to obtain reliable price information in the market (Goodrich, slip op. at 87-88; Goodrich F 211-15, 219-21; Goodrich ID at 93-94).

654. Record evidence in this case, as discussed infra, confirms that reliable price information is available to PVC producers in each of the relevant markets.

G. Price Protection Classes in Each of the Relevant PVC Markets Reduce the Incentive To Cheat on a Collusive Agreement

655. Most contracts in each of the relevant PVC markets contain two forms of price protection clauses: meeting competition clauses and clauses requiring advance notice of price increases (Goodrich, slip op. at 86; Goodrich F 237-38; Goodrich ID at 94). These clauses facilitate collusion by reducing the incentive to cheat on a collusive agreement (Goodrich, slip op. at 86) .

656. "Price protection" clauses include most-favored-nations clauses, and meeting competition clauses (also known as meet-or-release clauses) (Goodrich F 237; *See* Klass Dkt. 9159, 5695, 5704). They also include clauses requiring advance notice of price changes. As a matter of economic theory, these price protection clauses can facilitate collusion by reducing the potential gain from cheating on a collusive arrangement (*See* Klass Dkt. 9159, 5695-5704).

657. Most contracts in the PVC industry contain meeting competition clauses (Goodrich, slip op. at 87; Goodrich F 211, F 237). Furthermore, in most supplier-customer relationships without written contracts, customers bring competitive offers to other suppliers in the same way as would occur under a meeting competition clause (Goodrich, slip op. at 87-88; Goodrich F 237).

658. The existence of meeting competition clauses deters cheating because it encourages the customer to transmit information regarding a competitive offer to its regular supplier. Thus, the clause leads to detection of discounts (Goodrich, slip op. at 87; *See* Kaserman Dkt. 9159, 2394-96; *See also* Hirschleifer, *Price Theory and Applications*, 309-311 (1984); Salop, "Practices That (Credibly) Facilitate Oligopoly Coordination," *New Developments in the Analysis of Market Structure* 280 (Stiglitz, ed. 1986).

659. Most contracts in the PVC industry contain clauses requiring advance notice of price increases (*e.g.*, 30 days) (Goodrich

F 238). These clauses formalize the practice of giving advance notice of price increases. By giving advance notice, a supplier is able to ascertain whether its competitors are following a price increase prior to its effective date. Absent the advance notice, a period of time is necessary for other firms to discover and react to the price increase. During this lag time, the supplier that initiates a price increase may lose sales to those suppliers who have yet to react and raise prices. Thus, absent advance notice, there is an incentive not to be the first supplier to raise price and, therefore, an incentive against price increases occurring (*See* Areeda, *Antitrust Analysis* 274 (1981); Posner, *Antitrust Law: An Economic Perspective* 61 (1976); Stigler, *The Organization of Industry* 42-43 (1976); F.M. Scherer, *Industrial Market Structure and Economic Performance* 222-25 (2d ed. 1981); J. Bain, *Price Theory* 273-283 (1952)).

H. Anticompetitive Conduct in the Relevant PVC Markets Would Not Be Threatened By Rapid Technological Change

660. Market power may be harder to exercise or less likely to endure in the face of rapid technological change. New technology may signal that the market is being transformed, which may result in new entry, declining concentration, or unstable market shares.[36] Conversely, the absence of rapid technological change in a market may decrease the threats to the maintenance of a collusive agreement, and may thereby increase the likelihood that collusion will endure should it occur (*See* Klass Dkt. 9159, 5426-29).

661. None of the relevant PVC markets is currently undergoing rapid technological change (Goodrich ID at 94; Goodrich F 232; JX 3, PX 8 at 86 ln. 24 - 87 ln. 7; CPF 719-720). [##] (Goodrich F 223-226; *See* H. Wheeler Dkt. 9159, 734-35; Dkt. 9159 CX 515G; Dkt. 9159 RX 639H, R *In Camera*), and the development and implementation of vinyl chloride emission control technology to comply with newly-instituted environmental and worker safety regulations (Goodrich F 227-231; *See* Dkt. 9159 CX 642 U-V; Dkt. 9159 CX 597 A-E). Today, these changes have been largely implemented (Goodrich F 232).

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[36] *FTC Merger Statement*, (CCH) ¶ 4,516 at 6,901-3.

662. The initial growth and development of mass and suspension PVC as a product in the 1950's and 1960's occurred as flexible (plasticized) PVC resin found markets in wire and cable, calendered sheet, and specialty applications (Goodrich F 222; *See* DiLiddo Dkt. 9159, 3106-08; Dkt. 9159 CX 53D). [##] (Goodrich F 222; Dkt. 9159 RX 639H *In Camera*).

663. [##] (Goodrich F 223; Dkt. 9159 RX 639H *In Camera*; *See* Eades Dkt. 9159, 1464-65; McMath Dkt. 9159, 1893, 1922; Dkt. 9159 RX 639H *In Camera*). [##] (Goodrich F 223; Dkt. 9159 RX 639H, P *In Camera*). As demand for mass and suspension PVC resin shifted toward large volume, commodity grade end-use applications, PVC producers began to install large reactors of 18,000-35,000 gallon capacity to serve this demand; accompanying technology, such as computerization to ensure consistency in resin quality and efficiency in resin production using large-batch processes, was also developed (Goodrich F 223; Dkt. 9159 Disch 641, 648-53).

664. [##] (*See* Dkt. 9159 CX 42A-Z64 *In Camera*; Dkt. 9159 RX 639H, *In Camera*). [##] (Eades Dkt. 9159, 1464-65; Dkt. 9159 RX 639H *In Camera*).

665. Large reactors in use in the United States today range in size from 18,000 gallons to about 40,000 gallons in capacity; reactors of 50,000 gallon capacity are in use in Europe (Goodrich F 224; *See* Dísch Dkt. 9159, 638-40; Schaefer Dkt. 9159, 1213-14). Small reactors range in size from 2,000 to 5,000 gallons in capacity (Goodrich F 229; Schaefer Dkt. 9159, 1213).

666. Large reactor technology increased the efficiency of PVC production, reduced labor costs, and provided economies of scale above that available from small reactor technology (Goodrich F 225; Disch Dkt. 9159, 643; Schaefer Dkt. 9159, 1140; *See* Dkt. 9159 CX 515G). The cost disadvantage of using a small reactor production configuration compared to that of a large reactor production configuration can be quite significant for commodity applications (Goodrich F 225; *See, e.g.*, H. Wheeler Dkt. 9159, 1734; Eades Dkt. 9159, 1463-65).

667. [##] (Goodrich F 226; *See* H. Wheeler Dkt. 9159, 1720-21, 1725; Dkt. 9159 RX 639D, H *In Camera*; Dkt. 9159 CX 515G; *See also* Eades Dkt. 9159, 1479-80). Many of the remaining small reactor PVC plants are still used to manufacture specialty PVC resin

grades (H. Wheeler Dkt. 9159, 1757-58; Schaefer Dkt. 9159, 1078-79; Becker Dkt. 9159, 1263- 64). However, it is unlikely that new small reactor capacity would be built by a producer today (Goodrich, slip op. at 79, n.178; Goodrich F 226; H. Wheeler Dkt. 9159, 1758; Disch Dkt. 9159, 640).

668. [##] (Schaefer Dkt. 9159, 1212; H. Wheeler Dkt. 9159, 1735-36; Dkt. 9159 RX 53I *In Camera*).

669. The mid-to-late 1970's were also a period of fundamental changes in the regulatory environment facing the PVC and VCM industries, a factor which had a profound effect on the technological design, siting, and operation of plants, capital costs, and the structure of the markets (Goodrich F 227; *See* Dkt. 9159 CX 642Z5-Z6; Dkt. 9159 CX 504D-O; Dkt. 9159 CX 597A-E; Dkt. 9159 CX 505S-U). While regulations promulgated by both federal and state agencies during this period affected all aspects of the PVC and VCM businesses, environmental regulations had the greatest overall impact (Goodrich F 227; *See* Dkt. 9159 CX 597C). Following the finding that VCM was a specific cause of liver cancer, the Occupational Health and Safety Administration (OSHA) promulgated a standard in 1975 to reduce occupational exposure to VCM; in 1976, the Environmental Protection Agency (EPA) promulgated a standard to reduce atmospheric VCM emissions (Goodrich F 227; *See* Dkt. 9159 CX 642U). Additional environmental regulations affecting other aspects of PVC and VCM/EDC production facilities were subsequently promulgated, (Goodrich F 227; Dkt. 9159 CX 597C-D; Dkt. 9159 CX 642Z164-Z177).

670. [##] (Goodrich F 228; Dkt. 9159 CX 200L *In Camera*; Dkt. 9159 CX 642Z5). Most of the requirements regarding VCM control technology pertain to PVC plants because these facilities contribute proportionately more emissions than VCM/EDC plants as a result of characteristics inherent in the batch process (Goodrich F 228; Dkt. 9159 CX 842).

671. Changes brought about by the promulgation of the VCM emissions standard were felt most acutely by the older PVC plants that had to retrofit their processes with new controls (Goodrich F 229; Dkt. 9159 CX 642Z5). As a result of the stringent requirements, seven PVC plants were forced to close down, three on a permanent basis (Goodrich F 229; Dkt. 9159 CX 642Z6). [##] (CX 5D-E *In*

Camera). Several PVC and VCM/EDC plants were still in the design phase during development of the regulation, and the engineering had to be altered to accommodate the new requirements (Goodrich F 229; Dkt. 9159 CX 642Z5; *See, e.g.*, Dkt. 9159 CX 505 S-U; Dkt. 9159 CX 504D-O). PVC producers also noted a 10% to 12% average loss in capacity as a result of compliance requirements (Goodrich F 229; Dkt. 9159 CX 642Z5; *See e.g.*, Dkt. 9159 CX 447J). This capacity loss was mainly due to the time needed to clean reactors and purge systems after each batch in an effort to reduce VCM emissions (Goodrich F 229; Dkt. 9159 CX 642Z5 - Z6).

672. The total cost of compliance for producers affected by the federal VCM atmospheric emissions standard alone for the 10-year period 1977 to 1986 is estimated to be $765.7 million (in 1977 dollars), including investments, capital, operating, and maintenance costs for new and existing plants (Goodrich F 230; Dkt. 9159 CX 642Z5).

673. The technological trend in the PVC industry throughout the 1970's toward large reactors, automation, computerized control of production, and decreased emphasis on the production of specialty PVC resins was partly promoted by, and greatly facilitated compliance with, the various environmental regulations (Goodrich F 231; Dkt. 9159 CX 642Z6, Z49-Z137). Current technology is well-established and stable (Goodrich F 232; Dkt. 9159 CX 642Z50-Z51). At the present time, nearly all PVC plants have completed the modifications necessary for compliance (Goodrich F 232; Dkt. 9159 CX 642Z6).

674. Thus, product and process technology is now considered to be stable and unlikely to undergo any significant change in the mass and suspension PVC market, the suspension PVC copolymer market and the dispersion PVC market (JX 3, PX 8 at 86 ln. 24 - 87 ln. 7; *See* Goodrich, slip op. at 78).

675. Because rapid change in process, environmental, or product technology in each of the relevant markets is unlikely to occur in the foreseeable future (*See* Klass Dkt. 9159, 5427-29), collusive behavior is less likely to be threatened by new entry and therefore more likely to endure should it arise.

I. The Declining Rate of Growth in Demand for Each of the Relevant Products Facilitates Anticompetitive Pricing

676. In markets where demand growth is rapid, a firm can cheat on a collusive agreement by discounting price to capture the new orders and new customers, made available as demand increases, without signaling this fact to other members of the collusive group, because they will not detect a loss of existing customers (Kaserman Dkt. 9159, 2424). In markets where demand growth has slowed, however, there will no longer be a large inflow of new buyers to which secret discounting can be directed. Additional sales must be gained at the expense of other firms in the market, thus making it easier for members of a collusive group to detect cheating. A slower rate of growth in demand facilitates the monitoring of cheating on a collusive agreement, and thus contributes to its stability (Kaserman Dkt. 9159, 2424).

677. A slower rate of growth in demand can also operate to change the expectations of incumbent firms with respect to new entry. If demand growth has slowed, is stable, or is declining, incumbent firms may be less concerned with the threat of entry of new firms than if demand growth were rapid, and may therefore be more inclined to engage in anticompetitive behavior (Kaserman Dkt. 9159, 2425, 2429-30).

678. Thus, a slower rate of growth in demand in a market tends to promote the formation and maintenance of collusive agreements (Kaserman Dkt. 9159, 2425, 2429-30).

679. The overall rate of growth in demand for mass and suspension PVC resin is expected to be much lower in the 1980's and in the future than it was in the 1960's and 1970's (Goodrich slip op. at 90, 94; Goodrich F 233; Goodrich ID at 94; DiLiddo Dkt. 9159, 3107-14, 3119; Disch Dkt. 9159, 691-92; Schaefer Dkt. 9159, 1122 Becker Dkt. 9159, 1265-68; Dkt. 9159 CX 64U; *See also* Liao Dkt. 9159, 1518-19).

680. [##] (Goodrich, slip op. at 90; Goodrich F 234; *See* Dkt. 9159 CX 64U; Dkt. 9159 CX 185D *In Camera*). [##] (Goodrich, slip op. at 90; Goodrich F 234; *See* DiLiddo Dkt. 9159, 3110; Becker Dkt. 9159, 1265-66; Dkt. 9159 CX 14F *In Camera*; Dkt. 9159 CX 67Z8 *In Camera*). [##] (Goodrich F 234; *See* Dkt. 9159 RX 639H *In*

Camera). [##] (Goodrich, slip op. at 90; Goodrich F 234; *See* DiLiddo Dkt. 9159, 3109-10; Dkt. 9159 CX 67Z8, *In Camera*). Rapid growth through the 1960's and early 1970's was sustained as more and more uses were found for PVC. Its versatility as a product also enabled PVC to replace traditional materials in a multitude of applications (Goodrich F 234; Disch Dkt. 9159, 719; Schaefer Dkt. 9159, 1154-55; DiLiddo Dkt. 9159, 3108; Becker Dkt. 9159, 1268-70; Dkt. 9159 CX 53D). Beginning in 1979, however, actual average growth rates declined to the 3%-4% range (Goodrich, slip op. at 90; Goodrich F 234; *See* H. Wheeler Dkt. 9159, 1731-32; Becker Dkt. 9159, 1265-66; *See also* Eades Dkt. 9159 1471).

681. [##] (Goodrich, slip op. at 90; Goodrich F 235; Goodrich, ID at 94; Becker Dkt. 9159, 1266-67 Eades Dkt. 9159, 1470; L. Wheeler Dkt. 9159, 941; DiLiddo Dkt. 9159, 3112-14, 3324-25; Dkt. 9159 CX 16Z11 *In Camera*; Dkt. 9159 CX 513C *In Camera*; Dkt. 9159 CX 374E-G, L *In Camera*; Schaefer JX 1, 585 ln. 2 -587 ln. 20; JX 3, PX 8 at 18 ln. 7-15, 80 ln. 20-24, 89 ln. 1-5; JX 3, PX 9 at 100 ln. 24 - 101 ln. 8; 125 ln. 15-17; JX 3, PX 6 at 82 ln. 11-23; JX 3, PX 10 at 1154 ln. 18 - 1157 ln. 8; JX 3, PX 11 at 691 ln. 15-23; JX 3, PX 13 at 452726). As observed by Dr. DiLiddo of Goodrich, "The world is changing, the PVC business is maturing, the opportunities for new markets . . . have been defined to a very large degree" (Goodrich F 235; DiLiddo Dkt. 9159, 3324-25).

682. [##] (CX 43E; RX 1L *In Camera*). [##] (CX 43L; CX 166; RX 1L *In Camera*; RX 300B; RX 307A; RX 312J; Donnelly CX 176D ¶ 4 *In Camera*; Heath CX 178E ¶ 8 *In Camera*). Demand for both suspension PVC copolymer and dispersion PVC is expected to grow at a slower rate than growth in demand for mass and suspension PVC (JX 3, PX 6 at 82 ln. 11-23; JX 3, PX 8 at 89 ln. 1-10; JX 3, PX 9 at 100 ln. 24 - 101 ln. 8).

683. [##] (RX 1L *In Camera*; CX 43G-I). This does not suggest, however, that demand for PVC resin in the relevant markets will grow in the future at a rate close to the rate at which it grew in the 1960's and 1970's. On the contrary, the rate of growth in demand for PVC resin in the relevant markets for the decade and beyond is, as Mr. Disch and others have testified, likely to be much closer to GNP than it is to a much higher level (Disch Dkt. 9159, 691; *See* CPF 725).

684. Increases in demand observed in recent years in the relevant markets reflect recovery of the PVC industry from the recession of the early 1980's. Also, the PVC industry has benefitted from strength in particular segments of the economy. While, in addition, PVC has grown in a limited number of newer applications, this growth is clearly of a much lesser magnitude than the type of explosive growth that the PVC industry enjoyed in the 1960's and 1970's, as noted in the Goodrich proceeding (Goodrich F 234).

685. From 1979 to 1987, aggregate PVC demand grew at a compound annual rate of 3.4 percent (compare CX 213C and Dkt. 9159 CX 672Z5). [##] (*See* RX 1L, RX 1V *In Camera*; RX 43C, RX 43E *In Camera*).

686. (Goodrich F 236; *See* Liao Dkt. 9159, 1517-19; Dkt. 9159 RX 639H *In Camera*). The slower rate of growth since 1979 discouraged entry into the relevant markets (Goodrich F 236; *See* Eades Dkt. 9159, 1468-69).

687. Moreover, the perception by PVC producers that demand for PVC will grow only slowly in each of the relevant PVC markets is acknowledged by producers in the industry to have an impact on their expectations regarding new entry (Goodrich F 236; *See, e.g.*, Schaefer JX l, 585 ln. 2 - 587 ln. 20; Schaefer Dkt. 9159, 1133; H. Wheeler Dkt. 9159, 1736; *See also* Eades Dkt. 9159, 1486-87).

688. Thus, a slower rate of growth in demand in the future for PVC resin in each of the relevant markets will make entry less likely to occur, affects the expectations of incumbent firms regarding new entry, and thereby tends to increase the likelihood of collusion (Kaserman JX l, 322 ln. 20 - 323 ln. 10; Kaserman Dkt. 9159, 2429-30).

IX. MARKET CONDUCT

A. Monitoring Activity

689. [##] (Goodrich F 215; Klass Dkt. 9159, 4358; *See also* Weber Dkt. 9159, 1791-1803; Becker Dkt. 9159, 1246-48; Dkt. 9159 CX 138; Dkt. 9159 CX 141; Dkt. 9159 CX 143; Dkt. 9159 CX 148; Dkt. 9159 CX 163 *In Camera*; Dkt. 9159 CX 169I; Dkt. 9159 CX 228; Dkt. 9159 CX 234; Dkt. 9159 CX 238; Dkt. 9159 CX 239; Dkt.

9159 CX 241; Dkt. 9159 CX 242; Dkt. 9159 CX 243). As a result, these producers have a working knowledge of competitors' prices and price changes, and are aware of price changes in the industry (Goodrich F 215; JX 3, PX 136 at 116 ln. 17 - 117 ln. 4; JX 3, PX 10 at 1199 ln. 5-11, 1135 ln. 5 - 1137 ln. 18; JX 3, PX 8 at 116 ln. 8 - 118 ln. 11; JX 3, PX 7 at 157 ln. 10 - 160 ln. 23; JX 3, PX 9 at 77 ln. 5 - 79 ln. 73, 84 ln. 2 - 85 ln. l; H. Wheeler Dkt. 9159, 1749-50, 1768; Schaefer Dkt. 9159, 1199; Becker Dkt. 9159, 1338). Producers obtain competitive price information quickly (H. Wheeler Dkt. 9159, 1749; Weber Dkt. 9159, 1799). [##] (Goodrich F 215; Becker Dkt. 9159, 1248-49; Schaefer Dkt. 9159, 1135-37; H. Wheeler Dkt. 9159, 1747-48; McMath Dkt. 9159, 1897-98, 1901-09 *In Camera*; DiLiddo Dkt. 9159, 3124-27, 3128 *In Camera*).

690. Knowledge that a competitor is reducing price would facilitate collusive behavior in each of the relevant markets, by allowing rivals to detect and discipline any cheating on a collusive agreement, thus discouraging such cheating (Goodrich F 204; Kaserman JX l, 346 ln. 15 - 347 ln. 14). [##] (*See, e.g.,* CX 67A *In Camera*; CX 66A-B *In Camera*; CX 62 *In Camera*; CX 133 *In Camera*; CX 134 *In Camera*; CX 68B *In Camera*).

691. [##] (*See* CX 4A-Z518 *In Camera*; Goodrich F 215; JX 3, PX 136 at 119 ln. 25 - 120 ln. 9; JX 3, PX 9 at 78 ln. 12 - 79 ln. 13; JX 3, PX 10 at 1135 ln. 8 - 1137 ln. 18; JX 3, PX 8 at 117 ln. 9 - 118 ln. 11; JX 3, PX 7 at 160 ln. 7-22; *See, e.g.,* JX 3, PX 58; JX 3, PX 59; JX 3, PX 60; JX 3, PX 62; JX 3, PX 72; JX 3, PX 122; JX 3, PX 21; JX 3, PX 63; JX 3, PX 65; JX 3, PX 66; JX 3, PX 67; JX 3, PX 73; JX 3, PX 74; JX 3, PX 75; JX 3, PX 117; JX 3, PX 119; JX 3, PX 120; JX 3, PX 124). [##] (Kulkaski RX 255C ¶ 6 *In Camera*). By bringing competitive offers to their regular suppliers, pursuant to meeting competition clauses or in non-contract situations, buyers provide information about the prices of competitors (Goodrich F 212; Disch Dkt. 9159, 728; Becker Dkt. 9159, 1246-48; Weber Dkt. 9159, 1798-99; Schaefer Dkt. 9159, 1136-37; H. Wheeler Dkt. 9159, 1747-48).

692. [##] (*See, e.g.,* Goodrich F 213; RX 106 *In Camera*; RX 111B *In Camera*; RX l00 B *In Camera*; RX 105A *In Camera*; RX 139B *In Camera*; RX 141A *In Camera*; RX 169B *In Camera*; RX 216D *In Camera*; RX 216F *In Camera*), [##] (*See* CX 85; CX 86; CX

87; CX 88; CX 89; CX 90; CX 91; CX 92; CX 93; Goodrich F 213; Wheeler 1800; Dkt. 9159 CX 30Z7; Dkt. 9159 CX 32V-X; Dkt. 9159 CX 99 *In Camera*; Dkt. 9159 CX 124; Dkt. 9159 CX 127; Dkt. 9159 CX 131C-D; Dkt. 9159 CX 140; Dkt. 9159 CX 142C; Dkt. 9159 CX 144; Dkt. 9159 CX 145; Dkt. 9159 CX 128B-E; Dkt. 9159 CX 149; Dkt. 9159 CX 231; Dkt. 9159 CX 463; Dkt. 9159 CX 464; Dkt. 9159 CX 470; Dkt. 9159 CX 578 *In Camera*). [##] (Stuart CX 201C ¶ 6 *In Camera*).

