3. Detailed Financial Statements

TONNES/$M	BUDGET 1976	NO EXPANSION 1978	DEBOTTLENECK 2000T 1978	EXPANSION 5000T 1978	EXCL. PCB's 1976
Sales Volumes					
Molten diphenyl	1300	1490	1490	1490	1300
Flake diphenyl	300	340	340	340	300
Aroclors	2658	-	-	-	-
Pyroclors	1006	-	-	-	-
Santosol 340	850	600	1100	4100	850
Santotherm 66	650	900	900	900	650
	6764	3330	3830	6830	3100
Sales Revenue	5919.7	3663.8	4320.4	8260.0	2705.3
Total Costs	4409.2	2939.1	3250.7	6157.0	2246.5
Total Gross Profit	1510.5	724.7	1069.7	2103.0	458.8
GP %	25.5%	19.8%	24.7%	25.5%	16.9%
MAT	523.6	500.0	500.0	700.0	523.6
Agents Comm.	59.2	36.6	43.2	82.6	27.0
Inc.Charges	11.8	7.3	8.6	16.5	5.4
Performance Income	915.9	180.8	517.9	1303.9	(97.2)
GROSS INVESTMENT					
Fixed	3628	2283	2283	4560	2283
Working Cap.	1480	918	1082	2067	676
Total Gross Inv.	5108	3201	3365	6627	2959
NET INVESTMENT	2276	1162	1326	4370	1240
P.R.O.I.%	17.9%	5.6%	15.4%	19.7%	(3.3%)

DSW 185400

4. Assumptions for Financial Statements

1. Benzene Usages

111:100	No Expansion, With PCB's
120:100	Without PCB's (inc.Debottlenecking)
130:100	Without PCB's,With Expansion

2. New Capital

$M 177	re Polyphenyl Pyrolysis Furnace
$M2000	re HB40 Expansion to 5000 tonnes, plus increase in allocated capital of $M100, additional to this $M2000.

3. Depreciation

10% p.a. Straight-line

4. Inflation Factors

1976 = 100
1978 = 126.5 (15% 1977/1976 ; 10% 1978/1977)

5. Parity Rate

£1 = $2.0

6. Benzene Cost

1976 B = £113 tonne
1978 = £143 tonne

7. PCB Fixed Costs

After production/sales ceased in 1977, deemed to have been absorbed by total Newport plant, no part of which has been re-allocated or included in Polyphenyl costings in the Business Plan.

8. Start-up

Start-up and saleable product available from January 1st 1978 in both debottlenecking and expansion cases.

9. MAT

Based on level of operations from 1977 onwards.

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5. Cost of PCB Write Off

Dismantling & Plant decontamination
$ 250 M approx.

Machinery & Equipment obsolescence
$ 50 M approx.

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6. Tentative Impact of MCS 1238 on the Polyphenyls Complex in 1978

(i) Assumptions

- Sales volume at 2600 tonnes MCS 1238 is in line with the 40 % M/I of the estimated market for capacitor impregnants (see Appendix 8.).
- Sales price at $ 1700/tonne is 10 % above the equivalent price for Aroclors on a volume basis after escalating the 1976 Aroclor bulk price of $ 870 by 26.5 % (the inflation factor used for COGS).
- Formulation of MCS 1238 is 75% MIPB, 25 % TXS.
- MIPB cost is calculated assuming a diphenyl usage of 1:1 , a diphenyl cost of $ 572/tonne for case 2 and $ 656/tonne for case 3. MIPB conversion costs are assumed to be $ 0,12/lb for 1976 (Dixie Chemical mean figure) escalated by 26.5 % to give a 1978 figure of $ 0.177/lb or $ 390/tonne. Thus MIPB costs would be

  Case 2 : $ 572 + $ 390 = $ 962 /tonne
  Case 3 : $ 656 + $ 390 = $1046 /tonne

- TXS costs are assumed to be $ 0.75 /lbs in 1978 in absence of any other data. (St.Louis prelim. estimate).

