fire-resistant industrial fluids use similar technology and the same production facilities, but serve a less quality-sensitive market. Skydrol enjoyed a 100% M/I for many years but has more recently dropped to about 50% in the face of industry approval of new sources and price competition from lower-density fluids. Pydraul has always been a price-sensitive market, but performance can command a premium from some customers. Environmental aspects of hydraulic fluids (e.g. phenol content) are becoming important.

Synthetic lubricants for aircraft and stationary (steam or gas) turbines represent a $ 10M potential which we are only beginning to penetrate. Our ester jet lubes are blended from purchased base stock, while we are basic in the phosphate esters used in stationary turbine lubes.

A. Current Situation

Skydrol: Both prices and M/I appear to have bottomed out in the U.S., while Europe is following the recent U.S. pattern. The performance and toxicity disadvantages of the low-density fluids are becoming evident to customers, which may presage a return to higher-density fluids where Monsanto is stronger.

Pydraul: Recent reformulations to eliminate first PCB and then PCT have given us a product line which is no longer proprietary, but still somewhat technically superior to competition and allowed us to save our market share, but our cost position has been weakened.

Lubes: We are in the midst of customer and OEM testing to achieve the necessary approvals and credibility that will permit bidding on business.

Cost: We have a serious overcapacity problem in phosphate ester base stocks. This has aggravated cost and, with very competitive pricing, has squeezed profit. Internal transfer pricing has hurt profitability to this business group, but not to MICC.

B. Objectives

1. We will maintain worldwide M/I at 50% minimum in Skydrol by exploiting product performance.

2. In Pydraul, our continuing standard will be 45% M/I and 30% G.P.

3. Pydraul will be our stepping stone into the metal-working industry with such products as rolling and cutting oils; our goal is one new type of product to this market by 1974.

4. Our hydraulic fluids will surpass competition in low toxicity and low environmental impact. We will evaluate ways to participate in the revenue from fluid reclamation.

5. In turbine lubes, we will achieve OEM approvals (e.g. G.E.) in 1973. We will sell 5M pounds, $3.0M in 1978.

6. We will correct overcapacity in phosphate esters by improved volume and/or other products. 70% occupancy by 1975, 90% by 1978.

C. Key Assumptions

1. Toxicity and environmental compatibility will become additional primary factors in customer fluid selection decisions, along with fire resistance, price and performance.

2. Reclamation and recycle of used fluid will have a major impact on new fluid sales to the industrial market within five years.

D. Strategy and Plans

Skydrol: We will encourage a return to the higher-density fluids in which we are strongest and modify products to eliminate any serious toxicity or handling questions. The "general aviation" business, where Monsanto has a high M/I for historical reasons, is not well served by anyone, and we must find a better way to do so.

Pydraul: A further round of reformulations will lower our cost while maintaining a competitive edge in performance and low toxicity. Customers, in response to governmental pressure, will demand a continuing reduction or elimination of phenolic content of fluid, both new and in use. Longer-term, to get products of even better environmental compatibility, a water-based technology will be needed. We will investigate strategies to permit profitable participation in recycle of used fluid. Our Pydraul sales to Europe will remain via U.S. export until/unless volume justifies a European plant.

Cost: We will attempt to improve volume by sale of base stock to competitors, provided we can do so without giving away our cost or performance edge. Cost control in Pydraul base stock will be improved.

Acquisition: Acquisition will be considered as a key strategy for broadening our metal working product line and increasing our market participation. See Section on Acquisitions.

E. Resources

1. M.A.T. levels will remain near the current amounts.

2. Capital will be required only for cost improvement projects except for the possibility of European manufacture of Pydraul base stock. This would probably be a joint venture with the Plasticizer Business Group.

VI. DIELECTRICS

Business Parameters

	1973 Sales	% G.P.	Current M/I	Projected 10-yr Annual Growth Rate Spec. Prdt.	Industry
U.S. and Export	$ 8.4M	38%	100%	-2%	4%
U.K.	$ 0.7M	20%	100%	0%	7%
EEC /USSR	$ 1.1M	15%	30%	0%	5%

A. Current Situation

Aroclor dielectrics have been made for 40 years and are the original reason for the manufacture of biphenyls and terphenyls. Since Aroclor became identified as "PCB and an environmental hazard" a few years ago, applications have been narrowed to the original dielectric application where no suitable replacement is yet available. We have been able to raise prices to cover the cost increases caused by overcapacity, raw material cost and extensive environmental work. Conditions are such that a new supplier of PCB's may occur in the USA. Japan has banned PCB's, which has caused some U.S. demand for non-PCB capacitors for equipment for export to Japan. While this volume is small, it could result in establishing feasibility of non-PCB dielectrics, which would erode our position. Our own new dielectrics are promising in potential cost and performance, but 1-2 years will be required to prove their utility

and profitability and volume required. Metallized film capacitors will require less fluid, and may use a commodity which could decrease the size of the total market.

B. Objectives

1. In Aroclors, retain M/I of 95-100% U.S., 100% U.K., 30% Europe. Gross profit 35% worldwide.

2. Support dominance of Aroclor as major dielectric fluid through 1975.

3. In new non-PCB dielectrics, achieve at least 50% M/I domestically through 1976.

C. Key Assumptions

1. PCB's will not be banned by major worldwide governments, but some customers will prefer non-PCB fluids once they are proven.

2. There will be growing acceptance that capacitor dielectrics need not be fire-resistant in most applications.

3. Neither we nor our competition will develop an economical capacitor dielectric which is both fire-resistant and biodegradable (i.e. a trade-off is necessary).

D. Strategy and Plan

To maintain a competitive lead and achieve targeted sales of new dielectrics in 1975, we will supply pilot-scale quantities of new non-PCB dielectric fluids to major customers by late 1973 and establish interim manufacturing facilities during 1974. Our product strategy is to blend additives (which contribute a high dielectric constant) with commodity-type hydrocarbons or esters, thus allowing us to tailor cost/performance to the desires of customers. We will seek to make the additives proprietary in chemistry or source. As a contingency, we will have a low-key effort to find a dielectric which is both fire-resistant and biodegradable.

Meanwhile, we will continue to protect the Aroclor usage through tight plant pollution control, policing of customer losses, working with governmental agencies and technical societies, etc. As Aroclor volume shrinks, prices will be increased to cover costs, and Aroclor will thus be driven from all applications except those where fire-resistance is vital.

The shift toward metallized film capacitors could be an opportunity as well as a problem. The major effort here will be to get our customers to tell us what they need and to determine whether Monsanto or our Business Group has a profitable approach.

E. Resource

1. Current marketing level.

2. Research effort will be at a 3% level of Aroclor dielectric sales for dielectric products and processes.

3. Capital:

(a) Further plant PCB pollution control $100M 1973 - 1974

(b) U.S. high-DK additive facility $1.5M 1974 or 1975

(c) EEC Blending - $.5M 1974 or 1975