693. [##] (Goodrich F 211, F 238; *See, e.g.*, Dkt. 9159 CX 73H *In Camera*; Dkt. 9159 CX 76C *In Camera*; Dkt. 9159 CX 78B *In Camera*; Dkt. 9159 CX 84E *In Camera*; Dkt. 9159 CX 89C *In Camera*; Dkt. 9159 CX 152B *In Camera*). Suppliers usually give advance notice of price increases (Goodrich F 211). This practice permits rivals to determine, prior to the effective date, whether competitors are following the proposed increase, thereby reducing the risk of losing sales as a result of increasing prices. Although the information obtained from customers is not perfect, most information is considered to be reliable (Goodrich F 215; Becker Dkt. 9159, 1338; H. Wheeler Dkt. 9159, 1749-50, 1768). Sales and marketing personnel are trained to probe and check to improve the accuracy of the information received (Goodrich F 215; Schaefer Dkt. 9159, 1136-37; Weber Dkt. 9159, 1797-98; Becker Dkt. 9159, 1246-47). The incentive for a customer to provide inaccurate information is tempered by the fact that the customer risks its relationship with a supplier if caught (DiLiddo Dkt. 9159, 3258-59). Because of the large number of buyers and the regularity and frequency of transactions, suppliers are able to gauge the accuracy of particular items of information to spot trends in prices and the behavior of particular rivals (H. Wheeler Dkt. 9159, 1749-50, 1768; Schaefer Dkt. 9159, 1135-37).

694. PVC producers in each of the relevant markets monitor the trade press for price information. Price increases are routinely announced in the trade press one or two months in advance of their effective date, allowing rivals an opportunity to react to such increases, and to make similar announcements to their customers (CX 8; CX 9A; CX 168; Goodrich F 214; Dkt. 9159 Weber Dkt. 9159, 1799-1800; Dkt. 9159 Becker Dkt. 9159, 1248; Dkt. 9159 CX 98; Dkt. 9159 CX 131; Dkt. 9159 CX 139E; Dkt. 9159 CX 409; Dkt.

9159 CX 410; Dkt. 9159 CX 411; Dkt. 9159 CX 413; Dkt. 9159 CX 436; Dkt. 9159 CX 532; Dkt. 9159 CX 563; Dkt. 9159 CX 711; Dkt. 9159 CX 714; Dkt. 9159 CX 715; Dkt. 9159 CX 718; Dkt. 9159 CX 719A).

695. Monthly trade reports often report on market pricing, and, based on discussions with PVC producers, forecast prices into the near future, providing an effective vehicle which producers in each of the relevant markets can use as a basis for communication and possible agreement (*See* CX 45A; CX 46A; CX 18G; CX 21G; CX 22G; CX 23G; CX 24G; CX 25G; CX 26G; CX 27G; CX 28G; CX 29G; CX 30G; CX 31G; CX 32G; CX 33H; CX 34G; CX 35G).

696. Industry consultants are also a mechanism through which PVC producers in each of the relevant markets obtain price information. Producers regularly tell such consultants what they believe the market price is or should be, or whether the price should increase, and consultants, in turn, report this information to other producers (JX 3, PX 45; JX 3, PX 81).

697. [##] (*See* CX 95B *In Camera*). A Vista call report recounts a meeting between a Vista salesman and an Occidental salesman, in which the Occidental salesman "called on" a customer while the Vista salesman was there. At this meeting, the Occidental salesman "confirmed Oxy's $0.32 lb market price announcement for pipe grade resin effective March 1" and "related that Oxy's intentions are to move to a $0.34 lb market price for pipe grade resin on April 1" (CX 129A-B).

698. A Formosa call report recounts a meeting among sales and management personnel from a number of PVC producers at a golf outing held by one PVC customer. One subject of discussion at this meeting was the share of the customer's business held by each supplier (CX 123A). This particular gathering of PVC producers is an annual one (CX 123B).

699. In addition, vertically integrated PVC producers also exchange price information, which is routinely communicated to marketing management (JX 3, PX 53; JX 3, PX 55; JX 3, PX 56; JX 3, PX 57).

700. In addition, as the Commission demonstrated in Goodrich, PVC producers in the relevant markets may be able to obtain price information through their VCM "supply interrelationships" with

integrated PVC producers (Goodrich, slip op. 107).[37] (DiLiddo Dkt. 9159, 3310, 3315-16 *In Camera*; Schaefer Dkt. 9159, 1223 *In Camera*). [##] (DiLiddo Dkt. 9159, 3316 *In Camera*; *See* Schaefer 1223 *In Camera*).

701. In determining the price of VCM, Goodrich and Occidental must first agree on the appropriate reference price for PVC. Indeed, as witnesses in Goodrich testified, the price of PVC is "the determinant of what the selling price for VCM is . . . " (DiLiddo Dkt. 9159, 3308, 3309 ("So, the price of PVC is driving the price of VCM")). [##] (*See* CX 79A *In Camera*).

702. These raw material supply relationships between the principal competitors in the mass and suspension PVC market, coupled with the agreement by producers to link higher VCM prices to higher PVC prices, increase the likelihood of coordinated price increases. As the Commission recognized in Goodrich, vertically integrated VCM/PVC producers "could create power over price in the PVC market by in effect creating an involuntary PVC cartel; that is, by forcing producers to raise price in a coordinated fashion, whether or not a voluntary PVC cartel could have formed" (Goodrich, slip op. at 104 n.220, 111-12 n.241).

703. Indeed, historical price data shows that, since the acquisition, PVC producers have succeeded in raising mass and suspension PVC prices by approximately twice the increase in VCM prices (CX 45A; CX 46A; CX 175). This suggests that the formula regarding VCM and PVC pricing (*i.e.*, the "Dow Air Products" formula) has not broken down.

704. [##] (Dkt. 9159 CX 252 *In Camera*; Dkt. 9159 CX 474 *In Camera*; Dkt. 9159 RX 35 *In Camera*), [##] (CX 54 *In Camera*), [##] (RX 258Z83 *In Camera*), [##] (CX 118 *In Camera*), [##] (CX 134 *In Camera*; CX 62 *In Camera*), [##] (RX 290B; RX 299B) [##] (CX 107 *In Camera*; Dkt. 9159 CX 30; Dkt. 9159 CX 31; Dkt. 9159 CX 32; Dkt. 9159 CX 215; Dkt. 9159 CX 424; Dkt. 9159 RX 296; Dkt. 9159 RX 297; Dkt. 9159 RX 298; Dkt. 9159 RX 299; Dkt. 9159 RX 302; Dkt. 9159 RX 303; Dkt. 9159 RX 304; Dkt. 9159 RX 311; Dkt.

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[37] *See* Motion and Supporting Arguments of Occidental Petroleum Corporation and Occidental Chemical Corporation for Reconsideration of Intent to Release *In Camera* Information, filed in Goodrich, Dkt. 9159, February 17, 1988.

9159 RX 314). The availability of this non-price market information enables competitors in each of the relevant markets to assess and predict the competitive strategies of their rivals, and facilitates the reaching and maintaining of an industry consensus with regard to market activities.

B. Signaling Activity

705. [##] (CX 66B *In Camera*). [##] (CX 67A *In Camera*). [##] (RX 93A *In Camera*).

706. [##] (Goldstein CX 180C ¶ 4 *In Camera*; Clark CX 193C-D ¶ 4 *In Camera*; Bendavid CX 194B-C ¶ 4 *In Camera*; Kulkaski CX 195B ¶ 3 *In Camera*; Alberti CX 199B ¶ 3 *In Camera*; Donnelly CX 176C ¶ 4 *In Camera*; Gmach CX 200C ¶ 3 *In Camera*). [##] (CX 133 *In Camera*).

707. In addition, PVC producers are quoted in the trade press or in monthly consultants' reports regarding their beliefs as to the likelihood that PVC prices will increase in coming months, thus signaling to their rivals their intention to maintain current prices or to support increased prices (CX 9; CX 18G-H; CX 27G-H). One "Contact Report," received by Occidental from an industry consultant, reported on a meeting between the consultant and Conoco Chemicals' General Manager for Plastics: "Conoco believes a price of 41 cents per pound for pipe resin is too high for C900 pipe and that 37 cents is an acceptable level for this type of pipe in 6 to 8 inch diameters" (JX 3, PX 82). The report goes on to note that "Conoco believes PVC volume and prices will be less depressed in 1984 than in 1983" (JX 3, PX 82).

708. The President of Occidental Chemical, Mr. J. Roger Hirl, has been quoted in the trade press as stating that "We're not willing to price below the perceived market to get share, but we do aggressively try to get accounts" (CX 44C). In addition, Occidental, as noted *supra*, receives "Contact Reports" from one industry consultant relating, in detail, conversations that consultant had with other producers. One "Contact Report" received by Occidental, reporting on a meeting with Georgia-Pacific PVC management, noted that "GP's current strategy is non-aggressive and conservative" (JX 3, PX 79). In another such "Contact Report," Occidental was

informed of Borden management's view that the problem in the PVC industry is the inability of PVC producers to move prices to the "published industry consensus" (JX 3, PX 45). According to the report, Borden attributed this problem to the fact that "Polymer producers continue to struggle to maintain market share as a quantity rather than being satisfied with maintaining a percentage of the market" (JX 3, PX 45). Occidental was similarly informed that "Conoco wishes other producers would not use aggressive pricing in periods of low demand in futile campaigns to increase market share. Mr. Flammer deplores the failure of intelligent people to use history and available statistics to their own advantage and for the good of the industry" (JX 3, PX 82).

709. PVC producers also provide signals to their competitors with regard to other non-price market activities. For example, producers announce their schedules for temporary plant shutdowns and scheduled maintenance (RX 290B; RX 299B). In addition, during 1987, some producers have announced to the trade press the projected magnitude of their anticipated incremental capacity expansions (*See, e.g.,* CX 165A; CX 166).

C. Competitive Performance in the Relevant Markets

710. During the early to mid 1980's, PVC producers exported PVC resin at a price lower than that at which they sold it in the United States, in order to avoid disrupting the domestic price structure (Schaefer Dkt. 9159, 1208; Schaefer JX l, 587 ln. 21-25; 589 ln. 1-14).[38] [##] (Alberti CX 199C ¶ 4 *In Camera*). [##] (CX 132 *In Camera*). [##] (CX 10 *In Camera*), [##] Industry newsletters document the pervasiveness of such economic discrimination in the mass and suspension PVC market (*See* RX 288F; RX 289F; RX 290F; RX 291F; RX 292F; RX 293F; RX 294F; RX 295F; RX 297F; RX 298F; RX 299H; RX 300J; RX 301F; RX 302F). [##] (CX 11 *In Camera*).

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[38] As a result of the decline in the value of the dollar relative to other currencies, PVC producers are today able to export PVC at a price significantly above the domestic price.

711. [##] (CX 112C *In Camera*; CX 113A *In Camera*; JX 3, PX 94; *Cf.* RX 206A *In Camera*). [##] (Lewis CX 204B ¶ 4 *In Camera*).

712. PVC producers in each of the relevant markets take care to assure that their pricing activity will not be perceived by their competitors as disruptive or aggressive, and exercise restraint in responding to efforts by their competitors' customers to seek a competitive source of supply. [##] (CX 44C), [##] (CX 57 *In Camera*). [##] (CX 57 *In Camera*; *See also* CX 56 *In Camera*). [##] (CX 12A *In Camera*).

713. In order to avoid competitive reactions from their rivals, PVC producers do not generally look to increase market share, or gain substantial amounts of new business in market segments in which they do not participate, or at accounts they have not traditionally served. Thus, for example, Vista pointed out to one customer that was interested in purchasing pipe-grade resin that "Vista is not currently trying to expand pipe grade resin sales and that we would not aggressively compete with his current suppliers" (CX 130B). [##] (CX 36B *In Camera*). [##] (CX 77B *In Camera*; *See also* CX 76A *In Camera*). Similarly, an Occidental memorandum following the company's acquisition of Firestone Plastics noted, "Price increases have been implemented in all PVC product lines in an effort to improve profit margins and outpace raw material price increases" (JX 3, PX 50 at 150572).

714. [##] (*See* Pflugrath CX 177F ¶ 9 *In Camera*; Heath CX 178D ¶ 6 *In Camera*; Wilhite CX 179C-D ¶ 4 *In Camera*; Bendavid CX 194B-C ¶ 4 *In Camera*; Rutland CX 196A-B ¶ 3 *In Camera*; Alberti CX 199C-D ¶ 5 *In Camera*; Gmach CX 200C ¶ 3 *In Camera*; Donnelly CX 176B-C ¶ 2 *In Camera*; Underwood CX 203D ¶ 8 *In Camera*; Hamilton CX 206F ¶ 10 *In Camera*). [##] (Wilhite CX 179D ¶ 4 *In Camera*). [##] (Alberti CX 199C ¶ 5 *In Camera*). [##] (Alberti CX 199C-D ¶ 5 *In Camera*). [##] (Heath CX 178D ¶ 6 *In Camera*). [##] (Pflugrath CX 177E ¶9 *In Camera*; *See also* Heath CX 178F ¶9 *In Camera*; Wilhite CX 179D ¶3 *In Camera*). [##] (Kulkaski RX 255C ¶ 6 *In Camera*). [##] (*See* RX 110A *In Camera*; RX 106 *In Camera*; RX 124 *In Camera*; RX 206A *In Camera*).

715. [##] (RX 1L *In Camera*). [##] (RX 1L *In Camera*).

716. [##] (CX 43C; Donnelly CX 176C-D ¶ 4 *In Camera*; Heath CX 178E ¶ 8; Kulkaski CX 195C ¶ 4 *In Camera*). [##] (Donnelly CX 176C-D ¶ 4).

717. [##] (CX 100 M *In Camera*). [##] (CX 49D-E *In Camera*) and B.F. Goodrich. [##] (Hamilton CX 206F ¶ 10 *In Camera*). Moreover, the fact that idle capacity is held by the two largest producers allows these firms to hold this capacity as a potential threat against any other producers that may consider making substantial expansions in the market.

718. [##] (CX 95B *In Camera*), [##] (CX 95A *In Camera*). [##] (CX 137Z61 *In Camera*).

719. [##] (CX 95D *In Camera*). [##] (Donnelly CX 176B ¶ 3 *In Camera*). Thus, PVC recognize the degree to which they are able to maintain firm prices at relatively low levels of capacity utilization, without a significant degree of price discounting (*See* Dkt. 9159 CX 220C; Schaefer Dkt. 9159, 1123-24; H. Wheeler Dkt. 9159, 1745.

720. [##] (Pflugrath CX 177E-F ¶ 10 *In Camera*; Heath CX 178F-G ¶ 10 *In Camera*; Goldstein CX 180C ¶ 4 *In Camera*; Clark CX 193C-D ¶ 4 *In Camera*; Bendavid CX 194B-C ¶ 4 *In Camera*; Kulkaski CX 195B ¶ 3 *In Camera*; Porter CX 198B ¶ 2 *In Camera*; Alberti CX 199D ¶ 6 *In Camera;* Gmach CX 200C ¶ 3 *In Camera*; Donnelly CX 176C ¶ 4 *In Camera*; Hamilton CX 206F-G ¶ 10-11 *In Camera*).

721. [##] (Pflugrath CX 177E-F ¶ 10 *In Camera*). [##] (Donnelly CX 176C ¶ 4 *In Camera*). [##] (Clark CX 193C-D ¶ 4 *In Camera*).

722. [##] (Clark CX 193D ¶ 4 *In Camera*). [##] (Gmach CX 200C ¶ 3 *In Camera*). [##] (Gmach CX 200C ¶ 3 *In Camera*; *See also* Alberti CX 199D ¶6 *In Camera*).

723. [##] (CX 96B *In Camera*; *See also* JX 3, PX 13 at 452726). Similarly, Occidental has described the profitable pricing levels that exist in the dispersion PVC market (JX 3, PX 13 at 452717). [##] (Flammer CX 84E ¶9; Hoyer CX 185E-F ¶11; Hill CX 183D-F *In Camera*).

724. [##] (CX 100 L *In Camera*). [##] (CX 100 K *In Camera*).

725. [##] (*See* CX 100 A-N *In Camera*; CX 100O). [##]

726. [##] (Goldstein CX 180C ¶ 4 *In Camera*; Donnelly CX 176A-B ¶2 *In Camera*; Heath CX 178D-E ¶7 *In Camera*; Alberti CX 199B ¶3 *In Camera*; Wilhite CX 179B ¶2 *In Camera*; Pflugrath CX

177D ¶7 *In Camera*; Clark CX 193B-C ¶3 *In Camera*; Porter CX 198A-B ¶2 *In Camera*; Underwood CX 203D ¶7 *In Camera*; Hamilton CX 206B-C ¶5 *In Camera*). [##] (Donnelly CX 176B ¶ 2 *In Camera*). [##] (Heath CX 178E ¶ 8 *In Camera*; RX 292B *In Camera*). [##] (Donnelly CX 176B ß2 *In Camera*; Pflugrath CX 177E ¶8 *In Camera*).

727. [##] (CX 100 F *In Camera*).

728. [##] (CX 100 E *In Camera*). [##] (Baker CX 205C ¶ 4 *In Camera*).

729. [##] (CX 45A *In Camera*; *See also* CX 175; Donnelly CX 176B ¶ 2 *In Camera*). [##] (CX 79A *In Camera*; *See also* CX 143I; CX 144I; CX 145I).

730. The following graph, CX 175, illustrates the increases in mass and suspension PVC prices relative to VCM prices, and the resulting increases in the PVC/VCM margin. [##]

731. Moreover, while Occidental appears to argue that PVC price increases in the United States may be attributable to world supply and demand conditions, the record reveals that the PVC/VCM margin has in fact increased substantially more in the United States than it has in Europe. Market prices for suspension PVC homopolymer and for VCM in the United States and Europe, respectively, as reported by Tecnon's "Price Monitor," are recorded in the table below (RX 288F; RX 289F; RX 290F; RX 291D; RX 292F; RX 293F; RX 294F; RX 295F; RX 297F; RX 298F; RX 299H; RX 300J; RX 301F; RX 302F; RX 303F; RX 304F; RX 305H; RX 306F; RX 308F; RX 309F; RX 310H). Based on the range of reported prices for suspension PVC homopolymer ("U.S.; Actual" and "European") and VCM ("U.S.; Actual" and "European; Contract") (*See Id.*), margins realized respectively by United States and European PVC producers can be calculated. These margins, presented in the right-hand column of the tables, are stated as a range, with the minimum value for each month measured as the difference between the highest reported VCM price and the lowest reported PVC price for that month, and the maximum value measured as the difference between the lowest reported VCM price and the highest reported PVC price for that month.

TECNON "PRICE MONITOR"
Reported VCM and Suspension PVC Homopolymer Prices in U.S. Currency
May 1986 through January 1988
($/Ton Prices Converted to Cents/Pound)

UNITED STATES

MONTH	YEAR	VCM LOW	VCM HIGH	PVC LOW	PVC HIGH	MARGIN
May	1986	15	15.5	28.5	28.75	13 - 13.75
June	1986	16	16.5	28.5	32.5	12 - 16.5
July	1986	16	16.5	28.5	32.5	12 - 16.5
Aug	1986	16	16.5	28.5	32.5	12 - 16.5
Sep	1986	15	15.5	28.5	32.5	13 - 17.5
Oct	1986	15	15.5	30	33	14.5 - 18
Nov	1986	15.5	16	31	32	15 - 16.5
Dec	1986	15.5	16	31	32	15 - 16.5
Jan	1987	15.75	16	32	34	16 - 18.25
Feb	1987	16	16.25	32	34	15.75 - 18
Mar	1987	16.5	17	32	34	15 - 17.5
Apr	1987	17	17.5	33	35	15.5 - 18
May	1987	17.25	17.5	34	35	16.5 - 17.75
June	1987	17.25	17.5	34	35	16.5 - 17.75
July	1987	18	18.25	33	35	14.75 - 17
Aug	1987	18.25	18.5	35	36	16.5 - 17.75
Sep	1987	19	19.5	35	37	15.5 - 18
Oct	1987	19	19.5	38	39	18.5 - 20
Nov	1987	20	20.5	39	41	18.5 - 21
Dec	1987	20	20.5	39	42	18.5 - 22
Jan	1988	20.5	21	39	42	18 - 21.5

EUROPE

MONTH	YEAR	VCM LOW	VCM HIGH	PVC LOW	PVC HIGH	MARGIN
May	1986	19.9	22.0	32.5	33.5	10.5-13.6
June	1986	19.4	21.4	31.6	32.6	10.2-13.3
July	1986	19.8	21.9	32.3	33.3	10.4-13.5
Aug	1986	21.0	23.1	33.5	35.3	10.4-14.3
Sep	1986	21.0	23.2	33.1	35.3	9.9-14.4
Oct	1986	21.6	23.9	35.3	36.4	11.4-14.8
Nov	1986	21.1	23.3	33.3	35.5	10.0-14.5
Dec	1986	21.7	24.0	34.2	36.5	10.3-14.8
Jan	1987	22.5	24.9	35.5	37.9	10.7-15.4
Feb	1987	22.0	25.7	36.0	39.2	10.3-17.1
Mar	1987	22.0	25.7	37.2	39.2	11.5-17.4
Apr	1987	22.6	26.4	38.3	40.3	11.9-17.6
May	1987	25.5	26.5	38.7	40.7	12.2-15.3
June	1987	25.0	26.0	38.8	41.4	12.8-16.3
July	1987	26.0	27.0	37.6	39.6	10.6-13.6
Aug	1987	25.3	26.3	36.6	38.5	10.4-13.3
Sep	1987	26.6	27.6	40.6	41.9	13.0-15.2
Oct	1987	28.7	29.7	39.6	40.9	9.9-12.1
Nov	1987	31.8	32.9	44.4	45.2	11.5-13.5
Dec	1987	31.6	32.7	44.1	44.6	11.5-13.0
Jan	1988	32.2	33.3	45.0	45.8	11.7-13.6

SOURCE RX 288F; RX 289F; RX 290F; RX 291D; RX 292F; RX 293F; RX 294F; RX 295F; RX 297F; RX 298F; RX 299H; RX 300J; RX 301F; RX 302F; RX 303F; RX 304F; RX 305H; RX 306F.

732. Comparison of United States and European margins for suspension PVC homopolymer in the table below, reveals that United States PVC margins have historically exceeded margins in Europe and that the gap between United States and European margins has increased since the acquisition.

733. European suspension PVC homopolymer margins have remained relatively stable over time while suspension PVC homopolymer margins in the United States have risen dramatically in recent years. Thus, in May 1986, minimum margins in the United States exceeded European minimum margins by 2.5 cents (13 cents vs. 10.5 cents) while maximum PVC margins in the United States exceeded maximum calculated European margins by 0.15 cents

(13.75 cents vs. 13.6 cents). By January 1988, minimum PVC margins in the United States exceeded those in Europe by 6.3 cents per pound (18 cents vs. 11.7 cents), while maximum PVC margins in the United States exceeded those in Europe by 7.9 cents per pound (21.5 cents vs. 13.6 cents).

734. Suspension PVC homopolymer margins in Europe showed little change between May 1986 and January 1988, while minimum margins in the United States increased over this period by 38% (18 cents in January 1988 vs. 13 cents in May 1986) and maximum calculated margins in the United States increased by 56% (21.5 cents in January 1988 vs. 13.75 cents in May 1986).