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- Blending costs excluding packaging are assumed to be Pyroclor blending costs currently $ 90 /tonne escalated by 26.5 % to $ 114 /tonne ($ 0.05 /lb)
- Volume Effect of MCS 1238 on polyphenyl complex in 1978

	Case 2	Case 3
HB-40	2000	5000
Diphenyl	1830	1830
Diphenyl for MCS 1238	2000	1670
Diphenyl Total	3830	3500
Polyphenyl Total	5830	8500
Q_2/Q_3	66/34	41/59
Polyphenyl Capacity p.a.	7500	8500*
Benzene Usage	112	124

* this capacity increase is the result of an expenditure of $ 177 M new capital .

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- Effect of including MCS 1238 tonnages in the Polyphenyl Business Plan :

	Debottleneck 2000t - 1978	Expansion 5000t-1978
Changes required :		
(a) Diphenyl required for MCS - add	2000t	1670t
(b) Benzene Usage	112:100	124:100
Cost P.A.W. $/tonne		
Polyphenyls without MCS 1238	660.6	700.0
Polyphenyls/MCS after correcting for (a) and (b)	572.2	655.7
Net gain of volume/benzene usage corrections : $/tonne	88.4	44.3
Being - variable costs	+ 23.0	+ 17.2
- volume effect	+ 65.4	27.1

NOTE : The above reduction in unit costs results solely from adjusting the benzene usage rate and including the extra Diphenyl (MCS) tonnages. No additional fixed costs have been included in respect of MCS manufacture.

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(ii) Cost Calculations ($ /tonne)

Raw Materials	Case 2	Case 3
MIPB 0.75 x MIPB cost	722	785
TXS 0.25 x TXS cost	414	414
Total R.M.'s	1136	1199
Blend Loss 1 %	11	12
Blending costs	114	114
Total Cost	1261	1325

(iii) Gross Profit

		Case 2	Case 3
Sales price	$/tonne	1700	1700
COGS	$/tonne	1261	1325
G.P.	$/tonne	439	375
G.P. %		26	22

In Case 2, gross profit on sales of 2600 tonnes of MCS 1238 would be $ 1141 M and in addition the extra polyphenyl throughput would reduce the COGS of products other than MCS 1238 by $ 88/tonne or $ 346 M. Thus neglecting any COGS increases due to MCS 1238 other than the blending costs already allowed for, the whole impact on gross profit in 1978 would be $ 1487 M.

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In case 3, gross profit on sales of 2600 tonnes of MCS 1238 would be $ 975 M and the effect of the additional polyphenyl throughput would be $ 44/tonne or $ 300 M. However to achieve this salesvolume we would have to cut back diphenyl sales by 330 tonnes worth $ 291 M. Thus neglecting any COGS increases due to MCS 1238 other than the blending costs already allowed for, the whole impact on gross profit in 1978 would be $ 984 M.

(iv) Consolidation of Tentative Impact for MCS 1238 With Polyphenyls Complex

(using Financial data for Polyphenyls in item 3 of this Chapter).

1978 Data ($ M)

	Case 2	Case 3
Sales Revenue:		
Polyphenyls	4320	8260
MCS 1238 (2600 tonnes at $ 1700/tonne)	4420	4420
Total Sales Revenue:	8740	12680
Gross Profit:		
Polyphenyls	1070	2103
Impact MCS 1238	1487	2103
Total G.P.:	2557	3087
G.P. %	29.3	24.4
MAT Polyphenyls	552	799
MAT for MCS 1238 (= 10% MCS 1238 sales)	442	442
Total MAT	994	1241
P.I.	1563	1846

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	Case 2	Case 3
Gross Investment Polyphenyls	3365	6627
Tentative Gross Investment for MCS 1238	1975	1975
Total Gross Investment	5340	8602
P.ROI %	29.3	~~20.3~~ 23

Note :

Tentative Gross Investment for MCS 1238 calculated as follows:

Blending plant $ 500 M in 1976 escalated by 40 % to give 1978 new fixed capital of $ 700 M.
Allocated capital 25 % of new fixed = $175 M.
Working capital 25 % of sales is $ 1100 M.
This gives a total gross investment figure of $ 1975 M.

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(v) Summary of Tentative Impact of MCS 1238 on the Polyphenyls Complex

	Case 2	Case 3
Sales $ M	8740	12680
G.P. $ M	2557	3087
G.P. %	29	24
P.I. $ M	1563	1748
P.R.O.I. %	29	20

Important Note

This tentative summary should in no way be construed as an accurate estimate since much of the data used needs to be thoroughly re-checked for validity, because of the large number of inknown factors.

