



E. I. DU PONT DE NEMOURS & COMPANY
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1982 RESEARCH SUMMARY AND
TECHNICAL ACTIVITY BRIEF

Attached is the Research Summary for Colored Pigments.
Please call me at 292-3715 if you have any questions.

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Attachment

N 26960

Role of Technology

Superior quinacridone process and product technology is the key factor in maintaining Du Pont's competitive leadership in quinacridones. The quinacridone segment is Du Pont's strength in Colored Pigments.

Evaluation

	Technology Position Opposite Competition		<u>Summary</u>
	<u>Today</u>	<u>3-5 Years</u>	
Product			
Quinacridones	+	+	Superior products for automotive finishes and plastics.
Inorganics	0	0	Conventional inorganics competitive in all areas. "Krolor" superior for plastics applications.
Copper Phthalocyanine	0	0	CPC blues are generally equal to competition.
Other Organics	0	0	Competitive products for ink and consumer paints, but product line is narrower than competition's.
Process	0	0	Low cost producer of quinacridone crude and inorganics. Some copper phthalocyanine and other organic processes are not cost competitive.

Patent Position

Du Pont's current competitive advantage in the quinacridone business is a direct result of past strong patent position on process and product technology.

Critical quinacridone patents on crude synthesis and solid solution products have expired in the last several years, allowing competition, especially Bayer, to introduce products that had been unique to Du Pont. Patent protection continues through the late 1980's on important treating agents and quinacridone gold products. No strong patent protection exists for other product lines with the exception of silica coated lead chromates ("Krolor") where product and process patent protection exists through the mid-80's. Competition is marketing "Krolor" type products, which we feel infringe our basic patents.

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Key Technologies

Quinacridone

- Crude Synthesis
- Finishing Technology
- Product Properties

	Du Pont	Hoechst	Bayer	Sun
Crude Synthesis	▲			
Finishing Technology		▲	▲	▲
Product Properties	▲			

Competitive Technical Activity

State of the Art

Research in Colored Pigments at Du Pont and major competition is generally aimed at modifying and improving existing products to meet the performance needs of changing end-use industries. European pigments manufacturers have also been successful in research aimed at developing completely new pigment chemical types (as judged by patent activity) especially in the yellow, orange, red color areas. Du Pont currently does not have a major technical effort aimed at new pigment development.

Major Activity

- Bayer has developed a small production unit (Bushey Park, S.C.) utilizing Du Pont quinacridone synthesis technology to produce unique red products.
- Bayer and Sun are actively developing quinacridone solid solution products which had previously been unique to Du Pont.

Du Pont Assessment

- Du Pont production scale should continue to yield better economics.
- Du Pont technical expertise in quinacridone product development and strong ties with Fabrics & Finishes Department will maintain our lead in new product development.

Conclusion

Du Pont's strength in Colored Pigments resides in the quinacridone segment of the business. Our large scale production facility based on intermediate synthesis of dihydroquinacridone and our backward integration to dimethylsuccinate (a Petrochemicals Department by-product) combine to make us the low cost producer of crude quinacridone. The requirement for high temperature operation and sophisticated solvent recovery make it difficult for competitors to duplicate our economics without significant investment. Bayer has installed a demonstration facility based on our technology to produce products formerly unique to Du Pont and are now studying the feasibility of using this technology to expand their quinacridone capacity.

Improved product introductions are key to maintaining a competitive advantage. Our technical expertise in quinacridone product development and our close ties to the critical automotive industry through Fabrics & Finishes Department should allow us to continue our product superiority.

Du Pont is generally equal to competition in product technology in non-quinacridone segments of the business. However, our multiplant configuration and low capacity utilization result in process cost disadvantages in these segments vs. competition.

Research Strategy and Programs (1982)

Research emphasis will be placed on maintenance of our quinacridone competitive position through improved product development to respond to new automotive finishes technology and to expand quinacridone penetration into high value plastics markets. Development of improved products in non-quinacridone business segments will be minimized over the next several years.

Manufacturing technical programs are aimed at upgrading and documenting existing product technology to improve operating reliability, allowing future operation of the Colored Pigments business in a more cost effective manner to improve profitability and competitive position.

1982 Programs

	1981		1982		Incentive
	Expenditures		Expenditures		
	MP	\$M	MP	\$M	
<u>Tactical Research</u>					
● Develop new, improved QA products to meet changing automotive end-use technology and maintain our competitive position.	3.8	614	3.1	650	● \$4.7MM PTE during 1983-1986. ● Protection of our QA competitive position.
● Develop new non-QA product forms that improve value-in-use in critical paint and plastics applications.	3.2	496	2.7	550	● \$4.0MM PTE during 1983-1986.
● Development of new environmentally acceptable yellow-red pigments for paints and plastics.	4.5	820	1.2	250	● Improved market image. ● Program reduced because of low probability of success.
<u>Manufacturing Technical</u>					
● Upgrade and document operating technology and facilities to allow more reliable operation of manufacturing processes.	7.2	1070	18	2790	● \$1.5MM/yr. in inventory and reprocessing costs. ● Allows achievement of Colored Pigments zero based management.

Key Issues

- Can we be successful in process improvement program to achieve cost reduction goals of Colored Pigments business?
- Will we successfully maintain our quinacridone competitive position through new product development programs?

	Technical Expenditures (\$MM)		
	<u>1981(A)</u>	<u>1982(F)</u>	<u>1983 (F)</u>
R&D	3.4	2.3	2.9
MT	<u>3.4</u>	<u>4.8</u>	<u>3.8</u>
Total	6.8	7.1	6.7
R&D % S+T	2.6	1.5	1.7
Total % S+T	5.3	4.7	3.9

	Research Objectives (%)		
	<u>1981(A)</u>	<u>1982(F)</u>	<u>1983(F)</u>
Cost Reduction			
Existing Process	10	6	17
New Process	-	-	-
Capacity	5	-	-
Existing Product			
Improvement	53	82	83
New Product	32	12	-
Regulations	-	-	-

P. A. Wriede:jla
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