Suspension PVC Homopolymer/VCM Margins
in the United States and Europe
Calculated from Tecnon "Price Monitor"
Reported VCM and Suspension PVC Homopolymer Prices
in U.S. Currency
May 1986 through January 1988
($/Ton Prices Converted to Cents/Pound)

MONTH	YEAR	UNITED STATES MARGIN	EUROPEAN MARGIN
May	1986	13 - 13.75	10.5 - 13.6
June	1986	12 - 16.5	10.2 - 13.3
July	1986	12 - 16.5	10.4 - 13.5
Aug	1986	12 - 16.5	10.4 - 14.3
Sep	1986	13 - 17.5	9.9 - 14.4
Oct	1986	14.5 - 18	11.4 - 14.8
Nov	1986	15 - 16.5	10.0 - 14.5
Dec	1986	15 - 16.5	10.3 - 14.8
Jan	1987	16 - 18.25	10.7 - 15.4
Feb	1987	15.75 - 18	10.3 - 17.1
Mar	1987	15 - 17.5	11.5 - 17.2
Apr	1987	15.5 - 18	11.9 - 17.6
May	1987	16.5 - 17.75	12.2 - 15.3
June	1987	16.5 - 17.75	12.8 - 16.3
July	1987	14.75 - 17	10.6 - 13.6
Aug	1987	16.5 - 17.75	10.4 - 13.3
Sep	1987	15.5 - 18	13.0 - 15.2
Oct	1987	18.5 - 20	9.9 - 12.1
Nov	1987	18.5 - 21	11.5 - 13.5
Dec	1987	18.5 - 22	11.5 - 13.0
Jan	1988	18 - 21.5	11.7 - 13.6

SOURCE RX 288F; RX 289F; RX 290F; RX 291D; RX 292F; RX 293F; RX 294F; RX 295F; RX 297F; RX 298F; RX 299H; RX 300J; RX 301F; RX 302F; RX 303F; RX 304F; RX 305H; RX 306F; RX 308F; RX 309F; RX 310H.

735. The graph below plots minimum calculated margins for suspension PVC homopolymer in the United States relative to those in Europe, based on the Tecnon VCM and suspension PVC homopolymer price data.

736. The next graph plots maximum calculated margins for suspension PVC homopolymer in the United States relative to those in Europe, based on the Tecnon VCM and suspension PVC homopolymer price data.

Minimum Margin Between Suspension PVC Homopolymer and VCM Prices In U.S. and European Markets

GRAPH FROM PAGE 218 GOES HERE

Note: Minimum PVC Margin in each market is calculated by subtracting maximum VCM prices from the minimum PVC prices reported in RX288-RX310

Maximum Margin Between Suspension PVC Homopolymer and VCM Prices In U.S. and European Markets

GRAPH FROM PAGE 219 GOES HERE

Note: Maximum PVC Margin in each market is calculated by subtracting minimum VCM prices from the maximum PVC prices reported in RX288-RX310

737. Regardless of whether minimum or maximum margins are considered, the increase in United States suspension PVC homopolymer margins relative to European margins, provides strong evidence that the increase in PVC prices in the United States are not explainable by cost increases or world-wide market forces.

738. Thus, it is not surprising that over the past year PVC producers have reported large profits from their PVC operations. Borden reported in September, 1986, that its operating income from the sale of PVC resins was "more than double last year's level" (CX 142I). BF Goodrich reported operating income from "PVC and Intermediates" of $49.9 million for the nine months ended September 30, 1986 and $107.7 million for the nine months ended September 30, 1987 (CX 146L). Goodrich also noted that third quarter operating income "increased to $46.8 million, 2.5 times last year's income of $18.8 million" (CX 146M). It noted that the increase in operating income "was largely attributable to increased volume combined with margin improvements resulting from significantly enhanced domestic pricing and a stronger sales mix" (CX 146M). Goodrich has recently announced plans to dispose of its interest in Uniroyal Goodrich Tire Company, in order to focus its resources, long-term, on its chemical and aerospace businesses (CX 167). "Analysts say the prospects for Goodrich's key polyvinyl chloride business are strong" (CX 167). Vista reported income from operations for the first three quarters of 1987 of $79.4 million, an improvement of $15.4 million over income for the same period of 1986. It noted that the "improvement primarily reflects higher PVC margins resulting from the higher prices along with lower ethane feedstock cost" (CX 145I; *See also* CX 143I; CX 144I; CX 139I-S).

739. Consideration of fixed costs and operating costs, as well as VCM feedstock costs, reveals an even more dramatic increase in PVC producer profits over the past year than that reflected in the Tecnon data. One monthly trade report has reported that PVC producers' margins were 8.1 cents per pound in 1987 compared to 2.1 cents in 1986, an increase of approximately 300 percent (CX 214E).

740. [##] (CX 13A *In Camera*).

X. THE ACQUISITION'S PROBABLE EFFECTS ON COMPETITION IN THE RELEVANT MARKETS

741. The ultimate inquiry under Section 7 of the Clayton Act is whether the effect of the acquisition "may be substantially to lessen competition." 15 U.S.C. 18. The test is one of reasonable probability. Section 7 is concerned with the probability, and not the certainty, of anticompetitive effects.

742. It has long been recognized that a horizontal acquisition in an industry characterized by few firms and high market shares may increase the market power held by the industry leaders and the joining parties. One of the principal dangers of concentration of market power is that the top firms will collectively use their market power to pursue "parallel policies of mutual advantage." The likely result is higher prices.

743. The Commission's task in a Section 7 case is to determine whether the facts of a particular acquisition are indicative of a probable future lessening of competition. This acquisition resulted in a major restructuring of the producer side of the relevant markets. It significantly increases concentration in the markets; it eliminated a substantial competitor in each of the markets; and it has increased the likelihood of collusion in each of the markets.

744. It is well settled that statistics reflecting the shares of the market controlled by the industry leaders and the parties to the merger are the primary indicia of market power. Such statistics are not conclusive, but they are entitled to great weight.

745. Under the *DOJ Merger Guidelines*, an HHI below 1000 suggests an unconcentrated market, an HHI between 1000 and 1800 suggests a moderately concentrated one, and an HHI above 1800 suggests a highly concentrated market. Where the post-merger market would be in the moderately concentrated range, a merger that increases the HHI by more than 100 points will, absent other factors, present serious antitrust difficulties. Where the post-merger market would be highly concentrated, an increase of only 50 points in the HHI will present serious difficulties. If the increase in the HHI exceeds 100 in a highly concentrated market, the acquisition is substantially likely to lessen competition except in "extraordinary" cases. *DOJ Merger Guidelines, supra*, at ¶ 4493.101 at 6,879-12.

746. Applying the standards of the *DOJ Merger Guidelines* and judicial precedent, the proposed acquisition raises major antitrust concerns in all three relevant markets. In the mass and suspension PVC market the combined market share is 18.0.[39] (18.2)[40] percent, the post-acquisition four-firm and eight-firm concentration ratios are 60.9 (62.7) percent and 95.8 (95.0) percent respectively, the HHI increases by 156 (158) points and the post acquisition HHI stands at 1278 (1305). In the dispersion PVC market the combined market share is 34.5 (27.9) percent, the post-acquisition four-firm and eight-firm concentration ratios are 85.2 (87.1) percent and 100 (100) percent respectively, the HHI increases by 448 (331), and the post-acquisition HHI is 2201 (2051). Finally, in the highly concentrated suspension PVC copolymer market the combined market share is 59.2 (52.2), the post-acquisition four-firm concentration ratio is 100 (100) percent, the HHI index increases by 1577 (1360) and the post acquisition HHI is 4368 (3504).

747. The levels of market concentration in the concentrated mass and suspension PVC market and in the highly concentrated dispersion PVC and suspension PVC copolymer markets are sufficient to bring into play the presumption of illegality recognized in the *DOJ Merger Guidelines, supra*, (CCH) ¶ 4493 at 3.11(c). (*See* Goodrich, slip op. at 63).

748. [##] (CX 53A *In Camera*), [##] (CX 53A *In Camera*; CX 55 *In Camera*).

749. At the time of the acquisition, Tenneco was a significant and substantial competitor in each of the three relevant markets. Tenneco was a large producer and was perceived as being an aggressive supplier (*See* Weimar JX l, 36 ln. 25-27 ln. 7; Friedman JX l, 127 ln. 10-24; 145 ln. 5-146 ln 12; JX 3, PX 8 at 97 ln. 3-12; JX 3, PX 9 at 44 ln. 21-45 ln. 2, 48 ln. 17-49 ln. l, 50 ln. 15-19, 128 ln. 4-129 ln. 10, 130 ln. 4-22). [##] (Heath CX 178F ¶ 9 *In Camera*). [##] (Kilkaski CX 195B ¶ 3 *In Camera*). [##] (Underwood CX 203E ¶ 9 *In Camera*). [##] (CX 115 *In Camera*). [##] (CX 127 *In Camera*). [##] (RX 265 *In Camera*). [##] (*compare* RX 265 *In Camera* with

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[39] Based on United States 1985 Production.

[40] Figures in parentheses are based on United States 1986 Operating Capacity.

RX 268 *In Camera*; *See* CX 50 *In Camera*; CX 75B *In Camera*; CX 74B *In Camera*; CX 69 *In Camera*). [##] (Clark RX 254C ¶ 10 *In Camera*). [##] (Clark RX 254C ¶ 10 *In Camera*).

750. Tenneco has also maintained a strong reputation for providing high quality products and good technical service (JX 3, PX 8 at 97 ln. 21-98 ln. 7, 120 ln. 17-121 ln. 7; JX 3, PX 9 at 44 ln. 21-45 ln. 14). Tenneco's Pasadena PVC plant is a modern, low-cost, efficient plant (JX 3, PX 104 at 3227-28; JX 3, PX 132; *See* JX 3, PX 8 at 59 ln. 8-20). Tenneco's Burlington PVC facility is a well-maintained facility and was the subject of substantial capital improvement by Tenneco in the years immediately preceding the acquisition (JX 3, PX 104 at 3222-3223; JX 3, PX 8 at 77 ln. 15-23; JX 3, PX 9 at 45 ln. 19-46 ln. 11). Both the Pasadena and Burlington PVC operations were profitable to Tenneco (JX 3, PX 104 at 3219; JX 3, PX 9 at 150 ln. 12-19, 128 ln. 18-129 ln. 10).

751. [##] (Pflugrath CX 17-7D ¶ 7 *In Camera*; *See* CPF 812). [##] (*See* Pflugrath CX 177C-F ¶ 6-10 *In Camera*; Heath CX 178D-G ¶ 7-10 *In Camera*; Wilhite CX 179C-D ¶ 4 *In Camera*; Bendavid CX 194B-C ¶ 4 *In Camera*; Rutland CX 196A-B ¶ 3-4 *In Camera*; Alberti CX 199C-D ¶ 5 *In Camera*; Gmach CX 200C ¶ 3 *In Camera*; Donnelly CX 176B-C ¶ 3 *In Camera*; Hamilton CX 206A ¶ 10 *In Camera*).

752. [##] (Pflugrath CX 177E-F ¶ 10 *In Camera*; Heath CX 178F ¶ 10 *In Camera*; Alberti CX 199D-E ¶ 6 *In Camera*; Wilhite CX 179C ¶ 4 *In Camera*; Clark CX 193C-D ¶ 4 *In Camera*; Goldstein CX 180C ¶ 4 *In Camera*; Porter CX 198A-B ¶ 2 *In Camera*; Kulkaski CX 195B ¶ 3 *In Camera*; Bendavid CX 194B-C ¶ 4 *In Camera*; Gmach CX 200C ¶ 3 *In Camera*; Donnelly CX 176C ¶ 4 *In Camera*; Hamilton CX 206F-G ¶ 10-11 *In Camera*). [##] (Alberti CX 199D ¶ 6 *In Camera*). [##] (Heath CX 178G ¶ 10 *In Camera*). [##] (Bendavid CX 194C ¶ 4 *In Camera*). [##] (CX 179C ¶ 4 *In Camera*), [##] (Alberti CX 199D-E ¶ 6 *In Camera*), [##] (Porter CX 198B ¶ 2 *In Camera*). [##] (Stuart CX 201D ¶ 7 *In Camera*). [##] (Stuart RX 256A-B ¶ 3 *In Camera*). [##] (Stuart CX 201D ¶ 7 *In Camera*), [##] (Stuart CX 201D ¶ 7 *In Camera*). [##] (CX 138J *In Camera*). As higher mass and suspension PVC homopolymer prices raise the costs of Carlon's competitors, Carlon gains an increased cost advantage over its rivals, and exploits this advantage by increasing its profit

margin on PVC pipe products. It is not surprising that this customer would be in favor of, and testified in support of, the acquisition.

753. [##] (*See* CX 39 *In Camera*; CX 40 *In Camera*; CX 41 *In Camera*; CX 42 *In Camera*). [##] (CX 16 *In Camera*). [##] (Truog CX 202B ¶ 3-4 *In Camera*).

754. [##] (*See* CX 78 *In Camera*; CX 131 *In Camera*). [##] (CX 59C *In Camera*). [##] (Silver CX 190C *In Camera*; Beveridge JX 1, 93 ln. 17 - 94 ln. 8, 96 ln. 15 - 97 ln. 7; Weimar JX 1, 36 ln. 6-13; Friedman JX 1, 136 ln. 25-137 ln. 7).

755. PVC producers also forecast an increase in PVC resin prices as a result of the acquisition. Occidental itself saw, as a benefit of the acquisition, the reduction in the number of suppliers of suspension PVC copolymer resin, which, Occidental noted, would "significantly enhance the profitability of the Pottstown suspension plant" (JX 3, PX 12). Not surprisingly, Occidental has not otherwise noted among the perceived benefits of the acquisition the prospect of reduced competition and higher pricing. Other producers, however, have done so. Mr. Stevens, Director of Marketing for Tenneco Polymers (JX 3, PX 9 at 7 ln. 5-6) testified that in his view the acquisition would offer suspension PVC copolymer producers an improved position to seek price increases (JX 3, PX 9 at 55 ln. 1-7). One unnamed producer quoted in the trade press, in an article published subsequent to the consummation of the acquisition, noted: "When the [Federal Trade Commission] asked whether we had any arguments against Oxy buying Tenneco, we said 'No!', we needed somebody to stand up to Goodrich and put some backbone into the industry" (CX 44C). That producer went on to note that the benefits of the acquisition have been confirmed, "with the recent fourth quarter price increases" (CX 44C).

756. PVC producers and market observers noted, in other reports, prior to the consummation of the acquisition, the benefit of reduced competition that would result from the acquisition. One Drexel Burnham study of the PVC industry noted that "Producers of polyvinyl chloride resin look favorably upon Occidental Chemical's acquisition of Tenneco's PVC assets. One less producer means more market discipline" (CX 38L). One trade journal, Monthly Petrochemical Statistical Analysis, in an issue dated January of 1986,

reported that it saw the acquisition "as a beneficial change for the industry" (CX 28G). [##] (CX 28G; *See* CX 127 *In Camera*).

757. Occidental intended to gain a role as a market leader with the acquisition (JX 3, PX 12 at 151333), and has gained such a role. As a result of the acquisition, Occidental significantly enhanced its position in all of the relevant PVC markets (JX 3, PX 12 at 151333). Occidental management recognized that the acquisition of the Tenneco PVC operations would allow Occidental to assume a "leadership" role in the PVC businesses (JX 3, PX 12 at 151333). [##] (RX 1K *In Camera*). [##] (RX 1L *In Camera*). Other producers see Occidental as having obtained a leadership position as a result of the acquisition (CX 44C; CX 38L). [##] (Donnelly CX 176C ¶ 4 *In Camera*). [##] (Donnelly CX 176C ¶ 4 *In Camera*).

758. The acquisition eliminated, in each of the relevant markets, a significant independent competitive entity and substantially increased the concentration of market power and the likelihood that this market power will be exercised in an anticompetitive manner. The suspension PVC copolymer and dispersion PVC markets were highly concentrated at the time of the acquisition. The mass and suspension PVC market is substantially more concentrated than it was at the time of Goodrich. Thus, the presumption of anti-competitive effects is higher in each of these markets than it was in Goodrich (*See* Goodrich, slip op. at 63). In addition, record evidence in this case shows that cost differences among producers and PVC product heterogeneity, the structural factors identified by the Commission in Goodrich as making anticompetitive effects unlikely in the mass and suspension PVC market as a result of that acquisition, are today of less significance in the mass and suspension PVC market, and are not significant factors in the suspension PVC copolymer market or the dispersion PVC market.

759. Market conduct among PVC producers in each of the relevant markets strongly suggests that the markets are not in fact competitive. Indeed, the large increases in the price of PVC resin that have occurred during the period since the acquisition, and the wide perception of customers and competitors that the increases are a result of the acquisition, strongly suggest that these increases are in large part a result of the acquisition.

760. Consideration of all of these factors leads to the conclusion that the acquisition is likely substantially to lessen competition in the mass and suspension PVC market, the suspension PVC copolymer market, and the dispersion PVC market.

XI. CONCLUSIONS OF LAW

1. The Commission has jurisdiction over the subject matter of this proceeding and over respondents Occidental Petroleum Corporation and Occidental Chemical Corporation (collectively "Occidental") and over respondents Tenneco Inc., and Tenneco Polymers, Inc. (collectively "Tenneco").

2. Occidental was, at all times relevant herein, a corporation engaged in or affecting commerce, as "commerce" is defined in the Clayton Act, as amended, and in the Federal Trade Commission Act, as amended.

3. Tenneco was, at all times relevant herein, a corporation engaged in or affecting commerce, as "commerce" is defined in the Clayton Act, as amended, and in the Federal Trade Commission Act, as amended.

4. On or about April 30, 1986, Occidental acquired from Tenneco, Tenneco's polyvinyl chloride ("PVC") assets and business, including a suspension PVC homopolymer plant located at Pasadena, Texas, a suspension PVC plant located at Burlington, New Jersey, and a dispersion PVC plant located at Burlington, New Jersey, certain assets and equipment from Tenneco's shutdown PVC plant at Flemington, New Jersey, and other assets relating to the manufacture and sale of PVC.

5. An appropriate line of commerce within which to evaluate the competitive effects of the acquisition is the production of mass and suspension PVC.

6. An appropriate line of commerce within which to evaluate the competitive effects of the acquisition is the production of suspension PVC copolymer.

7. An appropriate line of commerce within which to evaluate the competitive effects of the acquisition is the production of dispersion PVC.

8. The appropriate section of the country within which to evaluate the effects of the acquisition in each of the relevant lines of commerce is the United States as a whole.

9. Prior to and at the time of the acquisition, Occidental and Tenneco were actual competitors in the United States mass and suspension PVC market.

10. Prior to and at the time of the acquisition, Occidental and Tenneco were actual competitors in the United States suspension PVC copolymer market.

11. Prior to and at the time of the acquisition, Occidental and Tenneco were actual competitors in the United States dispersion PVC market.

12. The effect of this acquisition has been or may be substantially to lessen competition or tend to create a monopoly in the aforesaid product and geographic markets in violation of Section 7 of the Clayton Act, as amended, and Section 5 of the Federal Trade Commission Act, as amended, in the following ways:

a. It eliminates Tenneco as a significant competitive entity in the production of mass and suspension PVC in the United States;

b. It eliminates substantial actual competition between Occidental and Tenneco and between Tenneco and others in the production of mass and suspension PVC in the United States;

c. It significantly increases already moderately high levels of concentration in the United States mass and suspension PVC market;

d. By raising significantly the level of concentration in the United States mass and suspension PVC market, it significantly enhances the likelihood of collusion or interdependent coordination in this market;

e. It eliminates Tenneco as a significant competitive entity in the production of suspension PVC copolymer in the United States;

f. It eliminates substantial actual competition between Occidental and Tenneco and between Tenneco and others in the production of suspension PVC copolymer in the United States;

g. It significantly increases already high levels of concentration in the United States suspension PVC copolymer market;

h. By raising significantly the level of concentration in the United States suspension PVC copolymer market, it significantly

enhances the likelihood of collusion or interdependent coordination in this market;

i. It significantly enhances the likelihood of dominant firm behavior to increase price in the suspension PVC copolymer market;

j. It eliminates Tenneco as a significant competitive entity in the production of dispersion PVC in the United States;

k. It eliminates substantial actual competition between Occidental and Tenneco and between Tenneco and others in the production of dispersion PVC in the United States;

l. It significantly increases already high levels of concentration in the United States dispersion PVC market;

m. By raising significantly the level of concentration in the United States dispersion PVC market, it significantly enhances the likelihood of collusion or interdependent coordination in this market;

13. The order entered hereinafter is appropriate to remedy the violation of law found to exist.

XII. ORDER

I.

DEFINITIONS

It is ordered, That for purposes of this order the following definitions shall apply:

A. "*Occidental*" means Occidental Petroleum Corporation and Occidental Chemical Corporation, two corporations organized under the laws of California with their principal places of business in Los Angeles, California, and their directors, officers, agents, and employees, and their subsidiaries, divisions, affiliates, successors, and assigns;

B. "*Tenneco*" means Tenneco Inc. and Tenneco Polymers, Inc., two corporations organized under the laws of Delaware with their principal places of business in Houston, Texas, and their directors, officers, agents, and employees, and their subsidiaries, divisions, affiliates, successors, and assigns.

C. The "*acquired PVC assets*" means the suspension PVC homopolymer manufacturing facility located at Pasadena, Texas, the suspension PVC manufacturing facility located at Burlington, New Jersey, the dispersion PVC manufacturing facility located at Burlington, New Jersey, and all assets, titles, properties, interests, rights and privileges, tangible and intangible, related to the PVC business that were acquired by Occidental from Tenneco, together with all improvements thereto.

D. "*PVC*" means any vinyl chloride homopolymer with the repeating unit CH_2=CHCl, and any copolymer of vinyl chloride with varying amounts of other chemicals, including vinyl acetate, ethylene, propylene, vinylidene chloride, or acrylates.

E. "*Mass PVC*" means PVC produced from vinyl chloride by the mass (also referred to as "bulk") process.

F. "*Suspension PVC homopolymer*" means PVC homopolymer produced from vinyl chloride by the suspension process.

G. "*Suspension PVC copolymer*" means any copolymer of vinyl chloride and vinyl acetate, that is produced by the suspension process and contains over 50 percent by weight vinyl chloride.

H. "*Dispersion PVC*" means PVC produced by the emulsion or dispersion process.

II.

It is ordered, That within twelve (12) months from the date this order becomes final, Occidental shall divest, absolutely and in good faith, at no minimum price, the acquired PVC assets that Occidental acquired on or about April 30, 1986, together with all assets, title, properties, interest, rights and privileges, of whatever nature, tangible and intangible acquired by Occidental as a result of its acquisition of the acquired PVC assets or acquired by Occidental from Tenneco in connection with Occidental's acquisition of the acquired PVC assets, and all additions and improvements to the acquired PVC assets added by Occidental.

The purpose of the divestiture is to reestablish the acquired PVC assets, either singly or separately, as ongoing, viable enterprises engaged in the manufacture, distribution, sale, research and development of suspension PVC homopolymer, suspension PVC

copolymer, and dispersion PVC; and to remedy the lessening of competition resulting from the acquisition of the acquired PVC assets by Occidental. The divestiture(s) shall be made only to an acquirer or acquirers, and only in a manner, that receives the prior approval of the Federal Trade Commission.

Pending divestiture, Occidental shall take all measures necessary to maintain the acquired PVC assets in their present condition and to prevent any deterioration, except for normal wear and tear, of any part of the acquired PVC assets, so as not to impair the acquired PVC assets's present operating viability or market value.

III.

It is further ordered, That at the time of the divestiture required by this order, Occidental shall provide to the acquirer of the acquired PVC assets, on a nonexclusive basis, all PVC technology (including patent licenses and know-how) used by Occidental, or developed by Occidental for use in connection with the acquired PVC assets; and

For a period of one (1) year following the divestiture required by this order, Occidental shall provide the acquirer of the acquired PVC assets, if the acquirer(s) so requests, such additional know-how as may reasonably be required to enable such acquirer(s) to manufacture and sell suspension PVC homopolymer, suspension PVC copolymer, and dispersion PVC. Occidental shall charge the acquirer no more than its own costs for providing such additional know-how.

IV.