STLCOPCB4051655

Dielectric Fluids of European polyethylene Plan (draft)

III. FINANCIAL FORECASTS

1. Sales Summary

(i) 1976 Budget

Product	Tonnes	Net S.P. $/kilo	Sales Revenue $ M
Aroclor	2658	0.896	2383
Pyroclors	1006	0.827	832

2. Financial Summary

	1976	
	With PCB's	Without PCB's
Sales $M	5920	2705
G.P. $M	1511	459
G.P. %	26	17
P.I. $M	916	(97)
P.R.O.I. %	18	(3)

IV. KEY ACTION STEPS

4. PCB Withdrawal

- Prepare a plan, by 1st July 1976, in line with the one issued by the U.S. PCB Task force, which covers our withdrawal from PCB's.

- Appoint a project man to handle the introduction of PCB replacement and the PCB withdrawal programme and to liaise closely with St. Louis, by 1st April 1976.

DSW 185410

5. Capacitor Impregnants

- Introduce our PCB replacement product MCS.1238.* to our existing key PCB accounts (excluding E. Europe) from 1st December 1975.

- Introduce MCS.1238 to large accounts in France, Germany, Italy, Spain and other European countries including E. Europe, from 1st February,1976.

- Where necessary to improve relationships take a minor share of the PCB business at accounts in France and Germany from 1st January 1976.

- Present data on MCS.1238 to W. European Governments emphasising that it is in the development stage . Between 1st April and 1st July 1976.

- Monitor competitive reaction to our sampling of MCS.1238 and see if any come to us to propose licensing our technology. Review on 1st Sept.1976.

- Check out which non-competitor companies have production facilities suitable for alkylation of diphenyl or manufacture of TXS by 1st April 1976.

Note: * Any reference to MCS 1238 would apply to any other replacement for PCB's in capacitors.

DSW 185411

- Provide up-to-date information on status and value of our patents on MCS.1238 Quarterly.

- Exchange up-to-date information on progress of MCS.1238 evaluations by U.S.A. and European customers, changes in specifications for the product etc. Quarterly

- Decide whether MCS 1238 production represents a viable business, by 1st December 1976.

6. Safety Transformer Fluids

- Take a minor share of the business at the largest PCB transformer fluid user in France (the largest European market) from 1st July 1976. This is to have a base for the introduction of any non-PCB fluids we develop.

- Ensure that we are covered by Bayer TCB in the event of a retaliatory cut off by Prodelec due to the above, by 1st March 1976.

- Review progress of Monsanto U.S.A. development of a non-PCB safety transformer fluid, Quarterly.

STLCOPCB4051658

VI. THE PCB PROBLEM

Continued environmental pressures in the USA (see EPA statement in Appendix 9) will cause Monsanto to cease manufacture and sales of PCB's in the USA. The timing for Monsanto's phase out of PCB's in Europe will be in the period between the date of the phase out in the USA and the date on which European Governments cause a ban to be effective. When the date for Monsanto USA's withdrawal from PCB's is known, overall considerations related to public image, legal implications, etc. will influence the final decision for the timing of the withdrawal of PCB's in Europe. The impact of Monsanto's European withdrawal of PCB's needs to be carefully considered in the light of local market conditions in arriving at the final decision.

European competitors are likely to follow OECD/EEC/European Governments recommendations /rulings and they may well be able to profit out of a Monsanto decision seen as unilateral in European terms.

Assuming no European ban is effective before 1st of January 1978 we have two years in which to develop a market for PCB replacements and part of the action plans are aimed at replacing our current PCB capacitor impregnants by a polyphenyl derived replacement MCS 1238 (based on alkylated diphenyl).

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At the present time no satisfactory fire resistent replacements for PCB-based safety transformer coolants are available.

A Monsanto U.S. PCB position paper is to be found in Appendix 10.

A major change in the balance of supply/demand as it relates to diphenyl and terphenyl will occur when PCB's are banned. Currently about 60 % of European diphenyl production (see Appendix 4) is taken up by PCB production. Unless one or more of the diphenyl producers shuts down or other outlets for polyphenyls are found, there will be something like 50 % over capacity in Europe for polyphenyls in the event of a PCB ban.

VII. THE LONG RANGE PLAN

1. Results

(i) Achieve a $10M sales and 30% gross profit out of the Newport polyphenyls complex in 1980 (excluding PCB fluids).

2. Strategic Direction

Summary

Principle thrust will be to develop a business which is viable without PCB's.

(iv) Dielectrics

- Withdraw from PCB fluids in line with world-wide plans agreed by corporate management.
- Appoint a man to plan and coordinate the phase out of PCB's and the introduction of replacement products.
- When the decision to cease sales of PCB's is made, replace as much of our PCB business with non-PCB products based in order of desirability on
(i) polyphenyl derivatives, (ii) non-polyphenyl derivatives.

DSW 185415

(iv) Capacitor Impregnants - Europe (incl. E. Europe)

Item	Units	1973	1974	1975	1976	1977	1978	1979	1980	1985
Potential (PCB based)	tonnes	9400	9400	9400	9400	9400				
Potential (PCB based)	$ m			8.0	8.5					
Potential (non PCB based)	tonnes						6700	6700	6700	6700
Potential (non PCB based)	$ m						12.1			
Growth (vol.)	%	0	0	0	0	0	7	7	43	
Sales (PCB)	tonnes	3184	2866	2630	2658	2660				
Sales (PCB)	$ m	1.4	2.0	2.2	2.6	2.9				
M/I (vol.)	%	34	30	28	28					

Notes :

1. Forecasted growth for PCB fluids is zero because the reduced use of PCB's in Western Europe due to technological improvements is balance by increased used in Eastern Europe.
2. Approx. 25 % of the 1973 potential was in Eastern Europe.
3. The potential for non-PCB fluids if a ban becomes effective on 1st January 1978 is assumed to be the same cubic volume as PCB fluids i.e. the PCB potential divided by 1.4 to allow for density difference.

   1978 potential $ m for non-PCB fluids is based on a market price of $ 1800 / tonne (delivered)
4. No growth is expected is non-PCB fluids as the industry is likely to bring out new designs using less fluid. Any effect of growth in the number of capacitors used will be negated by these technological changes.

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(v) Safety Transformer Coolants

Item	Units	1973	1974	1975	1976	1977	1978	1979	1980	1985
Potential (PCB based)	tonnes	13000	13700	14300	15000	15800				
Potential (PCB based)	$ m			11.4	12.0					
Potential (non PCB)	tonnes						10400	10900	11400	14600
Potential (non PCB)	$ m						16.6			
Growth (cubic Vol.)	%		5	5	5	5	5	5	5	28
Sales	tonnes	975	1092	1068	998	1000				
Sales	$ m	0.5	0.7							
M/I (vol.)	%	8	8	7	7	6				

Notes :

1. Although the growth of the distribution transformer market is around 10 % p.a. this has been discounted to 5 % because of the PCB problem.
2. E. Europe market for this type of product is negligible. They make their own product or use oil.
3. The potential for non-PCB replacements if a ban becomes effective on 1st January 1978 is assumed to be the same cubic volume as PCB-based fluids i.e. it is the PCB potential divided by 1.6 to allow for the density difference.
4. 1978 potential $ m for safety transformer coolant to replace PCB-based fluid is based on an estimated market price of $ 1600 / tonne.

DSW 185417

4. Critical Assumptions

(iv) Capacitor Impregnants

- No Government ban on PCB's is effective before January 1st, 1978.
- Monsanto is able to develop a cost/performance competitive replacement for PCB's in large power factor capacitors.
- Replacement for PCB's will have to be locally manufactured if we are to retain a significant market share.

(v) Safety Transformer Fluids

- No Government ban on PCB's is effective before January 1st, 1978.

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5. Goals

(iv) Dielectrics

- Maintain M/I with PCB capacitor fluids at 25% min. and with PCB transformers fluids at 10% min. while sales are still allowed.
- In the event of a ban on PCB fluids achieve an M/I of 40% in the market for non-PCB capacitor impregnants.

6. Key Action Steps

4. PCB Withdrawal

- Prepare a plan, by 1st July 1976, in line with the one issued by the U.S. PCB Task force, which covers our withdrawal from PCB's.

- Appoint a project man to handle the introduction of PCB replacement and the PCB withdrawal programme and to liaise closely with St. Louis by 1st April 1976.