It is further ordered, That at the time of the divestiture required by this order, Occidental shall provide to the acquirer(s) of the acquired PVC assets,

A. A list of all Occidental's respective customers for suspension PVC homopolymer, suspension PVC copolymer, and dispersion PVC who have purchased PVC from Occidental during the three years prior to the date this order becomes final; and

B. An assignment of all VCM supply agreements; all PVC sales, toll, or exchange agreements; and all PVC customer records and files

relating to PVC produced in (or supplied by Occidental at any time since January 1, 1986 from) the acquired PVC assets.

V.

It is further ordered, That if Occidental has not divested the acquired PVC assets within the twelve-month period provided in paragraph II of this order, the Federal Trade Commission may appoint a trustee to effect the divestiture. The trustee shall be a person with experience and expertise in acquisitions and divestitures. Neither the appointment of a trustee nor a Commission decision not to appoint a trustee under this paragraph V of the order shall preclude the Commission from seeking civil penalties and other relief available to it, including a court-appointed trustee, for any failure by Occidental to comply with this order.

Any trustee appointed by the Commission pursuant to this paragraph V shall have the following powers, authority, duties, and responsibilities:

A. The trustee shall have the exclusive power and authority, subject to the prior approval of the Commission, to divest the acquired PVC assets. The trustee shall have twelve (12) months from the date of appointment to accomplish the divestiture. If, however, at the end of the twelve-month period, the trustee has submitted a plan of divestiture or believes that divestiture can be accomplished within a reasonable time, the divestiture period may be extended by the Commission.

B. The trustee shall have full and complete access to the personnel, books, records and facilities of the acquired PVC assets, and Occidental shall develop such financial or other information relevant to the acquired PVC assets as the trustee may reasonably request. Occidental shall cooperate with the trustee, and shall take no action to interfere with or impede the trustee's accomplishment of the divestiture. Any delays in divestiture caused by Occidental or Tenneco shall extend the time for divestiture under this paragraph V in an amount equal to the delay, as determined by the Commission.

C. The power and authority of the trustee to divest shall be at the most favorable price and terms available consistent with this order's

absolute and unconditional obligation to divest at no minimum price, and with the purposes of the divestiture as stated in paragraph II of this order, subject to the prior approval of the Commission.

D. The trustee shall serve, without bond or other security, at the cost and expense of Occidental on such reasonable and customary terms and conditions as the Commission may set. The trustee shall have authority to retain, at the cost and expense of Occidental, such consultants, attorneys, investment bankers, business brokers, accountants, appraisers, and other representatives and assistants as are reasonably necessary to assist in the divestiture. The trustee shall account for all monies derived from the divestiture and for all expenses incurred. After approval by the Commission of the account of the trustee, including fees for his or her services, all remaining monies shall be paid to Occidental, and the trustee's power shall be terminated. The trustee's compensation shall be based at least in significant part on a commission arrangement contingent on the trustee divesting the acquired PVC assets.

E. Occidental shall indemnify the trustee and hold the trustee harmless against any losses, claims, damages, or liabilities arising in any manner out of, or in connection with, the trustee's duties under this order unless the Commission determines that such losses, claims, damages, or liabilities arose out of the misfeasance, gross negligence, or the willful or wanton acts or bad faith of the trustee.

F. Promptly upon appointment of the trustee and subject to the approval of the Federal Trade Commission, Occidental shall, subject to the Federal Trade Commission's prior approval and consistent with provisions of this order, transfer to the trustee all rights and powers necessary to permit the trustee to effect the divestiture required by this order.

G. If the trustee ceases to act or fails to act diligently, the Commission may appoint a substitute trustee.

H. The Commission may on its own initiative or at the request of the trustee issue such additional orders or directions as may be necessary or appropriate to accomplish the divestiture required by this order.

I. The trustee shall have no obligation or authority to operate or maintain the acquired PVC assets.

J. The trustee shall report in writing to Occidental and to the Commission every sixty (60) days concerning the trustee's efforts to accomplish divestiture.

VI.

It is further ordered, That for a period of ten (10) years from the date this order becomes final, Occidental shall not directly or indirectly acquire -- other than the acquisition of manufactured product in the ordinary course of business -- all or any part of the stock or assets of, or any interest in, any producer of mass PVC, suspension PVC homopolymer, suspension PVC copolymer, or dispersion PVC located in the United States without the prior approval of the Federal Trade Commission.

VII.

It is further ordered, That Occidental shall, within sixty (60) days after the date this order becomes final and every sixty (60) days thereafter until it has fully complied with the provisions of paragraph II of this order, submit in writing to the Commission a report setting forth in detail the manner and form in which it intends to comply, is complying, or has complied with these provisions. Such compliance reports shall include, among other things that may be required from time to time, a full description of all contacts and negotiations relating to the divestiture of the acquired PVC assets, including the name and address of all parties contacted, copies of all written communications to and from such parties, and all internal memoranda, reports and recommendations concerning divestiture; and Occidental shall submit such further written reports of its compliance as the staff of the Commission may from time to time request in writing.

VIII.

It is further ordered, That Occidental, upon written request and on reasonable notice, for the purpose of securing compliance with

this order, and subject to any legally recognized privilege, shall permit duly authorized representatives of the Commission or of the Director of the Bureau of Competition:

A. Reasonable access during the office hours of Occidental, which may have counsel present, to inspect and copy books, ledgers, accounts, correspondence, memoranda, reports, and other records and documents in the possession or control of Occidental that relate to any matter contained in this order; and

B. Subject to the reasonable convenience of Occidental, an opportunity to interview officers or employees of Occidental, who may have counsel present, regarding such matters.

IX.

It is further ordered, That Occidental, shall notify the Federal Trade Commission at least thirty (30) days prior to any proposed corporate change, such as dissolution, assignment or sale resulting in the emergence of a successor corporation, the creation or dissolution of subsidiaries or any other change in the corporation, which may affect compliance with the obligations arising out of this order.

OPINION OF THE COMMISSION

BY AZCUENAGA, *Commissioner*:

The complaint in this matter challenges the acquisition by Occidental Petroleum Corporation, through its subsidiary Occidental Chemical Corporation ("Occidental"), of the polyvinyl chloride business of Tenneco Polymers, Inc., a subsidiary of Tenneco, Inc. At the time of the acquisition, Occidental owned polyvinyl chloride plants in Pottstown, Pennsylvania, Addis, Louisiana, and Burlington, New Jersey; Tenneco owned polyvinyl chloride plants in Pasadena,

Texas, and Burlington, New Jersey.[1] The complaint alleges that the acquisition may substantially lessen competition in the manufacture and sale of polyvinyl chloride in the United States in violation of Section 7 of the Clayton Act and Section 5 of the Federal Trade Commission Act.

The administrative law judge identified three relevant product markets: mass and suspension polyvinyl chloride ("PVC") homopolymer, suspension PVC copolymer, and dispersion PVC. He concluded that the relevant geographic market for all three products is the United States. The administrative law judge found a violation in each of these markets and entered an order requiring divestiture.

Occidental appealed the decision of the administrative law judge in each of the three markets. In the first market, mass and suspension PVC homopolymer, Occidental asserts on appeal that the decision of the administrative law judge is "flatly inconsistent" with the decision of the Commission in *B.F. Goodrich Co.*, Docket 9159, 110 FTC 207 (1988), *appeal dismissed by stipulation,* Nos. 86-4065 & 86-4066 (2d Cir. April 24, 1989), *modified final order,* 112 FTC 83 (1989), and "should be set aside." R.A.B. at 2.[2] In Goodrich, the Commission concluded that B. F. Goodrich's January 1982 acquisition of the mass

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[1] Tenneco also owned a plant in Flemington, New Jersey. Occidental obtained an option to and later did acquire equipment from this plant. At the time of the Initial Decision, Tenneco was awaiting state approval of its clean up plan before dismantling the plant and selling the property. I.D. at 3 n.4.

[2] We use the following abbreviations in this opinion:

I.D.	Initial Decision
I.D.F.	Initial Decision Finding
R.A.B.	Respondents' Appeal Brief
R.R.B.	Respondents' Reply Brief
C.A.B.	Complaint Counsel's Answering Brief
Tr.	Transcript.

Citations to the record in *B.F. Goodrich Co.*, Docket 9159, 110 FTC 207 (1988), incorporated by stipulation of the parties, are marked "Goodrich." The record also includes testimony and exhibits from *FTC v. Occidental Petroleum Corp.*, Civ. No. 86-0900 (D.D.C. Apr. 29, 1986), *vacated as moot*, No. 86-5254 (D.C. Cir. Oct. 23, 1986), marked as Joint Exhibits ("JX") and further identified by transcript page number, Plaintiff's Exhibit ("PX") or Defendants' Exhibit ("DX"), as appropriate.

and suspension PVC business of Diamond Shamrock Chemicals Company was not unlawful, relying primarily on conclusions concerning product heterogeneity, transportation and production cost differences among producers and the elasticity of demand of finished vinyl products.[3] *See* 110 FTC at 339. Occidental asserts that the market characteristics on which the Commission relied in Goodrich have not changed and that "simple adherence to Commission precedent," R.A.B. at 1, requires the same result in this case.

In addition, Occidental asserts on appeal that suspension PVC copolymer is not a relevant product market but should be included in the mass and suspension PVC homopolymer market, because of supply side substitutability. R.A.B. at 60. Finally, Occidental claims that the administrative law judge improperly overlooked imports and relevant structural factors in finding a violation in the dispersion PVC market. R.A.B. at 11. We affirm the decision of the administrative law judge.[4]

I. MARKET DEFINITION

Section 7 of the Clayton Act prohibits acquisitions that may substantially lessen competition or tend to create a monopoly. The analysis of competitive effects focuses on whether the acquisition is likely to create or enhance the ability of a firm or firms to exercise market power, that is, to raise prices. *Hospital Corporation of America v. FTC*, 807 F.2d 1381, 1386 (7th Cir. 1986), *cert. denied,* 481 U.S. 1038 (1987). The first step in the analysis is to identify the relevant product and geographic markets in which to assess competitive effects. *United States v. E.I. du Pont de Nemours & Co.*, 353 U.S. 586, 593 (1957); *Goodrich,* 110 FTC at 288.

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[3] The Commission held that Goodrich's acquisition violated Section 7 of the Clayton Act in the related market of vinyl chloride monomer. 110 FTC at 347-48.

[4] We adopt the findings and conclusions of the administrative law judge to the extent that they are not inconsistent with this opinion.

A. Product Markets

Product markets are defined by "the reasonable interchangeability of use or the cross-elasticity of demand" between a product and its possible substitutes. *Brown Shoe Co. Inc. v. United States*, 370 U.S. 294, 325 (1962). When the cross-elasticity of demand or supply between products is high, the products ordinarily are in a single market. Because cross-elasticity data rarely are available, product markets usually are defined by reference to other relevant evidence. Such evidence may include patterns of substitution between and among products, similarities or differences in use, design, physical composition and technical characteristics, price similarities or dissimilarities that are not attributable to common trends and the perceptions of industry members that the products are or are not substitutes. *See Goodrich*, 110 FTC at 290; *Grand Union Co.*, 102 FTC 812, 1038-42 (1983).

1. Polyvinyl Chloride

Polyvinyl chloride is a thermoplastic resin that is combined with additives, such as stabilizers and coloring agents, and then converted by heat and pressure to a variety of finished vinyl products. I.D.F. 12. Products made from other materials compete with finished vinyl products -- cast iron pipes, for example, compete with pipes made from PVC, and wood siding competes with vinyl siding -- but there are no substitutes for PVC in vinyl products.

PVC is produced as a white powder or granules by four different processes: suspension, mass or bulk, dispersion and solution.[5] I.D.F. 15-16. Each of the four processes involves polymerization (a chemical reaction) of the raw ingredient vinyl chloride monomer

[5] PVC made by the solution process is not involved in this case. I.D. at 5 n.5.

("VCM").[6] A second monomer, vinyl acetate, is added to produce suspension PVC copolymer. The suspension process is by far the most common, and PVC produced by the suspension process accounts for more than 85% of the PVC produced in the United States.[7] I.D.F. 17.

PVC homopolymer resins made by the mass and the suspension processes are comparable in appearance and properties and are interchangeable for many end uses, such as pipe and pipe fittings, wire and cable, packaging film and sheet, siding and bottles. Mass PVC homopolymer is more suitable than suspension PVC homopolymer for products requiring greater optical clarity, such as packaging materials.[8] I.D.F. 17, 18 & 57; *Goodrich,* 110 FTC at 291. The parties agree that mass and suspension PVC homopolymer constitutes a relevant product market. I.D.F. 55; *See Goodrich,* 110 FTC at 290-92.

Suspension PVC copolymer resin ("copolymer"), made from vinyl chloride and vinyl acetate, has different characteristics from

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[6] In layman's terms, PVC is made by cooking VCM and other ingredients in a large pot under heat and pressure. The resulting wet product is then dried. PVC made by the mass and suspension methods resembles sugar; dispersion PVC resin resembles flour or talcum powder. Lull, JX1(I), Tr. 504-06. PVC resin is combined with other ingredients to make finished vinyl products. Disch, JX1(IV), PX11 at 655-56. The various processes for making PVC are described in notes 7-9 & 14 *infra.*

[7] Suspension PVC homopolymer is made by mixing the ingredients -- VCM, demineralized water, suspending agents and catalysts -- in a reactor or large pot: "The order of addition and temperature of ingredients [are] important and [are] regulated by computer control." The mixture is stirred to start the polymerization process, which takes 10-18 hours, depending on the grade of homopolymer being produced: "Reactor temperature, pressure, and other conditions are constantly monitored and controlled by the computer." After polymerization, the wet product (or "slurry") is removed from the reactor, excess VCM is removed, the slurry is "de-watered" in a centrifuge and the resulting "wetcake" is dried in heated air chambers. The dried resin particles are moved to large silos and sorted by type and quality before shipment. JX1(III), PX18, Ex.16-H(1); Disch, JX1(IV), PX11 at 627-28.

[8] In the mass process, VCM is polymerized without water. Disch, JX1(IV), PX11 at 629; Goodrich I.D.F. 23. Occidental, Goodrich and Certain Teed are the only PVC producers with mass PVC production facilities. RX197Z *In Camera.*

other PVC resins and is used to make different products.[9] I.D.F. 19 & 69 (portion *In Camera*). Copolymer is recognized by industry members as a separate product from the demand side. It is sold in "distinct end-use markets." I.D.F. 69-78 (portion *In Camera*).[10] The price of copolymer moves independently of the price of homopolymer resins, implying that the two are not in the same market.[11] I.D.F. 72. Mr. Disch, formerly of Tenneco and then with Occidental,[12] and Mr. Schaefer, Senior Vice President of Occidental PVC Resins and Compounds Division, testified that suspension homopolymer and copolymer prices are unrelated, I.D.F. 73, and a comparison of Occidental's actual prices for suspension homopolymer and copolymer bears this out. *See* I.D. at 21 (chart). The administrative law judge concluded that suspension PVC copolymer constitutes a separate product market. I.D.F. 81. Occidental disputes this conclusion and maintains that, because of supply side substitutability, suspension copolymer is part of the mass and suspension PVC

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[9] "The basic recipe . . . for all copolymer resins [is] various quantities of VCM, VAM [vinyl acetate monomer], suspending agents, catalysts, buffer and demineralized water." JXl(III), PX18, Ex. 16-H(2) at 2; *See* CX5A. The ingredients are combined in a reactor; polymerization starts when the demineralized water is added. The reactor cycle for a batch of suspension copolymer is 12-15 hours. The slurry is transferred to a stripping vessel, where the unreacted monomers are removed (1.5-2 hours), then to holding tanks, where up to seven individual batches are continuously blended to ensure product uniformity. The slurry is next pumped through a centrifuge, then dried in a rotary dryer. Finally, the resin is passed through a screener to remove oversize product and transferred to a bagging operation or bulk storage facilities before shipment to customers. JXl(III), PX18, Ex.l6-H(2) at 2-3.

[10] According to Occidental, "[t]he copolymer market is about 192 [million] pounds, with 53% going into flooring; records and calendering [pressing between rollers] consume the rest." RX197L *In Camera*.

[11] When two products are in the same market, the prices of each ordinarily will respond to changes in the price of the other. Although the prices of copolymer and homopolymer move independently of one another, both presumably reflect changes in the price of their common raw material, vinyl chloride monomer.

[12] Mr. Disch was a vice president at Tenneco; before the acquisition, Occidental announced that Mr. Disch would become director of national accounts at Occidental. JX1(IV), PX8 at 109.

homopolymer market. R.A.B. at 61.[13] In part I.A.2 below, we explain our conclusion that suspension PVC copolymer is a relevant market.

PVC made by the dispersion process accounts for about 7% of PVC sold in the United States.[14] RX197H *In Camera*. Dispersion resin is finer than other PVC resins and is used for vinyl resilient sheet flooring,[15] coatings and molded plastic products. I.D.F. 20 & 30-33. The parties agree with the administrative law judge that dispersion PVC is a relevant product market. I.D.F. 82 & 105.

2. Production Substitution

Productive capacity that could be modified economically within a year to produce the relevant product constrains the ability of incumbent firms to increase prices and, therefore, should be included in the product market. On appeal, Occidental maintains that productive capacity devoted to suspension PVC copolymer should be counted as part of the mass and suspension PVC homopolymer market, because of the ease of production substitution. R.A.B. at 61. According to Occidental, "[a]ny copolymer plant can produce

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[13] Suspension PVC copolymer was not at issue in Goodrich.

[14] The "basic recipe" for dispersion PVC resin is VCM, demineralized water, emulsifier and catalyst. The ingredients are weighed and mixed, pumped through an homogenization system and then moved to reaction towers. The reaction process is controlled by "use of 'cooling tower' and 'refrigerated' water circulating through the tower jackets. The reaction is considered complete when the tower pressure decreases to a preset level." After the unreacted VCM is removed, the mixture is moved through blend tanks to rotary vacuum filters for dewatering and through a hot air drying system. The product is then spray dried to obtain a very fine particle size; another resin and alcohol may be added "to achieve the proper rheological characteristics." Dispersion PVC is bagged in 50-pound bags for shipment. JX1(III), PX18, Ex.l6-H(2), at 5-7; Disch, JX1(IV), PX11 at 630. A dispersion PVC copolymer resin is made but is not at issue in this case.

[15] Different types of PVC are used for different types of vinyl flooring and are not interchangeable in these end uses. Dispersion PVC is used for vinyl sheet flooring. Suspension PVC copolymer is used as a binder for inexpensive filler in vinyl resilient floor tile. Solid vinyl tile, made from suspension PVC homopolymer, is 30 times more expensive than copolymer tile. *See* CXl92 A-D; CX197B *In Camera*; CX205B; CX209 *In Camera*; JX3, PX9 at 34-35 & 97-98.

homopolymer resins with the simple turn of a valve," and "[h]omopolymer plants can be converted to copolymer production quickly and profitably in response to copolymer price increases." *Id.* This assertion involves two different issues: whether a suspension copolymer plant can easily and economically switch to the production of suspension homopolymer and whether a suspension homopolymer plant can easily and economically switch to production of suspension copolymer. We discuss each separately below.

We agree that a suspension copolymer plant could be modified with relative ease to produce suspension homopolymer.[16] It is because of the ease of substitution that the administrative law judge included suspension copolymer capacity in measuring the market for mass and suspension homopolymer. I.D.F. 56 (portion *In Camera*).[17] It is not so clear that this substitution could be accomplished economically, because of substantial production cost differences between suspension copolymer and homopolymer plants. *See* I.D.F. 56 (portion *In Camera*). Suspension copolymer is made in small reactors or vessels; most suspension homopolymer is made in large reactors at lower cost.[18] The cost of making suspension PVC homopolymer in a small reactor is as much as 6 cents per pound higher than in a large reactor.[19] According to Occidental business

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[16] According to Tenneco, a suspension copolymer plant can be modified to produce suspension homopolymer by "a change to the process controls of the reactor. The change can be accomplished in less than 10 days." JX1(III), PX18 at 49.

[17] The parties do not challenge this finding.

[18] Small reactors are 2500-10,000 gallons; large reactors are "at least" 18,000 gallons. Bailey, JX3, PX6 at 98; *See Goodrich*, 110 FTC at 321 n.177. Small reactor suspension plants are older and, in general, have been displaced by more efficient, large reactor suspension plants. According to Mr. Schaefer of Occidental, "[i]n the early 1970's, . . . a real technological breakthrough . . . consist[ed] of these very large reactors which are used to make commodity grade PVC resin. And as the [PVC] business has grown and become more commodity oriented, a number of producers invested in large reactor capacity in order to maintain a competitive position in the commodity business." JX1(I), Tr. 560-61.

[19] JX1-4, PX131 at 1349 (4 cents per pound); CX43P (4 cents per pound); Goodrich RX875V-W (6.3 cents per pound). If the price of pipe grade homopolymer PVC is 29 cents, the cost disadvantage of small reactor plants is 14% to 22% of the price.

planning documents, because of this cost disadvantage, suspension PVC homopolymer made in small reactors cannot economically compete in the general purpose sectors.[20] RX197M *In Camera.* Occidental (and other producers) sell their small reactor suspension PVC homopolymer in "specialty niches" that "are priced approximately $.07-$.12 above General Purpose resins and therefore deliver a return over their high costs."[21] RX197M *In Camera*; *See* I.D.F. 56 (portion *In Camera*); CX183B; CX182B-D *In Camera.* For these reasons, switching production from suspension copolymer to suspension homopolymer appears uneconomic, unless the copolymer producer could identify a "specialty niche" for his high cost homopolymer.[22] We conclude, therefore, that it is not necessary to include suspension copolymer capacity to measure the mass and suspension homopolymer market. Still, because of the ease of substitution and with an abundance of caution, we include suspension copolymer capacity in the mass and suspension homopolymer market for the purposes of this case.

It is possible that suspension copolymer capacity may constrain the pricing of suspension homopolymer producers but that the pricing constraint does not run in the opposite direction, from homopolymer capacity to copolymer producers. If this is the case, then it is appropriate to include suspension copolymer capacity in measuring the suspension homopolymer market, as we have decided to do, but not to include homopolymer capacity in measuring the suspension

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[20] Occidental also said in its business planning documents that "[n]umerous old small [suspension] reactor operations have closed down over recent years due to their inability to compete on a cost/performance basis. Those still in operation are competing only in specialty niches." RX197S *In Camera.* Mr. Schaefer of Occidental said that "the old small reactors that are still left can produce copolymer and at least compete in the business, whereas you cannot produce . . . homopolymer in those reactors." JX1(III), PX 136 at 83.

[21] Occidental in its business plans said that the "specialty resin [*i.e.*, small reactor suspension PVC homopolymer] competition consists of domestic producers with small reactor facilities. O[ccidental], Georgia Gulf, B.F. Goodrich, and Keysor comprise 90% of the market." RX197M *In Camera.*

[22] Suspension homopolymer specialty resins might constitute a relevant product market, but that argument was not made in this case.

copolymer market. We therefore turn to the second production substitution issue: whether a suspension PVC homopolymer plant can easily and economically be converted to production of suspension PVC copolymer.

Conversion of a suspension homopolymer plant to produce copolymer would require capital investment for additional equipment for vinyl acetate, including vinyl acetate feed lines, storage tanks and a recovery system, as well as different meters and gauges for vinyl acetate. Hill, CX183C; Flammer, CX184C; Fischer, CX208D; Disch, JX3, PX8 at 68; Lull, JX1(I), Tr. 509-10. Such a conversion would cost several million dollars and would take approximately two to two and one-half years, including time for planning, construction and new environmental permitting that may be required because of the addition of vinyl acetate to the polymerization process. I.D.F. 320-24 (portion *In Camera*) & 328 (portion *In Camera*).[23] Additional time -- three months to a year -- would be required after physical conversion for production trials, followed by customer trials. I.D.F. 325-26. The administrative law judge concluded that producers of homopolymer would not modify plants to produce copolymer in response to even "significant increases" in the price of copolymer, because plant conversion would be difficult and unprofitable. I.D.F. 79-80 (portion *In Camera*), 304-31 (portion *In Camera*). We agree.