DSW 185419

5. Capacitor Impregnants

- Introduce our PCB replacement product MCS.1238.* to our existing key PCB accounts (excluding E. Europe) from 1st December 1975.
- Introduce MCS.1238 to large accounts in France, Germany, Italy, Spain and other European countries including E. Europe, from 1st February, 1976.
- Where necessary to improve relationships take a minor share of the PCB business at accounts in France and Germany from 1st January 1976.
- Present data on MCS.1238 to W. European Governments emphasising that it is in the development stage . Between 1st April and 1st July 1976.

- Monitor competitive reaction to our sampling of MCS.1238 and see if any come to us to propose licensing our technology. Review on 1st Sept.1976.
- Check out which non-competitor companies have production facilities suitable for alkylation of diphenyl or manufacture of TXS by 1st April 1976.

Note: * Any reference to MCS 1238 would apply to any other replacement for PCB's in capacitors.

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- Provide up-to-date information on status and value of our patents on MCS.1238 Quarterly.
- Exchange up-to-date information on progress of MCS.1238 evaluations by U.S.A. and European customers, changes in specifications for the product etc. Quarterly.
- Decide whether MCS 1238 production represents a viable business, by 1st December 1976.

(vi) Safety Transformer Fluids

- Take a minor share of the business at the largest PCB transformer fluid user in France (the largest European market) from 1st July 1976. This is to have a base for the introduction of any non-PCB fluids we develop.
- Ensure that we are covered by Bayer TCB in the event of a retaliatory cut off by Prodelec due to the above, by 1st March 1976.
- Review progress of Monsanto U.S.A. development of a non-PCB safety transformer fluid Quarterly

7. Sales Forecasts

Newport Manufacture (figures in tonnes)

Assumes PCB's discontinued 1st Jan 1978 and excludes sales of MCS 1238.

DSW 185421

Case 1: HB-40 Capacity in maintained at 1500 tonnes p.a.

Product	1975	1976	1977	1978	1979	1980
Aroclors Total	2630	2658	2660	-	-	-
Pyroclors Total	1068	998	1000	-	-	-

APPENDICES

X 1. Polyphenyls and derivatives currently manufactured.

2. Polyphenyls and derivatives we could envisage manufacturing.

3. Current situation in our markets.

4. Estimated 1973 European polyphenyl capacity and production.

5. HB-40 sales forecast detail.

6. P & PT comments on current technology.

7. Data on other producers of polyphenyls and derivatives.

X 8. Data on the 1973 market for PCB capacitor fluids and PCB based transformer fluids.

9. EPA statement on PCB's December 22, 1975.

10. Monsanto U.S. PCB position paper, December 1, 1975.

11. Misc. market data-heat transfer fluids, dye carriers, intermediates.

DSW 185422

APPENDIX I.

Polyphenyls and Derivaties currently manufactured

Product Chemical Name	Application
Trichloro - diphenyl	Fire resistant capacitor impregnant (Aroclor)
Blends of Penta and Hexa-chloro-diphenyl with trichloro-benzene	Fire resistant transformer coolants (Pyroclors 5 + 15)

DSW 185423

APPENDIX 3.

European markets currently supplied with Monsanto polyphenyl derived products

Market	Product Supplied	Competitive Products	Strengths / Weaknesses of Monsanto Product
Capacitor impregnants PCB based Est. market value 1976 $ 8.5 m	Aroclor 1342 Aroclor 1342 El (Aroclor 1043) (MCS. 1498) Monsanto 1976 budget $ 2.6 m	Clophen C(Bayer) Clophen CS (Bayer) (ex Prodelec) Pyralene 3010 Pyralene 3011 Pyralene 1500 Pyralene 1501	-Strengths vs. Bayer and Prodelec: nothing significant. vs. Bayer : we have MCS 1489 to match Pyralene 1500. Significant M/I (25 %). -Weaknesses vs. Prodelec : have no equivalent of Pyralene 1500, 1501. Nearest is MCS.1489 but it is a development product and is more highly chlorinated. Over half our business is in E.Europe where future is uncertain. Environmental problems.
Capacitor impregnants PCB replacement Est. market value 1978 $	MCS.1238	Chloroalkylene 12 (Prodelec) ? (Bayer) chlorinated diphenyl oxide (ICI) ? alkyl naphthalenes (Esso) ? benzylated methenes (Hüls) + (Japs) ?	-Strengths vs. Prodelec : their product would probably be classed as a PCB . Franchise with European affiliates of GE and Westinghouse through our US position. -Weaknesses vs. Prodelec & Bayer : no real knowledge of their plans. PCB replacements will be less special than Aroclors MCS.1238 less fire resistant than Chloroalkylene 12.

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APPENDIX 3.

European markets currently supplied with Monsanto polyphenyl derived products

Market	Product Supplied	Competitive Products	Strengths / Weaknesses of Monsanto Product
PCB based fire resistant transformer coolants Est. market value 1976 $ 12.0 m	Pyroclor 5 Pyroclor 15 (Inerteen 100-42)	Clophen T64 (Bayer) Clophen T241(Bayer) Pyralenes (Prodelec) + products ex Caffaro(local only) Coquisa/Flix (local only)	-Strengths vs. Bayer+Prodelec+others: our experience with lower chlorinated transformer fluids in U.S.A. vs. all : U.S.A. leads in PCB replacements. -Weaknesses vs. Bayer+Prodelec : we have to buy our trichlorobenzene from one or both of them vs. Bayer+Prodelec : limited knowledg of markets in Germany, France and Italy. Low M/I (8 %).
Safety transformer fluids to replace PCB-based products Est. market value 1978 $ 16.6 m		silicones ?	-Strengths vs. Bayer+Prodelec : closer relationship with General Electric U.S.A. + Westinghouse U.S.A. for evaluation of new products. -Weaknesses No proven candidates.

DSW 185425

P & PT Comments on Current Technology

Notes on discussions with H.A. Vodden

3. Capacitor fluids

- G.E.'s ability to use MCS 1238 in existing designs of power factor capacitors is a critical issue.

- Time allowed for switch from PCB's to non-PCB fluids is also important as it determines how long manufacturers will have to alter their capacitor designs in order to use less fluid.

- At CIGRE both the Germans and the Poles favour dichlorodiphenyl for capacitors and the Swiss have also said OK to dichlorodiphenyl for small capacitors. What concentrations of higher homologs are allowed is yet to be defined.

  The Swiss law says, in fact, that nothing higher than dichloro- can be used after 1976.

- Although the amounts of 4-4' dichlorodiphenyl in MCS 1043 could be expected to cause trouble, they don't.

- Outside of the U.S.A. there is not too much pressure on PCB's. Manufacturers of PCB's in Europe should go to lower chlorinated products. The Swedes and the Swiss want to go this way. The Swedes probably prefer dichlorodiphenyl to a new molecule because they now understand alot about PCB's. They would want to specify content of higher homologs.

- Non-PCB fluids open up a whole new set of competitors, e.g. Alkylated naphthalenes ex Esso at around $300/tonne, Chlorinated diphenyl oxide ex ICI (rumoured to be copying Dow).

- Alkylated naphthalene could be a good base stock for our sulfone technology.

- Our sulfone technology is our only real handle on the impregnants business if it goes non-PCB. MCS 1238 is test of our sulfone technology but lower cost base stocks exist. Lipinol T ex Huls is another possibility.

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- Huls could perhaps alkylate biphenyl for us.

- The Japanese are using low permittivity fluids (Nippon article refers to triarylmethanes).

4. Transformer fluids

- Bayer still make chlorinated terphenyls and sell for plasticiser applications. They could make a good transformer blend with a mixture of lower chlorinated biphenyl, lower chlorinated terphenyl plus trichlorobenzene. The fire resistance would be good because chlorinated terphenyls contain less hydrogen than chlorinated biphenyls. Maybe they could chlorinate crude biphenyl.

- Transformers (askarel type) could be replaced by dry type or cast resin. For us to be successful a patent position would be required.