According to an Occidental document of December 1985, "[t]he conversion of a small reactor Suspension [homopolymer] Resin plant to produce 50 [million] pounds per year of Copolymer is estimated to cost $2 [million] to $2.5 [million]." CX51.[24] Mr. Hill of Keysor-Century Corporation, a producer of copolymer, estimated that conversion would cost $3 million and would take one to two years, if the plant remained in operation during the process. CX183C. Mr.

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[23] Deciding whether to convert a plant to copolymer could extend the time considerably. Mr. Disch reported that Tenneco took about 2 years to decide to replace the reactors at its Burlington plant (planning began in 1982; the new reactors did not come into production until July 1985, JX1(III), PX20 at 32-34) and that a decision to convert a plant to copolymer would be more complicated. JXl(IV), PX8 at 76 & 78-79.

[24] Memorandum from F.A. Sacks, Occidental Director of Marketing, Dec. 13, 1985.

Flammer of Vista Polymers, Inc., estimated that conversion of a homopolymer plant to produce copolymer would take 2 to 2.5 years. CX184D & E. Tenneco reported that the cost of converting its Flemington, New Jersey, plant from homopolymer to copolymer, completed in 1975, was $5 million, JX1(III), PX18 at 36, and that subsequent improvements to increase Flemington's copolymer capacity by 10 million pounds (to 95 million pounds per year) cost $3.2 million and took 3 years, from planning in early 1978 to production in the first quarter of 1981.[25] JX1(III), PX20 at 34-35.

Against this evidence from Occidental, Tenneco and other industry members, Occidental relies on an estimate prepared in anticipation of this litigation at the direction of Mr. Lull, Occidental's Director of Manufacturing for PVC. The estimate was that conversion of a suspension homopolymer plant to produce 50 million pounds of copolymer would cost about $1 million to $1.5 million and would take approximately 42 weeks. Lull, JX1(I), Tr. 516-17 & 531-38; RX182. Given the circumstances in which this estimate was developed and its inconsistency with other figures in the record, we do not find Occidental's estimate persuasive.[26]

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[25] In light of this experience with Flemington, the basis for Tenneco's 1986 estimate (in a document prepared for the Commission's review of this acquisition) that "major process items needed" to convert a plant from homopolymer to copolymer would cost $250,000 to $750,000, "depending on scope of work," and that installation would take 3 to 9 months, "depending on scope of work," is not clear. JX1(III), PX18 at 50.

[26] Occidental asserts that the cost of conversion could be reduced by eliminating a new recovery system, identified in the April 1986 estimate prepared for Mr. Lull as costing $685,000. R.A.B. at 62-63. A recovery system recovers, separates, purifies and recycles unreacted monomers (VCM and vinyl acetate ("VAC")) after polymerization. Mr. Lull said that a new recovery system was not necessary, that the combined VCM and VAC could be collected in the same recovery system used for recovering VCM used in making homopolymer. Lull, JXl(I), Tr. 514. Other copolymer producers disagreed and testified that new monomer recovery systems would be needed for conversion to copolymer. Hill, CX183B-C (VCM and VAC must be separated to reuse VCM and for waste water purification); Hornack, RX177 C-D *In Camera*; JX1(III), PX18 at 50 (Tenneco identified "recovery, purification, and recycle facilities" for VAC as a "major process item needed" for conversion); *See also* Flammer, CX184C; Fisher, CX208D-E & RX264B-C; Bailey, JX3, PX6 at 76-77.

Even if technically feasible,[27] conversion of a suspension homopolymer plant to produce copolymer is highly unlikely, because of the declining demand for copolymer.[28] Every witness who testified on the subject said that modifying a homopolymer plant or reopening a closed plant to produce copolymer would be uneconomic.[29] Mr. Schaefer, a vice president of Occidental, testified

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The recovery system identified in Mr. Lull's estimate is a carbon adsorption system that may be less expensive than other recovery systems. *See* Fisher, RX264B-C ("comparative costs" not studied). The carbon system generates a "crudely purified" VCM and "somewhat more contaminated" VAC. RX182B. Care is necessary in using recovered VCM and VAC, because of the risk of contamination. According to Tenneco, use of recovered monomer must be limited to prevent "batch 'set-up,'" in which a batch of copolymer becomes unuseable chunks or a mass in the reactor, instead of discrete particles. JX1(III), PX18 at 50. Vygen believed that imperfectly purified VCM (*i.e.*, VCM contaminated by VAC) was the most likely source of contamination in its homopolymer resin. CX125 *In Camera*. When recovered VCM and VAC are separated, vessels, pumps and piping should be upgraded from carbon to stainless steel, because of the corrosive effects of VAC. Lull, JX1(I), Tr. 533-34. This upgrade would bring Mr. Lull's estimate to about $1.5 million. RX182B.

The estimate prepared for Mr. Lull assumed full "compliance with all government (Federal/State) regulations," including emissions standards, RX182A, and did not identify the cost of complying with environmental regulations for vinyl acetate. These costs may be substantial. Occidental claimed to be "one of the few companies that has spent the capital to install the necessary environmental equipment specific to handling vinyl acetate monomers." CX5E *In Camera* (emphasis added). According to Occidental, "most PVC producers have dropped their copolymer lines instead of investing the capital to comply" with the "tough environmental regulations." CX5D-E *In Camera*.

[27] It is worth noting that the evidence addresses only the conversion of a small reactor suspension homopolymer plant to copolymer production. Conversion of a large reactor plant appears to be even less likely. Some witnesses questioned whether copolymer could be produced in large reactors, *e.g.*, Hill, CX183B; Flammer, CX184C; others testified that producing copolymer in large reactors, even if possible, would not be economically feasible. Bailey, JX3, PX6 at 77-78; Disch, JX3, PX8 at 72-73.

[28] The demand for copolymer for vinyl floor tile is flat, and the demand for copolymer for phonograph records is declining rapidly. *See, e.g.*, Hill, CX183F; Bailey, JX3, PX6 at 82.

[29] Mr. Lull said that he considered only the technical feasibility of conversion and did not consider the economic feasibility. JX1(I), Tr. 535 & 538.

that Occidental would not reopen its closed Perryville, Maryland, suspension PVC homopolymer plant to produce copolymer, even if the price of copolymer increased three cents or four cents a pound (approximately a 10% increase), because of insufficient demand for copolymer. JX1(I), Tr. 585-86. Mr. Schaefer also testified that Occidental would not consider expanding copolymer capacity at its Pottstown plant: "As long as the outlook for consumption continues to be one of negative growth" for copolymer, any additional production capacity "would depress the price." *Id.* at 587.[30] Mr. Disch said that conversion to produce copolymer was unlikely because of declining demand, and Tenneco in 1982 or 1983 reduced its copolymer capacity because of declining demand. JX3, PX8 at 59 & 66-67.

Air Products exited the copolymer market in 1983, because of declining demand for copolymer, and believes that reentry would be uneconomic.[31] Fisher, CX208B-C. Formosa has not made copolymer since 1981 and would not reenter copolymer production even if prices increased by 10%. Mr. Boyer of Formosa, like Mr. Schaefer of Occidental, said that entry by Formosa would create excess

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[30] The copolymer capacity of Occidental's Pottstown plant is limited by the size of the vinyl acetate recovery system. Lull, JX1(I), Tr. 539. Although Occidental asserts on appeal that the cost of such a recovery system "could be brought as low as $685,000," R.A.B. at 63, citing Lull, JX1(I), Tr. 516, this figure tells us nothing about the economic feasibility of investing in additional copolymer capacity. Like Occidental, Vygen could expand its copolymer capacity by upgrading its vinyl acetate recovery and wastewater discharge systems, but, according to the president of Vygen, this "would require a substantial capital expenditure by Vygen" that is "not economically justifiable," given the level of demand and projected growth for copolymer. Hornack, RX177 D *In Camera*. Even a sustained price increase of 10% would not induce Vygen to dedicate additional capacity to copolymer production. Hornack, CX182C *In Camera*.

[31] Air Products maintained separate production lines for homopolymer and copolymer until, in 1983-84, when the plant was closed for 15 months, it "reconfigured the plant to dedicate both reactor trains" to suspension homopolymer. Fisher, CX208B. Air Products exited the copolymer market because it believed that its sales of copolymer would be insufficient to cover production costs: "The price of suspension PVC copolymer resin would have to increase by 30-50% relative to the price of suspension PVC homopolymer before re-entry into copolymer production would be economic for Air Products." Fisher, CX208C.

copolymer capacity and drive price down to a level that would make entry unprofitable. Boyer, CX185G. Mr. Flammer of Vista Polymers and Mr. Hill of Keysor-Century also testified that additional copolymer capacity would be "economically impractical," because of declining demand. CX184D; CX183F *In Camera.* Mr. Bailey of Occidental said that "there is no economic benefit to producing copolymer as opposed to homopolymer." JX1(IV), PX6 at 77. Mr. Disch, who moved from Tenneco to Occidental, testified that demand for copolymer is not sufficient to attract new entry and predicted that expansion or conversion to produce copolymer might occur only if demand for copolymer were to increase over a period of years. JX1(IV), PX8 at 67 & 89-90.

Conversion of a suspension homopolymer plant to produce both homopolymer and copolymer also is unattractive, because of the costs of switching production between the two products. These costs result from the problem of cross-contamination between the two products and from the downtime required to clean the production system before beginning production of a different product.[32] Mr. Fisher testified that Air Products would not swing its production capacity between homopolymer and copolymer because of the additional costs involved: product contamination could reduce the saleability or the price of resins, and production of copolymer could reduce the overall capacity of the plant by 20% to 30%. CX208C-D.[33] Mr. Boyer of Formosa testified that copolymer production "had an overall negative impact on the operations of the plant," because problems with contamination resulted in off-grade

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[32] Tenneco (at Burlington), Occidental (at Pottstown) and Borden have swing capacity to produce either copolymer or specialty homopolymer resins. Switching is costly. Switching between copolymer and homopolymer requires closing down and thoroughly cleaning the reactors, dryers and other equipment. Tenneco estimates the downtime for each production switch is about 8 hours. JXl(III), PX18 at 50. Downtime for product changeovers at Occidental's Pottstown plant in 1984 "amount[ed] to 13.9 [million] pounds of lost production." RX230A *In Camera.*

[33] This estimate appears to be consistent with Occidental's experience at Pottstown. *See* note 32 *supra.* Mr. Lull of Occidental testified that the number of different resins produced at a plant should be reduced to "absolutely minimize down time, maximize productivity and decrease costs." JX1(I), Tr. 548 & 526; *See also* JX1(III), PXl5 at 21; RX230A *In Camera.*

batches of both homopolymer and copolymer, reducing the value of total plant output. CX185G. Mr. Hornack of Vygen said that switching production between homopolymer and copolymer is not economically feasible, because of the loss of production and because any contaminated copolymer is a total loss. According to Mr. Hornack, contaminated homopolymer can be sold as an off-grade product at a price 20% to 30% below that of prime resin, but contaminated copolymer cannot be sold at any price. CX182D *In Camera*.[34]

The record shows that conversion of a homopolymer plant to produce copolymer is costly and time-consuming and that such conversion is unlikely to occur within one year in response to an increase in the price of copolymer. We hold that supply-side considerations do not warrant including capacity devoted to the production of suspension homopolymer resin in measuring the suspension PVC copolymer market.

B. Geographic Market

The relevant geographic market includes those suppliers that constrain the ability of the merged firm to raise price or restrict output, *i.e.*, those firms to which buyers could turn in the event of a price increase. *FTC v. Elders Grain Inc.*, 868 F.2d 901, 907 (7th Cir. 1989); *Hospital Corporation of America* 106 FTC 361, 466 (1985), *aff'd*, 807 F.2d 1381 (7th Cir. 1986), *cert. denied,* 481 U.S. 1038 (1987). Price movements, shipping patterns, transportation costs and

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[34] Contamination may continue to occur long after a production line switch. Occidental experienced contamination in the first 5 to 8 batches of copolymer after switching from homopolymer. RX94C *In Camera* (a batch of copolymer is about 13,000 pounds; the reactor cycle for a batch is 12 to 15 hours, JX1(III), PX18, Ex.16-H(2) at 2-3). Occidental identified "a whole host of possibilities" for contamination on swing equipment, including reactors, drop lines and stripping vessels, blend tanks, dryer feed lines and dryers, dust collectors, conveying systems, silos, loading lines and railcars or trucks. In June 1985, Occidental noted that "contamination is a real problem and we must eliminate it in future shipments." CX72; *See also* CX73; CX124-126 *In Camera*. In January 1986, Occidental attributed its failure to meet 1985 copolymer sales goals to its "inability to supply uncontaminated resin." CX60 (copolymer sales 20% below plan).

the existence of excess capacity outside the tentatively identified geographic market are relevant to identify the geographic market. *Elders Grain Inc.*, 868 F.2d at 906-07; Goodrich, 110 FTC at 289; *Hospital Corporation of America*, 106 FTC at 466-69.

The administrative law judge concluded that the relevant geographic market for each of the three relevant products is the United States. I.D.F. 147, 154 & 165. Occidental claims that the relevant geographic market for mass and suspension PVC "is at a minimum, North America." R.A.B. at 21 n.17. Occidental also claims that imports of dispersion PVC and the ability of foreign producers to increase imports in the event of a noncompetitive price increase show that the market for dispersion PVC is broader than the United States. R.A.B. at 11 & 72-80.

1. PVC Imports

The Commission observed in Goodrich that "imports are a small proportion of domestic PVC consumption and, absent extraordinary conditions, do not appear to constrain domestic prices." 110 FTC at 300. In the intervening years, PVC imports to the United States have remained only a minor part of total domestic supply. Despite a strong price increase for PVC in the United States between 1984 and 1988 (from 23 cents per pound in November 1984 to 40 cents per pound in January 1988), imports declined from between approximately 4% and 5% of domestic supply in 1984-1985 to 2.7% of domestic supply in 1986 and to 1.5% of domestic supply in the period from December 1986 through November 1987. I.D.F. 119-24 (portion *In Camera*); *See* I.D. at 36-37 (charts).[35] By mid-1986, imports of PVC to the United States had "plunged" and exports had "soared." RX164A; RX22A *In Camera*; RX23F *In Camera*.

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[35] One approach for identifying geographic markets suggests that an area is a "strong market" if imports and exports are less than 10% of supply. Elzinga & Hogarty, "The Problem of Geographic Market Delineation in Antimerger Suits," 18 Antitrust Bull. 45, 75 (1973); "The Problem of Geographic Market Delineation Revisited: The Case of Coal," 23 Antitrust Bull. 1 (1978). Under this standard, the United States clearly is a relevant geographic market for PVC.

The relative increase in PVC imports in 1984 and 1985 -- although imports were still only a minor part of total domestic supply -- appears to have been related to currency exchange rate fluctuations that had the effect of increasing the price of PVC in the United States as compared to foreign prices.[36] *Goodrich,* 110 FTC at 300; I.D.F. 140-41; I.D. at 45; CX174D; RX21L; RX168Z42 *In Camera*; JX1-4, PX104 at E-4; *See* Schaefer, JX3, PX10 at 1130; Stevens, JX3, PX9 at 59; Disch, JX3, PX8 at 90; JX1-4, DX13 at 2 *In Camera.* This suggests, as Occidental claims, that imports are responsive to domestic price increases, but the degree of responsiveness does not appear sufficient to defeat a collusive price increase in the United States.

The increased value of the dollar relative to other currencies between 1980 and 1984 in effect increased domestic PVC prices by 66%, as compared to foreign prices. *Goodrich,* 110 FTC at 300; I.D.F. 137. Even with the combined effects of this price increase and the weather-related domestic shortages, *See* note 36 *supra,* imports of mass and suspension homopolymer PVC in 1984 were less than 3.8% of total U.S. supply, suggesting that a collusive price increase by domestic producers would be profitable. I.D.F. 137-41.[37]

An analysis by complaint counsel's expert witness confirms that imports are not likely to be sufficiently responsive to price changes to defeat the profitability of a domestic price increase. Kaserman, JX1(I), Tr. 296-303; JX1-4, PX141. According to complaint counsel's expert witness, a 10% increase in domestic prices would generate only a 20% increase in imports: for example, if imports were 5% of domestic supply, a 10% domestic price increase would

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[36] In Goodrich, the Commission attributed the increase in imports in 1984 to exchange rate fluctuations and to domestic shortages resulting from severe weather conditions in 1983-84 that closed several domestic PVC plants. 110 FTC at 300.

[37] The value of the dollar against other currencies, as measured by the Federal Reserve Board, continued to increase in the first quarter of 1985 and then fell below 1984 levels in the last quarter of 1985. CX174B & C. Imports of PVC were greatest in the last quarter of 1984 and the first quarter of 1985, when the value of the dollar was highest, and imports declined thereafter as the dollar fell. *See* I.D. at 45 (chart). A regression analysis prepared by Tenneco in 1985 also found a strong correlation between the value of the dollar and imports of PVC. JX1-4, DX13 at 3-9 *In Camera*; *See* I.D.F. 116 *In Camera.*

increase imports to only 6% of domestic supply. JX1-4, PX141; I.D.F. 114-17. Applying this analysis, for 1987, when imports were only 1.5% of domestic supply, a 10% domestic price increase would increase imports to only about 1.8% of domestic supply. I.D.F. 117. This clearly would be insufficient to constrain a domestic price increase.

Other considerations limit the ability of imports to constrain domestic prices. Tariff and transportation costs may make imports uneconomic. *E.g.*, CXl4; CX46A; JX1-4, DX13Z *In Camera*. Imports of PVC from most countries are subject to a 10.1% tariff. I.D.F. 143 (portion *In Camera*). Except for imports from Mexico and Canada, imported PVC faces freight costs for ocean transportation. Mexico and Canada have been the principal sources of imports into the United States. In 1986 and the first half of 1987, duty-free imports from Mexico accounted for 45% to 60% of all PVC imports, but these imports diminished considerably with the elimination of duty-free status for imports from Mexico. I.D.F. 126. Canada accounted for about 45% of imports of PVC in 1985. I.D.F. 127. The principal source of these imports is B.F. Goodrich, a leading domestic producer of PVC, the largest producer in Canada and a major producer in Mexico. *Id.* We agree with the administrative law judge that Goodrich has few incentives to undermine a domestic price increase by increasing imports from its Canadian and Mexican plants. *See Goodrich,* 110 FTC at 300-01; I.D.F. 127-28 (portion *In Camera*).[38]

In addition, the ability of PVC producers to export is limited by demand for PVC in their home markets. For example, by the end of 1986 and through 1987, PVC was in short supply worldwide. Lull, RX1Q *In Camera*; I.D.F. 129 (portion *In Camera*); RX310D & E. Suppliers in the United States and elsewhere were rationing PVC to

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[38] As the administrative law judge pointed out, including Goodrich's Mexican and Canadian plants in the domestic market does not change market share and concentration data in any meaningful way. I.D.F. 126-28 (portion *In Camera*).

their domestic customers, and little PVC was available for export.[39] In general, domestic and foreign producers of PVC sell in export markets on an opportunistic basis. Schaefer, J Xl(I), Tr. 589 & JX1(IV), PX10 at 1208; Bailey, JX1(IV), PX6 at 29; Friedman, JX1(I), Tr. 135; CX44C; Harris, JX1(II), Tr. 915. Mr. Schaefer testified that export sales are the "last pounds out of [the] plant."[40] JX1-4, PX136 at 149. This suggests that imported PVC is unlikely to provide a stable source of supply for domestic users.

Other evidence indicates that imports have not been a major restraint on domestic prices. Mr. Schaefer testified in 1986 that imports had not placed pressure on Occidental's PVC prices, JX1-4, PX136 at 145, and that Occidental does not track PVC production outside the United States. JX1(I), Tr. 577-78. In addition, domestic PVC supply contracts typically limit the obligation to meet lower prices to prices offered by domestic producers, implying that firms in the domestic market do not regard imported PVC as a significant competitive presence. *E.g.*, CX112C; JX1-4, PX94 at 2; Lewis, CX204B.[41]

Although some domestic PVC customers have bought imported PVC from time to time, in general, they decline to rely on imports as a regular source of supply because of the need for timely and frequent deliveries, consistent quality and technical support. *See, e.g.,*

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[39] In April 1987, PVC was "red hot": "Producers have had to put their customers on sales control to make sure all their customers were given their fair share of available production," and foreign buyers offering 5 cents per pound over domestic PVC prices found "few takers." CX31G & H.

[40] Mr. Schaeffer explained that U.S. producers typically sell at lower prices in export markets to "cover . . . variable costs and get something extra back. . . . Now, if he [a PVC producer] started selling product at the same price in the U.S., he's just going to collapse the whole [domestic] pricing structure . . . and lose a lot of money." JX1-4, PX136 at 149. According to one industry journal, "Oxy chose to pour PVC into export markets" instead of cutting price in the United States. CX44C (Chemical Business, Feb. 1987).

[41] The differences between domestic and export prices also are consistent with the conclusion that the United States is a relevant geographic market. *See, e.g.*, RX299H. Domestic producers usually sell in export markets at a lower price than they could obtain domestically. Schaeffer, JX1-4, PX136 at 147; *See* JX1(I), Tr. 569.

Pflugrath, CX177C *In Camera*; Dellevigne, CX188D; Baker, CX205B; Gmach, CX200D; Wilhite, CX179D; Weimar, RX249A-B & CX192F; Goldstein, CX180C; CX15; Friedman, CX120H-J *In Camera*; Lewis, CX204B. Delivery from overseas can be unpredictable, and shipments can be delayed in customs. Weekly or biweekly deliveries, which some customers require, are virtually impossible from overseas; larger volume import shipments would mean increased storage costs. Domestic PVC usually is shipped in bulk; imported PVC usually is shipped in bags, which imposes additional handling costs.[42] Some customers have found that imported resin is not of comparable or consistent quality, and foreign producers are not in a position to offer technical assistance to domestic purchasers or to replace a low grade shipment in a timely manner. *See* Friedman, JX1(I), Tr. 134-35 & 150; Mason, JX1(I), Tr. 196; Schaefer, JX1-4, PX136 at 148. For these reasons, foreign producers do not provide an alternative to domestic suppliers for regular, long-term supplies of PVC.[43]

2. Dispersion PVC Imports

The administrative law judge found that imports of dispersion PVC are a minor factor in the United States, that neither domestic producers nor customers regard imports of dispersion PVC as a significant source of supply and that domestic producers have been

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[42] The additional cost of bagging PVC would not apply to dispersion PVC, which almost always is shipped in bags.

[43] In 1988, fourteen European PVC producers were found by the European Commission to have fixed prices for PVC between 1980 and 1984. Decision of 21 December 1988, 32 O.J. Eur. Comm. (No. L74) 1 (1989). The Commission has appealed the nullification of its decision (vacated on procedural grounds *sub nom. BASF AG v. Commission* (EC Ct. lst Inst. Feb. 27, 1992), *reported in* 62 Antitrust & Trade Reg. Rep. (BNA) 294 (1992), *appeal pending, reported in* "EC Commission Opens New Probe of Cartel Behavior in PVC Market," 63 Antitrust & Trade Reg. Rep. (BNA) 179-80 (1992)). To the extent they have a propensity to fix prices or to follow an anticompetitive price increase, European firms may be unlikely "guarantors of competition," Olin Corporation, Docket 9196, slip op. at 27 (June 13, 1990), *aff'd,* No. 90-70452 (9th Cir. Feb. 26, 1993), in the event of a collusive price increase in the United States.

able to increase the prices of dispersion resin without attracting any import response. He concluded that the United States is an appropriate relevant market for dispersion PVC. I.D.F. 155-65 (portion *In Camera*). Occidental asserts that this conclusion is incorrect, that foreign producers "would be well-positioned to divert additional dispersion PVC to the United States if domestic producers attempted to increase prices." R.A.B. at 76.

The volume of dispersion PVC imports to the United States must be estimated, because available data do not provide disaggregated information concerning dispersion PVC. Complaint counsel's expert witness estimated that 1985 imports of dispersion PVC were 36.1 million pounds or approximately 8% of total domestic supply. JX1-4, PX140, Table 24. This estimate was derived by including all imported PVC priced over 35 cents per pound.[44] Because this is a low price for dispersion PVC, this estimate may overstate actual imports.[45] Occidental's estimate of imports of dispersion PVC, 30 to 40 million pounds, is similar and is similarly derived. *See* note 44 *supra*; I.D.F. 155. Occidental's projections for dispersion imports in its 1985-88 Strategic Plan, 49 million pounds in 1985, 41 million pounds in 1986 and 46 million pounds in 1987, also are similar. JX1(II), DX12 at 102633 *In Camera*. And in October 1985, Occidental estimated that 1985 imports of dispersion PVC would be 38 million pounds and that 1986 imports would be 33 million pounds. JX1-4, PX76 at 351555-56. These estimates are consistent with

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[44] More precisely, complaint counsel's expert included as dispersion PVC "imports from countries for which the value of imports exceeded $0.35 per pound for the entire year." JX1-4 PX140, Table 24; *See* R.R.B. at 76-77. The method is very similar to that used by Occidental. Sacks, JX1(IV), PX7 at 119-20 (Occidental estimate based on "Department of Commerce statistics, and which we have tried to cull down by due to country of origin and relative price levels and et cetera that would identify the product as dispersion and feel that it is a reasonably good estimate in that 30 to 40 million pound range"). We find that the estimate of complaint counsel's expert is reasonable.

[45] In 1985, Occidental's lowest mean actual sales price for dispersion PVC was 48.5 cents per pound (June 1985), JX1(III), PX15, Table 18A; Tenneco's mean selling price for dispersion PVC was about 47 cents per pound (June 1985), JX1(III), PX18 at 39 & PX20 at 28.

identifying the United States as the relevant geographic market for dispersion PVC.[46]

Other evidence in the record is consistent with the conclusion that domestic prices for dispersion resin are not constrained by imports. In October 1986, after the acquisition of Tenneco, Occidental "embark[ed] upon a program to bring up the pricing" for low end dispersion resins by 2 cents to 4 cents per pound, about a 5% to 10% price increase. CX39-42. In June 1987, domestic producers increased the price of dispersion PVC by 3 cents per pound, CX205C, and Occidental observed that its "dispersion business continues to remain very strong. The June 1 price increase appears to be holding . . . ." CX36A.[47] These price increases apparently did not attract increased volumes of imported dispersion resin (or finished vinyl products) to the United States in sufficient quantity to defeat the price increase. Instead, in January 1988, domestic producers increased dispersion PVC prices by another 3 cents per pound. RX311A; CX205C.

The administrative law judge found that the level of dispersion imports likely declined after 1985. This is consistent with Occidental's analysis, *See* JX1-4, PX76 at 351556, and PVC imports generally declined between 1985 and 1987. Tenneco's sales manager testified in March 1986 that "over the past six months we have seen a drying up of [dispersion] imports as the dollar value has declined." Stevens, JX3, PX9 at 59. If dispersion imports declined at the same rate as PVC imports generally, 1987 imports of dispersion resin

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[46] If we apply to dispersion imports the analysis of complaint counsel's expert (*i.e.*, a 10% domestic price increase would evoke a 20% increase in imports of dispersion resin, Kaserman, JX1(I), Tr. 296-303; JX1-4, PX141), we can calculate that imports would be between 9.6% and 13.2% of domestic supply in the event of a 10% domestic price increase. Under this analysis, domestic suppliers would lose only 1.6% to 2.2% of domestic sales to imports in the event of a 10% price increase.

[47] The ability to increase the price for dispersion PVC may have been related to the acquisition: Tenneco had been "very aggressive pricewise" for dispersion resins, according to Occidental. CX78.

would be 11.6 million pounds, less than 3% of domestic production. I.D.F. 157-58.[48]

Officers of Occidental and Tenneco testified that they did not consider imports of dispersion resin in making pricing decisions for domestic dispersion resin. Mr. Schaefer of Occidental testified in 1986 that imported dispersion resin has "relatively little" effect on the price of domestic resin. JX1-4, PX136 at 145. He added that "imported dispersion resins sell at some discount from the U.S. dispersion price." *Id.; See also* Bailey, JX3, PX6 at 29. Mr. Disch of Tenneco and later of Occidental identified only domestic producers as Tenneco's competitors for sales of dispersion PVC. JX3, PX8 at 38.

Dispersion PVC imports are subject to the same tariff and transportation costs that apply to other types of PVC, and the same considerations that limit the attractiveness of imported PVC to domestic consumers -- concerns about availability, delivery, storage costs, quality, cost and technical support -- limit the ability of imports of dispersion PVC resins to defeat a domestic price increase. Concerns about quality, delivery and technical support may be more important for dispersion PVC than for mass and suspension PVC, because, according to Occidental, dispersion resins "require advanced technology, stringent quality control, and good customer service." RX197C *In Camera.*[49]

Because of these concerns, neither customers nor producers of PVC view imported dispersion resin as a substitute for domestic resin in most end uses. I.D.F. 160; Stevens, JX3, PX9 at 55-57; Baker, CX205B-C. Instead, imported dispersion PVC is used primarily in low end applications, such as toys or traffic cones, in which the particular characteristics of the resin are not critical to the

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[48] There is some evidence that dispersion PVC imports may not have declined at the same rate but "continue[d] to come in because they are needed." RX164A (Chemical Week, Dec. 17, 1986). Also in 1986, Formosa and Goodyear expanded their U.S. dispersion production capacity. CX185E; RX127 A *In Camera*; RX237T *In Camera.*

[49] Occidental also said that "[I]t is these qualities which enable Dispersion resin to maintain profitable pricing levels." RX197C *In Camera* (Occidental 1986-1989 Strategic Plan).

performance of the end product. I.D.F. 161; Disch, JX3, PX8 at 43-44; Stevens, JX3, PX9 at 56. Domestic producers maintain higher prices for dispersion resin sold for critical applications than for dispersion resins sold for low end applications. I.D.F. 161.

Almost one-quarter of dispersion imports were accounted for by B.F. Goodrich, the second largest dispersion producer in the United States and the only dispersion PVC producer in Canada. I.D.F. 156. Goodrich would have few incentives to undermine a price increase in the United States by selling its Canadian dispersion resin at a lower price. In addition, demand in Canada limits Goodrich's ability to export to the United States. *See* CX137X *In Camera.*

Occidental asserts that "[p]roducers and customers of dispersion PVC recognize that imports would be a feasible alternative source of supply if domestic producers increased prices, citing statements from various witnesses. R.A.B. at 77. An examination of these cited statements does not support Occidental's claim. For example, Occidental quotes the statement of Mr. Boyer of Formosa "that dispersion PVC imports have 'influenced the slow downward trend [of dispersion PVC prices] over the past 3 years.'" *Id.* In the same paragraph, however, Mr. Boyer said that "[i]mported dispersion PVC resin is not currently a significant source of supply in the domestic market for dispersion PVC resin, and the level of imports is not likely to increase in response to a sustained ten-percent increase in the price of domestic dispersion PVC resin."[50] CX185F. Mr. Boyer also said that "the return on investment for dispersion PVC resins is good -- good enough that Formosa was in 1986 expanding the capacity of its

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[50] According to Mr. Boyer, although "[d]ispersion PVC resin pricing is relatively stable," prices declined from about 55 cents to about 45 cents per pound between 1983 and 1986. CX185E- F. Other evidence shows little decline in price between 1984 and 1986. Georgia Gulf's average dispersion price declined $.004 between January 1984 (52.6 cents) and January 1986 (52.2 cents). RX179Z11 *In Camera.* Occidental's mean actual price for dispersion resin declined $.017 between January 1984 (50.1 cents) and January 1986 (48.4 cents). JX1(III), PX15, Table 18A; CX100H. Domestic producers increased dispersion PVC prices beginning in October 1986. *See* CX39-42; CX17; CX36A; CX205C.

Delaware plant to produce dispersion PVC. CX185E; *See also* RX237T *In Camera.*[51]

Occidental also cites the testimony of Mr. McClellan, president of Plast-o-merics, Inc., a purchaser of PVC resins, "that he would increase his use of foreign PVC if the price of domestic PVC increased 5%." R.A.B. at 77. Mr. McClellan's testimony was not so unequivocal. In fact, he said that if the price of domestic resin increased 5%, his company "probably would to some extent" increase its use of foreign resin, but, he added, "[s]o much of it would depend upon circumstances." JX1(II), Tr. 725D. Even so, Mr. McClellan's experience is unusual. Most customers said that they could not rely on imported dispersion resin.

Occidental also cites the testimony of "a former Tenneco official . . . that imports would begin to displace domestic dispersion PVC if domestic prices were to increase." R.A.B. at 77. This characterization of the testimony is incomplete. The witness, Mr. Disch, formerly with Tenneco and now with Occidental, *See* note 12 *supra,* did say that consumption of dispersion resin for low end uses, such as toys and "other non-critical miscellaneous items," would tend to decline if price increased. JX3, PX8 at 42-43; *See* I.D.F. 161. For other end uses of dispersion resin, however, Mr. Disch testified that customers "would find it difficult" to substitute away from domestic dispersion PVC. JX3, PX8 at 44. For these more critical applications, Mr. Disch said, customers are "very particular" about the qualities of the resin used, *Id.* at 38, and their fabricating equipment is specialized to domestic resins. *Id.* at 44. Mr. Stevens of Tenneco also testified that imported dispersion resin is used in the "low end dispersion markets, the traffic cone type of thing," in which "there is very little technology involved." JX3, PX9 at 55-56. In the high end markets, such as flooring, according to Mr. Stevens, technology is "very sophisticated," and domestic customers would find substitution of imported dispersion resins difficult and costly. *Id.* at 56-57. This evidence is consistent with Occidental's analysis that most applications of dispersion resin are "specialty applications and

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[51] In 1986, Goodyear also increased its dispersion production capacity (by 15 million pounds to 115 million pounds) at its Niagara Falls, New York, plant. RX127A *In Camera.*

processes [that] require advanced technology, stringent quality control, and good customer service. It is these qualitites which enable Dispersion resin to maintain profitable levels." RX197C *In Camera.*[52]

Occidental points also to its Strategic Plan for 1985-88 that allegedly "projected that foreign dispersion PVC producers could 'continue to depress prices and/or gain market share.'" R.A.B. at 77. This was not a "projection" but one of a number of hypothetical "Risks" that Occidental identified under the general heading, "Opportunities and Risks." JX1(II), DX12 at 102637-38 *In Camera* (1985-88); *See also* RX197G-H *In Camera* (1986-89). Despite these "Risks," Occidental concluded in its business plans for 1985-88 and for 1986-89 that "[d]ue to the profitability that Dispersion provides, the only acceptable strategy is to grow." JX1(II), DX12 at 102638 *In Camera*; RX197 H *In Camera*; *See also* RX197D *In Camera.*

Finally, Occidental relies on the testimony of James Beightol, a PVC broker, "that if domestic dispersion PVC producers attempted to raise prices above competitive levels, imports would increase dramatically." R.A.B. at 77.[53] Mr. Beightol's estimates of dispersion PVC imports were anecdotal and unsupported. For example, Mr. Beightol's estimate of imports from Canada was based on his "poll[ing] the audience" in the courtroom "during the break": "I asked people from Oxy that were there . . . ." JX1(II), Tr. 694-95. For his estimate of imports from Germany, Mr. Beightol relied on his recollection of a chance meeting with an employee of an American importer "at a plastic show in Chicago last year. . . . I just asked him what kind of volume they were bringing in from Germany." *Id.* at 697. Mr. Beightol displayed no special knowledge of dispersion

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[52] Occidental's statement that dispersion PVC requires a high degree of customer service, R.A.B. at 81-82 (portion *In Camera*), undermines its assertion that imported dispersion resin is readily substitutable for domestic dispersion resin. *See* R.A.B. at 77.

[53] Mr. Beightol's statement appears to be inconsistent with that of Mr. Boyer of Formosa, a producer of dispersion resin, who said that imports of dispersion PVC are "not likely to increase in response to a sustained ten-percent increase in the price of domestic dispersion PVC resin." CX185F.

imports,[54] his estimates were inconsistent with others in the record[55] and we decline to rely on his testimony.

At their peak in the mid 1980's, when the dollar was high relative to other currencies, imports of dispersion PVC may have been as much as 8% to 11% of domestic supply. The record indicates that imports were limited to the low end, lower priced uses of dispersion resin and did not affect most of the domestic dispersion market. Even so, Occidental in October 1986 was able to increase prices of its low end dispersion resins, and the industry increased domestic dispersion prices generally in 1986 and 1987. We conclude that the record fully supports the conclusion of the administrative law judge that the United States is a relevant geographic market for dispersion PVC, and we affirm his conclusion.

II. ENTRY

If entry into the relevant market is easy, incumbent firms will be unable to sustain any exercise of market power. Entry into the relevant product markets is difficult. The Commission in Goodrich identified "substantial barriers and impediments to entry" into the mass and suspension PVC market: four or five years to plan and build a new plant or expand an existing plant, including one to two years to obtain environmental permits, additional time to evaluate and obtain technology licenses and the need to comply with newly enacted environmental regulations. *Goodrich*, 110 FTC at 297-300. According to a Goodrich document, the "lead time required for plant expansions and constructing grass root PVC plants . . . is now four to five years vs. the three years formerly required due to the increasing number of local and federal restrictions and necessary approvals." Goodrich CX196A. Requirements of scale and sunk costs also may impede entry into the mass and suspension PVC market. I.D.F.

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[54] Mr. Beightol said that he "kept abreast" of dispersion imports by traveling "to those countries" in which foreign producers are located. JX1(II), Tr. 648-49.

[55] Complaint counsel's expert estimated that dispersion imports were 36.1 million pounds, JX1-4, PX140, Table 24; Occidental's estimate was 30-40 million pounds. I.D.F. 155; *See* note 44 *supra.* In contrast, Mr. Beightol thought that dispersion imports were 60 million pounds. JX1(II), Tr. 690.

237-48, 267-71 & 278-92; *Goodrich*, 110 FTC at 300 n.85.[56] Sunk costs represent 75% to 80% of the total cost of a suspension PVC plant, and total costs for an efficient-sized plant could exceed $100 million. I.D.F. 270.

Entry into either the copolymer market or the dispersion PVC market would be similarly difficult. I.D.F. 239, 249-55. A copolymer or dispersion PVC plant requires a greater investment per pound of capacity than is required for a suspension homopolymer PVC plant.[57] In addition, requirements of scale and sunk costs are significant impediments to entry into these markets.[58] I.D.F. 249-55, 267-72 (portion *In Camera*). The copolymer and dispersion markets are relatively small as compared to the minimum efficient scale of entry, which enhances the price-depressing effect of minimum scale entry. Demand for copolymer is declining so that entry would be unprofitable. I.D.F. 41 & 262; Schaefer, JX1(I), Tr. 586-87; Disch, JX1(IV), PX8 at 18. Dispersion PVC is considered a mature market, with demand flat or growing only slightly, which reduces the attractiveness of entry. I.D.F. 42 & 263; Disch, JX1(IV), PX8 at 80; CX185E; RX197H *In Camera* ("little or no growth").

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[56] The administrative law judge also concluded that vertical integration in the PVC industry increases the difficulty of entry into all three product markets. I.D.F. 273-77. Because we conclude, based on other evidence, that entry would be delayed for a period of years, we find it unnecessary to consider the effect of vertical integration on entry.

[57] Occidental estimated that a mass or suspension homopolymer plant would cost 30-40 cents per pound of annual capacity; for a copolymer plant, the cost would be 50-70 cents per pound and for a dispersion plant, 80 cents to $1 per pound. JX1(III), PX15 at 75-76. Occidental believed that *de novo* entry, from initial planning to production, would take 30-36 months, *Id.* at 83; actual construction (after permitting) would take 18-24 months. *Id.* at 76.

[58] Occidental argues that these considerations are irrelevant, that "the Commission has recognized that a declining market does not create a barrier to entry." R.A.B. at 67-68, *citing Echlin Manufacturing Co.*, 105 FTC 410, 488-89 (1985). Considerations of scale requirements and sunk costs in a declining market are not barriers to entry in the Stiglerian sense, as the Commission recognized in Echlin, but merger analysis properly is concerned with conditions, in addition to barriers, that delay entry and permit market power to be exercised in the interim, *See* 105 FTC at 486-87, or that decrease the likelihood that entry will occur.

Expansion may be easier to accomplish than *de novo* entry, but expansion still requires a considerable amount of time and a substantial capital investment. Occidental's plans for expanding homopolymer capacity at Pasadena, for example, anticipated that production would not begin until two years after the expenditure had been authorized by management. RX1N *In Camera.* The estimated cost of the project was approximately $37 million. RXlZl6 *In Camera.* Tenneco estimated that any "major expansion would require two to three years to go through the permitting and construction phases." JX1-4, PX104 at E4.[59]

III. MARKET SHARE AND CONCENTRATION

The fewer the competitors in a market, the easier it becomes for firms to coordinate price and output decisions. As the number of firms in an industry declines and concentration increases, the likelihood of anticompetitive effects from an acquisition also increases. *United States v. Philadelphia National Bank*, 374 U.S. 321, 363 (1963); *Elders Grain, Inc.*, 868 F.2d at 905-07; *Hospital Corporation of America*, 807 F.2d at 1387; *FTC v. PPG Industries, Inc.*, 798 F.2d 1500, 1503 (D.C. Cir. 1986); *Goodrich*, 110 FTC 303; *Weyerhaeuser Co.*, 106 FTC 172, 278 (1985). When a market is

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[59] Expansion by the incumbent firms may not have the same procompetitive effect as new entry but may simply maintain the status quo. Formosa said that "we hope we are doing this [expansion] in such a way as not to stir the marketplace up." CX165B (Chemical Week, Nov. 4, 1987, at 58); RX222B. Vista announced that it was "tailoring [its] resin expansion program to match anticipated growth so that Vista will maintain its current 10% share of the overall PVC market." RX236A (J. Commerce, Dec. 14, 1987). Tenneco in a business plan said that "[t]he preferred method of expansion would be via acquisition as this offers increased market participation with no increase in total industry capacity." JX1-4, PX104 at E8. Occidental in 1987 said that anticipated expansions by incumbent firms "will enable industry capacity to keep pace with the demand growth" and that its proposed expansion of Pasadena "is necessary for OxyChem to maintain its position as the recognized market leader." RX1L *In Camera.*

moderately concentrated,[60] the Commission has said that an "especially careful review of a number of industry characteristics in addition to concentration" is necessary to assess the likely competitive effects of the transaction. *Weyerhaeuser*, 106 FTC at 280. When a market is highly concentrated, the Commission examines the particular characteristics of the industry to determine whether the presumption of anticompetitive effects that arises from the market share and concentration data is rebutted, Olin Corporation, Docket 9196, slip op. at 22 (June 13, 1990), *aff'd* No. 90-70452 (9th Cir. Feb. 26, 1993), but the Commission has said that "relatively strong evidence from other factors is needed to rebut that presumption." *Goodrich*, 110 FTC at 314.

A. Mass and Suspension PVC

Occidental's acquisition of Tenneco's PVC business increased the Herfindahl-Hirschmann Index ("HHI") in the moderately concentrated mass and suspension PVC market by 156 points to 1278, based on 1985 actual production (including PVC homopolymer and copolymer production), and increased the four-firm concentration ratio from approximately 54% to about 61%.[61] In terms of operating capacity, the acquisition increased the HHI by 158 points to 1305 and

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[60] Herfindahl-Hirschmann Index ("HHI") thresholds of 1000 and 1800 correspond roughly to four-firm concentration ratios of 50% and 70%, respectively. Department of Justice, *Merger Guidelines* Section 3.1 (1984). Markets for which the HHI is between 1000 and 1800 points are considered moderately concentrated, and markets for which the HHI is more than 1800 points are considered highly concentrated. *See Goodrich,* 110 FTC at 305; *Grand Union Co.,* 102 FTC at 1055.

[61] When actual imports are included, the acquisition increases the HHI by more than 140 points to between 1164 and 1187 (depending on the number of import producers), and the four-firm concentration ratio increases from 51% to 58%. JX1-4, PX140, Table 23. Imports play a much smaller role in subsequent years: by 1987, when the record closed, imports accounted for less than one-third of the market share recorded in 1985 and were continuing a rapid decline. *See* text at notes 35-36 *supra;* I.D.F. 123-25. In any case, imports were excluded from concentration and market share calculations in *Goodrich,* 110 FTC at 306-11, so that for purposes of direct comparison, the figures in the text are appropriate.

the four firm concentration ratio from about 56% to about 63%. I.D. at 59-60; JX1-4, PX140, Tables 1 & 2.[62]

Occidental argues that the finding of liability in the mass and suspension PVC market must fail, because the market share and concentration data "cannot be distinguished meaningfully from those in other litigated cases in which the Commission found no Section 7 violation," because the postacquisition HHI "is still comfortably in the lower half of the 'moderately concentrated' range established in the Guidelines" and because "[t]he Commission has never held an acquisition unlawful in the Guidelines era where the HHI was as low as it is here and increased by such a small amount." R.A.B. at 16-17.

These arguments ignore the principle that each case must be decided on its own facts. Market share and concentration data are important preliminary surrogate measures of market power, not infallible predictors of competitive effects. They are "an important starting point in merger analysis, [but] not conclusive in determining the legality of a merger under Section 7." *American Medical International Inc.*, 104 FTC 1, 200 (1984); *Goodrich,* 110 FTC at 305; *See also Weyerhaeuser,* 106 FTC at 278; *Hospital Corporation of America,* 106 FTC at 474; 1992 Merger Guidelines Section 1.51 ("a useful indicator of the likely potential competitive effect of a merger"). The next step is consideration of other characteristics of the market to assess likely competitive effects. *See Weyerhaeuser*, 106 FTC at 278. In each of the two cases cited by Occidental, Weyerhaeuser and Goodrich, the Commission recognized a "rebuttable presumption of anticompetitive effects" from market share and concentration data. *Goodrich,* 110 FTC at 305; *See Weyerhaeuser,* 106 FTC at 278. In each case, the Commission then reviewed the particular characteristics of the markets involved. In neither case were market share and concentration data dispositive of the issue of competitive effects. The point of the analysis is not

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[62] These data include the capacity of higher cost, small reactor plants unable to undercut the cartel price of lower cost, large reactor plants that constitute by far the majority of mass and suspension capacity. *See* text at notes 18-21 *supra* & I.D.F. 597-602 (portion *In Camera*). In addition to the cost disadvantage, small reactor plants are, for the most part, owned by the same firms that own the large reactor plants and would have incentives not to undercut the cartel price. *See* RX197L & M *In Camera*.

whether the numbers are different, as Occidental asserts, but whether the particular facts of the case indicate that anticompetitive effects are or are not likely.