Data on other Producers of Polyphenyls and Derivatives

1973 Production

Prodelec = (Rhone Progil + Ugine Kuhlmann)

Name	% Cl.	Production
Di-	32	404
Tri-	42.5	3627
Tetra-	48	711
Penta-	54	1114
Hexa-	59	43
Hexa+1/2	62	3730
Hepta-	63	11
Octo-	66	34
TOTAL		9674

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Chlorinated polyphenyls and benzenes

Prodelec

- -is owned 50/50 by Rhone Progil and Ugine Kuhlmann,
- -handles sales of PCB's for dielectric uses world-wide and sales of PCB's for non-dielectric uses on export markets only,
- -obtains supplies of PCB's 50/50 from Rhone Progil and Ugine Kuhlmann,
- -has a plant for production of selected PCB isomers and currently produces 2-4' and 2-2' dichloro-diphenyl,
- -has announced a new product chloroalkylene 12 based on alkylated dichlorodiphenyl,
- -obtains supplies of chlorobenzenes from Rhone Progil and Ugine Kuhlmann probably 50/50 for dielectric uses.

Rhône Progil

- -has a chlorination plant to manufacture only PCB's and chlorinated naphthalenes,
- -is a "Lindane" manufacturer in a joint manufacturing venture with Kuhlmann and obtains supplies of chlorobenzenes as a by-product from this manufacture.
- -has a large chlorobenzenes business,
- -are basic in chlorine.

Ugine Kuhlmann

- -has a chlorination plant operating in the liquid phase,
- -has a joint venture with Rhône Progil for manufacture of Lindane,
- -chlorinated terphenyl are produced by chlorination of crude terphenyls followed by distillation,
- -it is possible that Ugine's chlorination plant is a multipurpose plant (like Bayer's) and that they also produce their chlorobenzenes in it ?
- -are basic in chlorine.

DSW 185429

1973 Production

Bayer

Name	% Cl.	Production
Clophen		
A30	42.5	1894
A30S	42.5	247
A40	48.5	593
A40S	48.5	238
A50	54.5	328
A50T	54.5	1205
A60T	62	1205
TOTAL		5710

Additional Data :

Chlorinated polyphenyls and chlorobenzenes

Bayer

-manufactures PCB's in a multipurpose chlorination unit which also makes chlorinated benzenes and other chlorinated benzenoids.

-buys in "Lindane" by-product from German producers to refine and market.

-are basic in chlorine.

DSW 185430

1973 Production

Monsanto Europe

(as likely to be computed by our competitors)

Name	% Cl.	Production
1242	42	2851
1248	48	451
1254	54	454
1260	60	311
TOTAL		4067

Additional Data : (estimated to be knowledge among our key competitors)

Chlorinated polyphenyls and chlorobenzenes

Monsanto -not basic in chlorine,

-have sole purpose plant for chlorinating diphenyl in liquid phase,

-buy chlorobenzenes from Prodelec and Bayer.

DSW 185431

1973 Production

Caffaro, Italy

Name	% Cl.	Production
Fenclor 42	39	341
54	52	126
64	60	1688
70	64	84
DK	70	280
TOTAL		2519

Additional Data :

Chlorinated polyphenyls and chlorobenzenes

Caffaro

-partly owned by Kuhlmann who provide much of the know-how,

-are basic in chlorine,

-like Kuhlmann have plant chlorination of diphenyl in the vapour phase to decachloro-diphenyl for diol production. Plant is a full scale unit larger than Kuhlmann's,

-have a chlorination plant for chlorination of diphenyl in the liquid phase to PCB's,

-buy their chlorinated benzene needs from Prodelec.

DSW 185432

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1973 Production

Flix, Spain

(All estimated as no OECD statistics available to help)

Name	% Cl.	Production
trichloro	42	600
hexachloro+1/2	62	1200
TOTAL		1800

Additional Data :

Coquisa a Rhône Progil subsidiary market the PCB's produced by Flix under licence from Rhône Progil

Chlorinated polyphenyls and chlorobenzenes

Flix

-basic in chlorine,

-have normal plant for chlorination of diphenyl in liquid phase,

-buy chlorobenzene needs from Prodelec.

APPENDIX 8.