Occidental asserts several objections to the calculations of market share and concentration data cited in the Initial Decision. Occidental's principal objection is that the data cited by Judge Howder do not include practical production data, which, according to Occidental, were described by the Commission in Goodrich as "the most relevant measure of capacity." R.A.B. at 18, *citing Goodrich,* 110 FTC at 327. This is incorrect.[63] In Goodrich, the Commission cited and applied three measures of capacity and production -- nameplate capacity, practical production capacity and actual production -- to calculate market share and concentration, and it did not select one set of data over any other for this purpose.[64] We reject Occidental's claim that the administrative law judge erred in this respect.[65]

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[63] Occidental quotes this phrase out of context: The Commission in Goodrich said that practical production capacity was "the most relevant measure of capacity" to assess capacity utilization levels in the industry, not to calculate market share and concentration. 110 FTC at 327. To buttress its argument that the Commission has a "clear preference for the practical production capacity measure," R.A.B. at 19, Occidental also cites the Commission's statement that "[p]ractical production capacity . . . provides a better measure of actual production constraints" than does nameplate capacity. R.A.B. at 18-19, *citing Goodrich,* 110 FTC at 306 n.118. This statement did not select one measure over another as the most relevant but rather described a difference between two of the three measures that the Commission cited and applied in Goodrich: nameplate (or design) capacity, practical production capacity and actual production.

[64] All three measures yielded comparable results: the Goodrich acquisition increased the nameplate capacity HHI by 113 points to 1098 and the practical production capacity HHI by 112 points to 1079; the Commission estimated that the HHI for actual production increased by 110 points to 1020. 110 FTC at 309-10.

[65] Occidental attempts in this appeal to present new market share and concentration data and claims that Tenneco erroneously overstated its production capacity. R.A.B. at 20 n.16. Occidental had the opportunity to present these data at the hearing, when complaint counsel could examine and test them, and it failed to do so. In any event, Occidental's proferred data, which purport to show that the acquisition increased the HHI for practical production capacity by 137 points to 1250 (or by 144 points to 1255, if Tenneco's data are used), are of the same order of magnitude as those cited by the administrative law judge. *See* note 66 *infra.*

Occidental also argues that the numbers in this case are "indistinguishable" from those in Goodrich, suggesting that the complaint should, therefore, be dismissed. The postacquisition HHIs in this case, however, are approximately 200 points higher than in Goodrich.[66] Occidental attempts to understate the difference between the numbers here and those in Goodrich by assigning to the Goodrich acquisition the capacity of plants that were not acquired by Goodrich but were closed by the acquired firm. R.A.B. at 16 & n.12. Occidental's attempted comparison is factually incorrect. In Goodrich, the Commission declined to attribute the plant closures to the Goodrich acquisition and instead analyzed the acquisition on the basis of only those plants actually acquired by Goodrich. 110 FTC at 347.[67]

Even if the market share and concentration data were identical, it does not necessarily follow that we should reach the same result -- dismissal of the complaint -- in both cases. Market share and concentration data are "an important starting point in merger

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[66] For actual production, the HHI is 1278, 258 points higher than the 1020 points in Goodrich. Using Occidental's practical production figures, *See* note 65 *supra*, the HHI is 1250 points, compared to 1079 in Goodrich. For operating (nameplate) capacity, the HHI is 1305, compared to 1098 in Goodrich (although these figures are not strictly comparable, *See* C.A.B. at 45 (portion *In Camera*)).

[67] Occidental asserts that "[t]he Goodrich Commission indicated that the acquisition would be upheld even if Diamond Shamrock's closing of four other PVC plants . . . was attributed to the acquisition." R.A.B. at 16 n.12. This is incorrect. In discussing the presumption of anticompetitive effects based on market share evidence in Goodrich, the Commission compared the evidence in the record with that in Weyerhaeuser. The Commission said (1) that the increase in and level of HHI resulting from the acquisition (apart from the Deer Park and Delaware City plant closures) were about 100 points less than in Weyerhaeuser; (2) that, "[*a*] *fortiori*, the concentration data . . . create an even weaker presumption of anticompetitive effects" than in Weyerhaeuser; and (3) that, therefore, the rebuttal evidence "need not be as strong as it was in Weyerhaeuser." 110 FTC at 311. The Commission in Goodrich also observed that "[e]ven if" the Deer Park plant closures were attributed to the acquisition, the changes in HHI levels would be "barely comparable" to those in Weyerhaeuser, but the Commission did not determine that the plant closures should be attributed to the acquisition (Goodrich maintained that they should not, *Id.*), and it did not speculate about what its conclusion concerning liability might have been had the plant closures been attributed to Goodrich. *See also* 110 FTC at 309 n.125 & 311 n.130.

analysis," *Goodrich*, 110 FTC at 305, *quoting American Medical International*, 104 FTC at 200, not infallible predictors of competitive effects. Occidental's numerical approach would make market shares dispositive of liability under Section 7, an approach that the Commission specifically has declined to follow. *E.g., Goodrich*, 110 FTC at 305; *Weyerhaeuser*, 106 FTC at 278.

B. PVC Copolymer

Occidental's acquisition of the PVC business of Tenneco increased the HHI for operating capacity in the PVC copolymer market by 1360 points to 3504. The combined firm has approximately 52% of the market, and the four firm concentration ratio is 87%. Based on actual production, the acquisition increased the HHI by 1577 points to 4368, the combined firm has 59% of the market and the four firm concentration ratio is 100%. I.D.F. 201-10; I.D. at 63 (chart). This market is highly concentrated.[68]

C. Dispersion PVC

The acquisition increased the HHI for operating capacity in the dispersion PVC market by 331 points to 2051. The combined firm has almost 28% of the market, and the four firm concentration ratio is 87%. Based on actual production and including imports, the acquisition increased the HHI by 330 points to 1938; Occidental is the largest firm with almost 32% of the market and the four firm

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[68] Occidental's own documents suggest the same conclusion. In planning for the acquisition, Mr. Schaeffer, Occidental's Executive Vice President responsible for PVC, reported:

> In the copolymer business [after the acquisition], there would essentially be only two major producers: Occidental and Borden. This [acquisition] would provide us with almost half the market together with the major supply position to the record industry. This would significantly enhance the profitability of the Pottsdown suspension plant.

JXl(III), PXl2 at 151333.

concentration ratio is 80%. I.D.F. 219-22; I.D. at 66-67.[69] By Occidental's reckoning, the acquisition increased the HHI for the dispersion market by 336 points to 1746, the combined firm has about 30% of the market and four firm concentration is about 76%. R.A.B. at 79. Occidental's computations are flawed, and the HHI calculated in the Initial Decision appears better supported by the evidence.[70] We find that the dispersion PVC market is highly concentrated.

IV. INDUSTRY CHARACTERISTICS

The question in any Section 7 case is whether the acquisition creates or enhances market power or facilitates its exercise. In this case, because Occidental likely could not exercise market power unilaterally, the question is whether the acquisition creates, enhances or facilitates the ability of firms in the market to collude, either tacitly or expressly. *See Hospital Corporation of America*, 807 F.2d at 1386. Because market share and concentration data are only imprecise predictors, we examine other characteristics of the markets to determine whether anticompetitive effects are likely.[71]

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[69] Based on actual domestic production, without including imports, the acquisition increased the HHI by 448 points to 2201.

[70] For example, Occidental's computation double-counts B.F. Goodrich's Mexican production, treating it separately as an import after it already had been included in the market share assigned to Goodrich. Compare R.A.B. 79 with Beightol, JXI(II), Tr. 692, and JXI-4, PX140, Table 24 ("B.F. Goodrich figure includes dispersion imports from [its] Canadian and Mexican affiliates as reported in [its] subpoena return"). Eliminating this double-counting from Occidental's computations boosts the post-acquisition HHI to the highly concentrated range (over 1800), as Occidental virtually concedes. R.R.B. at 81 n.58. Any additional adjustments to replace Mr. Beightol's assumptions with more credible estimates, *See* text at notes 53-55 *supra*, would further increase the post-acquisition HHI calculated by Occidental.

[71] "The more compelling the prima facie case [based on market share and concentration data], the more evidence the defendant must present to rebut it successfully." *United States v. Baker Hughes, Inc.*, 908 F.2d 981, 991 (D.C. Cir. 1990); *See Goodrich*, 110 FTC at 305-06; *Grand Union Co.*, 102 FTC at 1055.

Collusion is easier to establish and maintain and, therefore, more likely to occur in a market that is concentrated on the seller side and in which products are homogeneous, demand is inelastic, conditions are stable, sellers have similar costs, buyers are unable to constrain prices, transactions are numerous and frequent and information about price and other competitive variables is readily available. *See Goodrich*, 110 FTC at 315- 28; R.A. Posner, *Antitrust Law, An Economic Perspective* 55-71 (1976) ("Posner"). In Goodrich, the Commission concluded that conditions in the market for mass and suspension PVC are conducive to collusion, except for product homogeneity (*i.e.*, with respect to product quality and transportation costs), production costs and the elasticity of demand for vinyl products. Occidental is referring to these conditions when it asserts that "there is no evidence that these factors have changed significantly in the short time since the Comrnission considered them in Goodrich." R.A.B. at 46. Each of these conditions is discussed below.

A. Product Homogeneity

Collusion is facilitated when the relevant product is relatively homogeneous and undifferentiated, because the number of dimensions on which the members of the cartel must agree is reduced.[72] *See* Posner at 59-60. Collusion may be more complicated and, therefore, more difficult when products are less standard, when

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[72] "Product homogeneity implies that the offerings of rival sellers are . . . virtually perfect substitutes [and] there remains only one dimension along which rivalrous actions and counteractions can take place: price." F.M. Scherer, *Industrial Market Structure and Economic Performance* 200 (2d ed. 1980). In some circumstances, sellers with market power may collude on product dimensions other than price, *e.g.*, product quality or service, but the theory in this case focuses on price.

a schedule of prices may be more complex.[73] When collusion is likely to be more difficult, it is less likely to occur or to persist.

The degree to which the relevant product is homogeneous is important here, because the Commission in Goodrich concluded that mass and suspension PVC homopolymer was "relatively heterogeneous" (as compared to vinyl chloride monomer), *Goodrich*, 110 FTC at 347, based on the different grades of PVC, a perception of quality differences within grade, and different transportation and production costs among producers. *Id.* at 316. The "crucial point" about these differences, according to the Commission in Goodrich, was that determining and enforcing a consensus price could be complicated: "Instead of establishing a single price for a single homogeneous product, firms must establish and maintain a whole series of prices for a whole series of product grades." *Id.* at 316 n.151. These "complicating factors," together with the possible constraining effect of the price elasticity of demand for vinyl end use products, were deemed sufficient to "refute the weak presumption of anticompetitive effects in the [mass and suspension] PVC market created by the concentration data." 110 FTC at 347.

Occidental maintains that "there is no evidence that these factors have changed significantly in the short time since the Commission considered them in Goodrich, R.A.B. at 46,[74] and, therefore, the conclusion of the administrative law judge that mass and suspension PVC is a homogeneous product must be incorrect. Based on additional evidence that was not in the record in Goodrich, we agree with the administrative law judge.

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[73] Product homogeneity is likely to be important in assessing the likelihood of collusion only when the relevant product is very heterogeneous, *e.g.*, a custom product that is different from order to order. *See* Posner at 59-60. It is unlikely to be important over a significant middle range of product variation. *See Hospital Corporation of America v. FTC*, 807 F.2d at 1390 ("there is no established threshold of complexity beyond which [collusion] is infeasible").

[74] The complaint in this case was issued a year after the evidentiary record in Goodrich was closed, and the record in this case, which was closed three years after the record in Goodrich was closed, includes extensive documents and testimony that were not available in Goodrich.

The analysis of the Commission in Goodrich emphasized that the market share and concentration data for the mass and suspension PVC market in that case "create[d] only a weak presumption of competitive injury" and, therefore, that the evidence to rebut that presumption need not be as strong as would be required if the market were more concentrated. 110 FTC at 311; *See also Grand Union*, 102 FTC at 1055 ("In general, the higher the concentration levels . . . the greater the evidence the Commission will require to rebut the *prima facie* showing."). If the same analysis were applied here, because the mass and suspension PVC market is somewhat more concentrated than it was in Goodrich, the presumption of competitive injury would be somewhat stronger than that in Goodrich, and the evidence to rebut that presumption also would need to be somewhat stronger than it was in Goodrich; given the greater concentration, the same evidentiary showing that sufficed to rebut the *prima facie* case in Goodrich would not necessarily be sufficient in this case. We need not and do not attempt to weigh the relative strengths and weaknesses of the evidence in Goodrich against the market share and concentration data in this proceeding, because evidence that was not in the record in Goodrich shows that mass and suspension PVC homopolymer is not heterogeneous in any sense relevant to the ability to collude.

1. Product Quality

The primary indicia of homogeneity among products are the substitutability among products of different producers and the inability of any producer to obtain a premium price for his product. Documents and testimony that were not in the record in Goodrich show that even for the more sophisticated grades of PVC, substitutions can be and are readily made and no producer can obtain a premium price for his resin as compared to that of any other producer.

The Commission in Goodrich regarded the evidence concerning the homogeneity of mass and suspension PVC homopolymer as "mixed." 110 FTC at 315. The Commission found that "commodity grades" of PVC, homogeneous products sold primarily on price, accounted for about 75% of mass and suspension PVC sales. The

Commission also concluded that "it is difficult to charge a premium for any given grade of PVC," *Id.* at 316, implying a substantial degree of homogeneity. Despite this evidence, the Commission thought that the existence of different grades of PVC and the perception of some quality differences within grade among different producers implied some degree of heterogeneity that would require a cartel to establish a number of different prices instead of a single collusive price. *Id.* at 316 n.151.

Mass and suspension PVC homopolymer is produced in three different grades, pipe grade, general purpose grade and specialty grade, each of which has different properties and is used to make different end products.[75] Pipe grade and general purpose grade mass and suspension PVC homopolymer is made in large reactor plants. Specialty homopolymer resins are made in small reactor plants, which comprise a diminishing part of the total suspension homopolymer market.[76] Copolymer and dispersion PVC also are produced in different grades that have different properties and are used to make different end products. Copolymer is made in flooring grade, calendering grade and record grade. J Xl(IV), PX9 at 18. The grades of dispersion PVC are general purpose grade, copolymer dispersion grade and flooring grade. *See* JX1(IV), PX9 at 88; JX1(IV), PX32.

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[75] The various properties that distinguish the different grades of PVC, such as molecular weight and particle size, are achieved by controlling the temperature, pressure and chemical additives in processing batches of PVC. JX1(IV), PX8 at 10; *See Goodrich,* 110 FTC at 316.

[76] The Commission in Goodrich believed that small reactor suspension PVC capacity constituted about 1/3 of total capacity. 110 FTC at 321. Because a number of small reactor plants have been closed over time, small reactor capacity should be a smaller proportion of total capacity today. I.D.F. 595-96 (portion *In Camera*).

The record shows that all three types of PVC are homogeneous within grade.[77] Occidental and Tenneco officials testified in 1986, in this proceeding,[78] that PVC made by different producers is a commodity product, readily interchangeable within grade with no significant quality differences among producers, and that no producer can obtain a premium price. Mr. Schaefer of Occidental testified in April 1986 that suspension PVC homopolymer is a commodity business: the product "is largely interchangeable from supplier to supplier, sold in high volumes, price being a very major factor in the purchasing decision." JX1-4, PX136 at 11; *See also* JX1(I), Tr. 559-61. Mr. Bailey of Occidental testified in 1986 that "almost all grades of PVC a[re] commodities," that the PVC resins of different producers are "essentially interchangeable" and that Occidental cannot obtain a price premium for any of its PVC resins, "whether it be dispersion, copolymer or homopolymer." JX1(IV), PX6 at 42, 104-05. Mr. Sacks of Occidental testified in 1986 that "[a]lmost all of the PVC business is commodity" with "little differences between competitive products" and "very little difference in pricing." JX1(IV), PX7 at 13-14. Mr. Disch of Tenneco testified in 1986 that "in most instances resins can be interchangeably used by customers." JX1(IV), PX8 at 11. Mr. Stevens, Tenneco's director of marketing, testified in 1986 that suspension PVC homopolymer produced in large reactors "is the most classic commodity product that I have

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[77] *See United States v. Container Corp. of America*, 393 U.S. 333, 336 (1969) ("While containers vary as to dimensions, weight, color, and so on, they are substantially identical, no matter who produces them, when made to particular specifications."); *FTC v. Bass Brothers Enterprises, Inc.*, 1984-1 Trade Cas. (CCH) ¶ 66,041, at 68,612 (N.D. Ohio 1984) ("Carbon black is a homogeneous, fungible product. Although it is produced in numerous different grades . . . in fact all of the producers produce basically the same grades and types.").

[78] This testimony, which was given approximately a year after the record in Goodrich had closed, was not in the Goodrich record and was not considered by the Commission in its decision in Goodrich.

seen,"[79] that the copolymer resins produced by different firms are "very similar" and that prices of PVC resins within grade "are the same." JX1(IV), PX9 at 13 & 32.

Customers also testified in 1986 and in 1987 and 1988 that PVC from different domestic producers is interchangeable. *E.g.,* Stuart, RX245B ("PVC resin is a commodity product that basically has uniform quality among all producers.); Marcus, RX242C *In Camera* ("all suppliers' copolymer resins are uniform in quality"); Byrnes, JX1(II), Tr. 624-27; Beveridge, JX1(I), Tr. 85, 88-89 (copolymer and dispersion resins of different suppliers can be used interchangeably); Witsken, JX1(I), Tr. 602-03 (the major suppliers "all provide a product that is acceptable"); Bailey, JX1(IV), PX6 at 62; Stevens, JX1(IV), PX9 at 112. Customers prefer to maintain several regular sources of supply for PVC, implying that PVC is a homogeneous product, not a differentiated one.[80] *See, e.g.,* Byrnes, JXl(II), Tr. 624-25; Beveridge, JXl(I), Tr. 91 (copolymer and dispersion); Gmach, RX252B; Boulay, CX189C; David, CXl94A-B; van Haaren, CX187D; Weimar, CX192E; Hamilton, CX206B; Pomerantz, RX244A-B *In Camera*; Baker, CX205C (dispersion); Stuart, RX245B & CX201D.[81]

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[79] Occidental documents also describe suspension PVC homopolymer as a commodity. According to Occidental, "[p]rice is the primary selling tool for Suspension [homopolymer] resins": although "[p]erformance has impact in some higher end markets . . . production technology is similar throughout the industry to force pricing to be the main sales tactic." JX1(III), PXl3 at 452734 (1985-1988 Strategic Plan).

[80] Multiple sources of supply are preferred even for purchases for a single plant. *Compare, e.g.,* Beveridge, JX1(I), Tr. 84-85, 88-89 (uses resins of different suppliers interchangeably), *with Goodrich,* 110 FTC at 326 (customers "fill their requirements for a given plant from one supplier"), and *Goodrich* I.D.F. 220-21.

[81] One customer that buys PVC from five domestic suppliers also buys a "unique" copolymer from a foreign source. Rutland, JXl(I), Tr. 733-36. The existence of one or a few resins uniquely qualified for a particular customer's use does not change our conclusion that the vast majority of mass and suspension homopolymer, copolymer and dispersion PVC is homogeneous. These few unique resins need not complicate the ability to collude but instead could be outside any cartel. *See Hospital Corporation of America v. FTC*, 807 F.2d at 1390.

Reports of sales calls from Occidental and other suppliers show that customers often buy their PVC requirements from more than one supplier. *E.g.*, RX218Z23, Z36, Z64-65, Z88, Z110, Z128-29, Z135, Z204 & Z206; RX2l6H. The willingness of customers to use PVC from more than one supplier suggests that customers do not perceive important quality differences among the PVC from different suppliers.[82] The willingness of suppliers to meet lower prices offered by their competitors implies that customer threats to switch suppliers are credible.[83] These threats would not be credible if important quality differences (or perceived quality differences) among the PVC of different suppliers deterred customers from changing their sources of supply.[84]

Many customers prefer to buy PVC from more than one supplier, to ensure a steady supply and to protect their ability to negotiate on

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[82] The Commission in Goodrich said, based on the evidence of record in that case, that "switching suppliers of a given grade entails significant costs," 110 FTC at 316, and that customers would not switch "when competing prices are identical." *Id.* at 326. As discussed below, the record in this case shows that most PVC buyers prefer to buy from several suppliers and that the costs of switching are for most buyers not significant.

[83] *E.g.*, RX2l7Z (customer ordered after Occidental met "competitive price"); RX218Z237 (Occidental reduced price ½ cent to meet offer and "obtain order"); RX218Z83 (Occidental reduced price 2 cents to meet offer for "large-scale plant trial"); RX218Z258 (Occidental reduced price 1 cent to meet offer and "regain business we lost in July re-price"); RX218Z77 (1 cent reduction to meet Tenneco price and "regain business"); RX218Z24 (meet competitive price to "reestablish ourselves at this account"); RX2l6M ("Occidental lost two bulk truckloads [of business] keeping price at 33 cents/lb" instead of 32 cents).

[84] Occidental and other PVC suppliers frequently offer their customers volume rebate incentives, *e.g.*, a one cent rebate for purchases of 13 million pounds during the year, to gain business. *E.g.*, RX217Z39-40; RXl73A *In Camera*; RX217Z42. If customers were tied to a particular supplier for all their PVC needs -- because the product was uniquely qualified for the customer's purposes and the cost of switching suppliers was high, *See Goodrich,* 110 FTC at 326 -- customer demand would be predictable, and there would be no need to offer volume purchase discounts to retain a customer's business.

price.[85] *E.g.,* Marcus, RX242B & E *In Camera*; Byrnes, JXl(II), Tr. 624-25. Documents in the record indicate that "qualifying" or testing PVC resins from different suppliers is a regular and frequent part of business. Occidental's monthly reports reflect frequent product testing by both prospective and existing customers. For example, in June 1986, sixteen firms were testing Occidental PVC resins. RX217Z19-22; *See also* RX2l7X-Z. This experience also is reflected in the documents of other PVC producers. *See, e.g.*, RXl66A *In Camera*; RXl73A *In Camera.*[86]

Occidental witnesses testified that product trials often can be run quickly and easily. Carlon, which buys 224 million pounds of PVC pipe resin annually from a number of producers (including Occidental and Tenneco), tests a new resin in the laboratory and then "run[s] it through a production line to determine that its use does not impair the smoothness of our operation." JX1(II), Tr. 626. These trials, "from notification to a vendor that we would like to test their resin" through completion of the testing, "can all be done in a matter of days -- certainly much less than a week." *Id.* at 627.[87] Another witness, a PVC compounder that buys homopolymer, copolymer and dispersion PVC resins, testified that general purpose resins can be qualified by "plug[ging] it into the computer." In "some instances," qualifying a new resin "could take a few hours in the lab." For "certain applications and perhaps certain types of resins it might take hours,

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[85] PVC customers assert "meeting competition" and "favored nation" clauses in PVC supply contracts to ensure that they get the best prices from their suppliers. *E.g.*, Stuart, RX245C. The clauses, which typically apply only to PVC of "equal quality," *See* JXl-4, PX94 at 2 & PX93 at 4, would have little meaning unless other suppliers offered PVC of comparable quality.