Data on the 1973 market for PCB capacitor fluids and PCB-based transformer fluids

DSW 185434

1973 Market for PCB Capacitor Fluids

(derived from 1973 OECD Statistics - Figures in mettons)

Country	M.	B.	P.	C.	C/F	TOTAL
Australia	22	-	39	-	-	61
Austria	-	50	115	-	-	165
Belgium	137	-	135	-	-	272
Canada	435	-	-	-	-	435
Denmark	-	13	17	-	-	30
Finland	304	-	-	-	-	304
France	27	-	1151	122	-	1300
Germany F.R.	-	1020	467	-	-	1487
Greece	-	-	-	-	-	-
Iceland	-	-	-	-	-	-
Italy	211	273	471	467	-	1422
Japan	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-
Netherlands	-	6	86	-	-	92
New Zealand	-	-	-	-	-	-
Norway	15	-	10	-	-	25
Portugal	-	-	-	-	-	-
Spain	119	1	-	-	600	720
Sweden	108	-	227	-	-	335
Switzerland	37	29	70	-	-	136
Turkey	-	1	-	-	-	1
U.K.	827	-	-	-	-	827
U.S.A.*	12502	-	-	-	-	12502
Ireland	-	-	-	-	-	-
TOTAL OECD	14744	1393	2788	589	600	20114
TOTAL non OECD	1615	856	1590	-	-	4061
TOTAL World	16359	2249	4378	589	600	24175
% Share	68	9	18	2	3	100
TOTAL W.Europe	1785	1393	2749	589	600	7116
% Share Europe	25	20	39	8	8	100

* estimates only St. Louis to confirm correct split between capacitors and transformers.

M = Monsanto P = Prodelec, France C/F = Coquisa/Flix, Spain
B = Bayer, Germany C = Caffaro, Italy

DSW 185435

European market excl. E. Europe for PCB based capacitor fluids in 1973 was approx. 7200 tonnes PCB's.

For Eastern Europe 1973 estimate :

U.S.S.R.	1500
Romania	450
Hungary	150
Misc.	100
Total	2200

The E. German market of 400 tonnes is now supplied ex Czechoslovakia.

If these figures are divided by 1.4 to allow for the density of PCB's the markets would become :

W. Europe	approx.	5100 tonnes p.a.
E. Europe	approx.	1600 tonnes p.a.
Total Europe	approx.	6700 tonnes p.a.

Our sales at different M/I's would be as follows :

M/I	W.Europe tonnes	E.Europe tonnes	Total
20	1000	300	1300
40	2000	600	2600
70	3600	1100	4700

DSW 185436

1973 Market for PCB based transformer fluids

(derived from 1973 OECD statistics - figures in mettons)

Country	M.	B.	P.	C.	C/F	TOTAL
Australia	141	-	-	-	-	141
Austria	-	41	-	-	-	41
Belgium	411	669	-	-	-	1080
Canada	1360	-	15	-	-	1375
Denmark	-	-	-	-	-	-
Finland	-	-	40	-	-	40
France	-	-	4560	340	-	4900
Germany F.R.	-	2330	-	-	-	2330
Greece	-	-	12	-	-	12
Iceland	-	-	-	-	-	-
Italy	-	286	-	1759	-	2045
Japan	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-
Netherlands	-	15	-	-	-	15
New Zealand	-	-	26	-	-	26
Norway	-	-	-	-	-	-
Portugal	-	27	24	-	-	51
Spain	-	-	-	-	2000	2000
Sweden	-	-	-	-	-	-
Switzerland	-	-	25	-	-	25
Turkey	-	44	-	-	-	44
U.K.	463	-	-	-	-	463
U.S.A.*	3931	-	-	-	-	3931
Ireland	-	-	-	-	-	-
TOTAL OECD	6306	3412	4702	2099	2000	18519
TOTAL non OECD	-	452	502	-	-	954
TOTAL World	6306	3864	5204	2099	2000	19473
% Share	32	20	27	11	10	100
TOTAL W.Europe	874	3412	4661	2099	2000	13046
% Share Europe	7	26	36	16	15	100

* estimates only St. Louis to confirm correct split between capacitors and transformers.

M = Monsanto P = Prodelec, France C/F = Coquisa/Flix, Spain
B = Bayer, Germany C = Caffaro, Italy

DSW 185437

European market excluding E. Europe which is self supplied for PCB based transformer fluids in 1973 was approx. 13000 tonnes.

If these figures are divided by 1.6 to allow for the density of the fluid, the markets become :

Total Europe approx. 8000 tonnes

Our sales at different M/I's would be as follows :

M/I	Total Europe
20	1600
40	3200
70	5600

DSW 185438