[86] A PVC producer may run tests to analyze and match a resin used by a potential customer. *E.g.*, RXl74A-B *In Camera.*

[87] In July 1985, Carlon cancelled its supply contracts with its PVC suppliers and began relying on monthly negotiations to keep suppliers "a little hungrier." The negotiations "may extend over a two-week period every month." JX1(II), Tr. 624-25.

if not days, of laboratory work to qualify a resin." JX1(II), Tr. 725B & C.[88]

Another PVC compounder testified that "an internal resin quality check that will give us information" about the chemical and physical characteristics is sufficient to place the new resin in a compound "most of the time." Rutland, JX1(II), Tr. 734. "On the rare occasions when a critical U.V. evaluation would have to be made, we may have to run samples in equipment to accelerate-age it and to obtain data before we take a chance on submitting it to the marketplace." These tests normally would be completed in "a couple of weeks" at a cost of about $500 to $1000. *Id.* at 734-35.[89]

Other evidence is consistent with the conclusion that PVC is a homogeneous product. Occidental and Tenneco both published catalogues describing their PVC resins. CX84A-Z34 & RX211Q-W (Occidental); CX111A-G (Tenneco).[90] These catalogues suggest that customers can meet their needs from the stock products listed and are inconsistent with the notion that "the industry is producing a custom product in the sense relevant to the feasibility of collusion." Posner at 60. Occidental also published charts showing for its PVC resins the equivalent products of other PVC producers. *E.g.,* JXl(IV), PX47

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[88] After the acquisition of Tenneco, Occidental required many of its customers to qualify "new" resins, because Occidental changed the sourcing plant of those customers: In October 1986, Occidental reported that "[a]ll customers affected by the change-over from [Occidental's] Addis to [Tenneco's] Pasadena are being advised and sampled [sic] the proper resins for approval." RX220Z6. This suggests that the cost of switching suppliers (*i.e.,* the production source of resin) is not high. This is consistent with Occidental documents showing the willingness of customers to change suppliers. *See* text at notes 80-85 *supra.*

[89] Other tests can be more expensive. One buyer of PVC for use in flooring said that product qualification tests can take up to a year and cost as much as $20,000. These costs do not restrict the ability of these customers to buy from more than one supplier, however, because the resins of most major domestic producers already are qualified with these customers. *E.g.*, Marcus, RX242B, C & E *In Camera*; Boulay, CX189C.

[90] The Occidental Data Sheets provide a "General Description" of the resin and list "Typical Applications" and "Typical Properties," including viscosity, specific gravity and particle size. For example, Occidental "FPC 9418 is a medium molecular weight PVC homopolymer resin primarily designed for rigid PVC applications," such as siding, pipe and conduit and windows. CX84Z20.

at 228496-97 ("Competitive Homopolymer Resins"); JXl-4, PX4B at 200339-40 ("Competitive Copolymer Resins"). These charts, which were intended to be used as sales tools by its salesmen, show that Occidental viewed its PVC products as interchangeable with the PVC of other producers.

Even the so-called specialty mass and suspension homopolymer resins are not custom products. The Commission observed in Goodrich that it is difficult to charge a premium price even for these specialty grades.[91] 110 FTC at 316. According to Occidental, the "specialty resin competition consists of domestic producers with small reactor facilities." JXl(II), DXl2 at 102643 *In Camera.* The fact that fewer suppliers make specialty resins -- Occidental in 1985 estimated that four producers, Occidental, Georgia Gulf, Formosa and Keysor, "comprise 90% of the [specialty suspension homopolymer] market, with no one being particularly dominant," JXl(II), DXl2 at 102643 *In Camera* -- would tend to make collusion with respect to the specialty homopolymer resins easier than for the nine producers of commodity homopolymer resins.

We conclude that PVC is a homogeneous product within grade, with no significant quality differences among the PVC made by domestic producers.

2. Pricing

The Commission in Goodrich believed that collusion in the mass and suspension PVC market would be complicated to some extent by the existence of different grades of PVC. The Commission said that "[i]nstead of establishing a single price for a single homogeneous product, firms must establish and maintain a whole series of prices for a whole series of product grades." 110 FTC at 316 n.l51. Evidence that was not available in Goodrich shows that PVC producers do not maintain complicated pricing schedules for different

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[91] Occidental suggested the possibility of some customized specialty resins in its 1986-1989 Strategic Plan: "we believe there is a custom segment where major users have resins tailored to their specific requirements." RX197M *In Camera.* This limited evidence of some custom products does not change the homogeneity of the vast majority of PVC.

grades of PVC. Instead, the prices of mass and suspension homopolymer resins (the "commodity" resins that account for more than 85% of PVC produced in the United States) are keyed to the price of a single grade -- pipe grade PVC, the lowest priced resin[92] -- with other grades generally one or two pennies higher. I.D.F. 570. This practice would tend to simplify collusion.[93]

General purpose mass and suspension homopolymer PVC usually is priced a penny higher than pipe resin, and film grade resin is a penny or two higher than that. For example, a price announcement by one producer shows pipe grade resin at 33 cents, general purpose resin at 34 cents and film grade resin at 35 cents. CX93A.[94] Tenneco, in a contemporaneous announcement, also priced its pipe grade resin at 33 cents and general purpose grades at 34 cents. CX92. B.F. Goodrich announced that its pipe grade resin would increase to 33 cents and general purpose resin would increase to 34 cents, effective the same date. CX87 & CX91; *See also* CX9A; RX293B. In early 1986, an industry journal reported:

> another round of polyvinyl chloride price increases, producers say. . . . [B.F. Goodrich's] January pipe grade price is 30 cents per pound, while general purpose resin firms to 31 cents. Special purpose and wire and cable grades are at 32 cents per pound, . . . and film grades are one cent higher. Shintech Inc. has posted similar prices . . . Tenneco Inc. has also raised its pipe grade price to 30 cents per pound. . . .

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[92] Pipe grade resin accounts for about 40% of annual consumption of mass and suspension PVC homopolymer. I.D.F. 372 (portion *In Camera*).

[93] The use of fixed price differentials simplifies collusion by eliminating any need to agree on a complicated schedule of prices. Collusion need not be either complex or perfect to raise prices, benefit the colluding firms and harm consumers. *See* 1992 Merger Guidelines Section 2.11.

[94] The pricing of PVC resins tends to be consistent within grade. For example, one producer price sheet shows only three prices for three resin grades comprising eighteen different product numbers: one pipe grade resin, priced at 33 cents, ten general purpose grade resins, all priced at 34 cents, and seven film grade resins, all priced at 35 cents. CX93B; *See also* JXl(IV), PX27, PX30, PX37 & PX45 ("published industry consensus" on price); JXl-4, PX78 at 900132.

RX209A.[95] This evidence is consistent with B.F. Goodrich's observation that "[t]he majority of G[eneral] P[urpose] grades and even specialty grades are sold at traditional differentials related to the base price of commodity pipe grade resin." Goodrich RX639I; *See also* Goodrich Tr. 1750-51 (H. Wheeler).[96]

The same pricing practice applies for copolymer and dispersion resins. Copolymer PVC is sold in three grades, flooring, calendering and record grades, with prices keyed to the lowest priced grade: "From flooring to calendering is a penny up charge and from calendering to records a penny." Stevens, JX3, PX9 at 23, 18; *See also* CX69; CX68B. Within grade, the prices of copolymer resins produced by different producers are "the same." JX3, PX9 at 32; Weimar, CX192E. Dispersion resin prices also generally follow three levels, depending on grade. Stevens, JX3, PX9 at 88; JX1(IV), PX32 at 204187; *See also* CX70A-B; CX67A; JX1-4, PX55 at 200148-49, PX56 at 200150-53, PX57 at 200170.

Based on this evidence, we conclude that the pricing of PVC is not complex and that the existence of different grades of PVC is not likely to complicate collusion.

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[95] Another example is a newsletter report, also in 1986, that PVC producers were increasing prices "to 29-30 for pipe grade with general purpose at 30-31 cents and specialty/film grades at 32-33 cents." RX293B (Tecnon, Oct. 1986).

[96] According to Occidental, specialty homopolymer resins "are priced approximately $.07-$.12 above General Purpose resins." RX197M *In Camera*. The "specialty resin" referred to in RX197M is suspension PVC homopolymer that is made in small reactors and "cannot economically compete in the general purpose sectors" of the PVC market. *Id.* In other contexts, the term "specialty resin" may have a different connotation. For example, the term sometimes is used to distinguish between mass and suspension homopolymer resins made in large reactors ("commodity resin") and dispersion, copolymer and small-reactor suspension homopolymer resins. *See* RX197K *In Camera* (Occidental's "specialty resins" are solution, copolymer, small-reactor suspension homopolymer and blending resins). The term also is used to refer to large-reactor mass and suspension homopolymer resins that are "higher end" or "higher return," as compared to pipe grade resin. *See* RX197T *In Camera*.

3. Transportation Costs

The Commission in Goodrich also said, based on the evidence of record in that case, that transportation cost differences among PVC producers could "complicate the determination and enforcement of consensus prices," because PVC producing plants are "scattered all over the country." 110 FTC at 316-17 & n.152. The record in Goodrich showed that mass and suspension PVC is sold on a delivered price basis, but it did not show whether that price was uniform throughout the United States. *Id.* at 317 n.152 & 322.[97] The record in this case shows that PVC is sold on a uniform delivered price basis throughout the United States, usually with a two cent premium for customers west of the Rockies. *See, e.g.,* CX90.

The costs of PVC producers to ship to customers will vary, depending on the location of the shipping plant, the location of the customer and the volume of PVC shipped, but transportation costs are a small part of the selling price of PVC, and transportation cost differences would necessarily be even less.[98] To reach a consensus on price, PVC producers would not need to make complicated, transaction-specific adjustments for transportation costs or allocate markets on the basis of natural freight advantages but could establish a single benchmark delivered price.

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[97] The Commission in Goodrich said that uniform delivered pricing can have the effect of eliminating price differences based on location. 110 FTC at 322.

[98] One analysis estimated that PVC market prices "generally include $0.015-$0.020 per pound for transportation costs." RX21U-V (Dean Witter Reynolds, June 16, 1987) (5%-7% of selling price). In 1986, Tenneco's freight costs were about 7.7% of its average selling price of PVC resins. CX47Z14 *In Camera.* Air Products' 1985 average distribution costs were about 9% of selling price (1.8 cents to 2.6 cents per pound). RXl78Z13 *In Camera.* CX54 shows 1983 shipping costs ranging from 0.6 cents per pound from New Jersey to New York to 2.67 cents per pound from Oklahoma City to New Jersey; shipments from Louisiana and Mississippi to New Jersey cost 2.45 cents and 2.06 cents per pound, respectively. Assuming that pipe grade resin sold for 22 cents per pound in 1983 (*See* Goodrich Tr. at 2161), these freight costs were 2.7% to 12% of the delivered price of PVC. B.F. Goodrich's average PVC freight costs in 1982, weighted by customer and volume, ranged from less than one cent to about 2.5 cents per pound. Goodrich RX245M & N.

The locational differences among PVC producing plants do not appear to be significant. *See* I.D.F. 612-16 (portion *In Camera*). Each of the eight PVC producers that, according to Occidental, comprise 99% of the [suspension PVC homopolymer] market" -- Occidental, Goodrich, Shin-Tech, Georgia Gulf, Vista, Borden, Formosa and Air Products -- has a large reactor plant in the Gulf Coast area. RXl97S-U *In Camera*; *See* RXl68Z45-46 *In Camera.*[99] In general, these firms share the same locational advantages or disadvantages with respect to PVC buyers.[100] Only Goodrich has large reactor suspension PVC homopolymer plants both in the Gulf Coast area and elsewhere in the United States.[101] Goodrich may have some locational advantages with respect to some customers who are closer to its plant in New Jersey than they are to the Gulf Coast producers,[102] but any advantage with respect to shipping PVC may

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[99] Three PVC producers do not have Gulf Coast plants: Keysor-Century, which makes specialty PVC homopolymer and copolymer in a small reactor plant in California, RXl44B & K *In Camera*; Goodyear, which makes dispersion resins at Niagara Falls, New York, RX148C-D *In Camera*; and Vygen, which makes homopolymer and copolymer in a small reactor plant in Ashtabula, Ohio. RXl77Z1 & Z12 *In Camera*; *See* RXl68Z46 *In Camera* (map).

[100] Some PVC pipe producers, the major purchasers of commodity suspension homopolymer resin produced in large reactor PVC plants, have moved their plants from the midwestern United States to the "Sun Belt" region, particularly Texas, to be closer to the areas of demand. RX38E *In Camera.*

[101] Goodrich has large reactor capacity in New Jersey and Texas. RX180Z1 & Z24 *In Camera*. Goodrich's plant in Louisville, RX180H *In Camera*, and a Borden plant in Illiopolis, Illinois, RX143X *In Camera*, have reactors slightly smaller than the 18,000 gallon minimum usually cited to define large reactors. *See* note 18 *supra*.

[102] A locational advantage does not necessarily mean a price advantage. Borden, with a plant in Illinois, was the high bidder (at 30 cents a pound) for a PVC customer in Northbrook, Illinois. Two other producers bid 28 cents, and one bid 29 cents. RX142A *In Camera*.

be offset by the cost of shipping VCM, the principal input for PVC.[103] In addition to the fact that its New Jersey plant does not have a clear cost advantage, because it has a plant in the Gulf Coast area, Goodrich would have substantial incentives to avoid undercutting any cartel price.

A number of PVC plants are clustered in the northeast.[104] I.D.F. 613 & 616 (portion *In Camera*). Most of these are small reactor plants that make specialty resins (specialty homopolymer, copolymer and dispersion PVC, for example) that do not compete with suspension PVC homopolymer made in large reactors.[105] Because these plants make products that do not compete with suspension PVC homopolymer, their location as compared to the Gulf Coast plants is irrelevant. To the extent that they compete with one another, the locational differences among them are minor: no small reactor PVC plants are located in any other part of the country, except for Keysor-Century in California.

We conclude that transportation cost differences, to the extent that they may exist, are not sufficient to complicate collusion and thereby to decrease the likelihood of anticompetitive effects stemming from this acquisition.

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[103] An Occidental document shows that the PVC freight advantage for a PVC producer in the northeast over a Gulf Coast producer with respect to a customer in the northeast is offset by the additional cost of shipping VCM from the Gulf Coast to the northeast. The cost for shipping VCM from Louisiana to New Jersey is $0.0230 per pound; the cost for shipping PVC from Louisiana to New Jersey is $0.0245 per pound. CX54.

[104] In 1983, 55% of all PVC was consumed within 350 miles of New York City, according to Occidental. CX54.

[105] These include Formosa's Delaware City, Delaware, plant, RX168Z63 *In Camera*; Occidental's Burlington, New Jersey, and Pottstown, Pennsylvania, plants; and Georgia Gulf's Delaware City, Delaware, plant. RX179T, U & Z1 *In Camera*. Goodrich has small reactor capacity at plants in Avon Lake, Ohio, Henry, Illinois, and Pedricktown, New Jersey. RX180 *In Camera*. Borden has small reactor capacity at Illiopolis, Illinois. RX143U *In Camera*. *See also* note 101 *supra*.

B. Production Costs

Large reactor PVC plants have comparable manufacturing costs. *See* Goodrich, 110 FTC at 321. These are the most efficient, low-cost plants in the industry, and they produce the lower priced, high volume, commodity grades of suspension homopolymer PVC.[106] According to Occidental, "[t]he domestic Suspension [homopolymer] market is dominated by high volume/low cost producers."RX197S *In Camera.*[107]

Evidence that was not available in Goodrich shows that small reactor plants that have higher production costs have turned to production of grades of PVC that are sold as specialty grades, as compared to pipe and general purpose grades, for higher prices. RXl97M *In Camera.* Occidental reported in its 1986-1989 Strategic Plan that "[n]umerous old small reactor operations have closed down over recent years due to their inability to compete on a cost/performance basis. Those still in operation are competing only in specialty niches." RX197S *In Camera.*[108] According to Occiden-

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[106] In 1982, Occidental estimated that the costs to seven producers of manufacturing suspension PVC homopolymer ranged only from 22.1 cents to 23.6 cents per pound. CX52G *In Camera.* The administrative law judge found that the cost of converting VCM to PVC varied only $.004 among 7 of 9 large reactor plants and less than $.012 among 8 of 9 large reactor plants identified in Goodrich RX1168A. I.D.F. 602 (portion *In Camera*). Conversion costs are derived from Goodrich RX1168A by subtracting the cost of VCM from the operating costs for each plant. This approach is consistent with CX52G *In Camera*, which assumes that all producers have the same cost for VCM.

[107] Mr. Schaefer of Occidental (JXl(I), Tr. 560-61) attributed the increasingly commodity nature of the PVC industry to large-reactor technology:

In the early 1970's, there was a real technological breakthrough, which . . . consists of these very large reactors which are used to make commodity grade PVC resin. And as the business has grown and become more commodity oriented, a number of producers invested in large reactor capacity in order to maintain a competitive position in the commodity business. . . . [W]e are talking about something that maybe started in the early seventies and ran through the late seventies and perhaps the very early eighties.

[108] As a result of the closing of small reactor plants over time, small reactors likely represent a smaller proportion of total capacity today than at the time of the Goodrich decision. *See* note 76 *supra.*

tal, the suspension PVC resins produced at small reactor plants, "due to very high manufacturing costs associated with small reactors, cannot economically compete in the general purpose sectors." RX197M *In Camera*. Instead, the specialty PVC resins made at small reactor plants are "priced approximately $.07-$.12 above General Purpose resins and therefore deliver a return over their high costs." *Id.* Also according to Occidental, "[t]he specialty resin competition consists of domestic producers with small reactor facilities. O[ccidental], Georgia Gulf, B.F. Goodrich, and Keysor comprise 90% of the market . . . ." *Id.*

In this industry, then, the difference in reactor size has led to two tiers of products, a lower cost, commodity tier and a higher cost, specialty tier, rather than disparate costs among producers.[109] PVC that is made in the higher cost, small reactors is not in a position to undercut the price of PVC produced in the large reactors. In addition, most of the small reactor capacity remaining in the industry is owned by the same firms that also are the major, large reactor producers and would have incentives to avoid undermining a collusive price.

C. Elasticity of Demand

The price elasticity of demand for a product measures the extent to which an increase in the price of the product will produce a decrease in demand for it. When the price elasticity of demand is low, the price of a product can be increased without losing a significant quantity of sales."[110] The administrative law judge made detailed findings concerning the price elasticity of demand for PVC and for the vinyl products made from PVC and concluded that the elasticity of demand for PVC is low. I.D.F. 361-548 (portion *In Camera*). We agree.

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[109] Tenneco estimated that the cost of producing suspension homopolymer PVC is 25.2 cents per pound in a "world scale large reactor plant" and 29.2 cents per pound in a "typical small reactor plant." JX1-4, PX131 at 1349; *See* notes 18 & 19 *supra*.

[110] Because PVC is a raw material used to manufacture other products, its price elasticity will increase to the extent that other raw materials can be substituted for it and to the extent that consumers can substitute away from finished vinyl products.

The Commission in Goodrich observed that the price elasticity for mass and suspension PVC resin is relatively low, for three reasons. First, there are no practical substitutes for PVC in the manufacture of vinyl products. Second, with the exception of pipe made from PVC, PVC resin accounts for only a small proportion of the cost of finished vinyl products. Third, although the elasticity of demand for finished vinyl products varies substantially, it is relatively low for most finished vinyl products. Goodrich, 110 FTC at 318-20. The Commission nevertheless concluded that "although the price elasticity of demand for PVC is, on balance, relatively low, an effort on the part of PVC producers to raise PVC prices to supracompetitive levels may be constrained to some degree by the higher price elasticity of demand for many PVC end use products, and made more difficult by variations in price elasticity from one PVC end product to another." 110 FTC at 339. At the same time, the Commission in Goodrich concluded that "the demand for PVC is sufficiently inelastic to make it likely that an increase in VCM prices can profitably be passed along to PVC customers." 110 FTC at 338.

Evidence that was not in the record in Goodrich suggests that the price elasticity of demand for finished vinyl products is less than the Commission then believed."[111] In Goodrich witnesses testified that when the price of pipe grade resin reached 33 cents to 34 cents, PVC pipe would lose business to pipes made from other materials. I.D.F. 430 (portion *In Camera*). PVC price increases in subsequent years have shown this prediction to be incorrect. Although the price of pipe grade PVC resin increased from 23 cents per pound in January 1986 to approximately 38 to 40 cents per pound in January 1988, Wilhite, CX179B; Porter, CX198A-B *In Camera*; RX310D, the sales

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[111] In Goodrich, the Commission found that the price elasticity of demand for finished vinyl products is lowest in the wire and cable, packaging film and sheet, phonograph record and medical products segments (21%-23% of PVC consumption). With respect to the PVC pipe, siding, floor tile and window frame segments (53%-55% of PVC consumption), the Commission said that the elasticity of demand is higher but still relatively low, citing a Goodrich study that concluded that "PVC pipe manufacturers appear to have plenty of room for price increases before approaching the price levels of most competing materials." The elasticity of demand for rigid and flexible calendered products and bottles (21%-27% of PVC consumption) was thought to be "considerably higher." 110 FTC at 319-20.

of PVC resin "in the pipe sector . . . remained remarkably good despite some fears that PVC pipe penetration would slow down due to competition from other types of pipe." RX309D; RX308C (with pipe grade PVC prices at 38-40 cents, "[s]o far there are no signs that PVC pipe prices are moving too far ahead of the competition"). Another trade journal, observing the increase in pipe grade resin sales in 1987, predicted that sales of PVC pipe grade resin would "remain strong," because of continuing expenditures on municipal water and sewage treatment systems. RX307A. The replacement of "outdated water pipe made from asbestos cement, steel or clay with PVC . . . provides a demand for large diameter pipe which helps to compensate for any losses elsewhere." RX304C. Pipe manufacturers attributed the absence of substitution away from PVC pipe to its lower installed cost, as compared to pipe made of other materials. Wilhite, CX179A-C; Porter, CX198B-C *In Camera*; Alberti, CX199F-G *In Camera*; Pflugrath, CX177B *In Camera*; Heath, CX178B. The cost advantage of PVC pipe historically is reduced in some applications, primarily larger diameter pipes, because the walls of PVC pipe must be thicker. For these applications, some pipe producers thought that "further significant increases in the price of suspension PVC homopolymer resin could result in some substitution to other [pipe] materials." Alberti, CX199F *In Camera*; Porter, RX261B *In Camera*; Heath, CX178B-C. But, in August 1988, almost eight months after the price of pipe grade PVC resin had reached 40 cents per pound, that substitution had not occurred. Porter, RX261C *In Camera*."[112]

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[112] Mr. Porter signed two affidavits, seven months apart. In January 1988, Mr. Porter said that his company, Porter Plastics, a PVC pipe producer, was paying 40 cents per pound for pipe grade PVC resin; that, despite the price increase, PVC pipe was "still priced substantially below the price of alternative materials"; and that the price "increases ha[d] not significantly affected the choice on the part of Porter Plastics' customers of PVC relative to other materials." CX198A-B *In Camera*. In August 1988, Mr. Porter told the respondent's counsel that PVC pipe "cannot compete on a cost basis with cast iron pipe in diameters of 10 inches or greater when pipe grade PVC resin reaches . . around 37 cents per pound" and that because pipe grade resin prices "have only recently gone above 37 cents per pound, . . the effect of that pricing" on large-diameter pipe "has yet to occur." RX261C *In Camera*. Notwithstanding these predictions, Mr. Porter also said in August 1988 that because of the shortage of domestic resin, he was buying imported resin at 52 cents per pound and finding it profitable to do so. RX261B *In Camera*.

Evidence in this case indicates that the price elasticity of demand for PVC used for calendering and bottles is lower than the Commission in Goodrich believed. One PVC customer testified that the "demand for PVC in the bottle applications in which it is used and preferred is relatively insensitive to increases in the price of PVC resin." Friedman, CX191B. Occidental identifies PVC bottle compound as a "specialty niche [that] . . . permit[s] premium pricing." RX197Y *In Camera.* This ability to obtain a price premium for PVC bottle compound suggests that the price elasticity of demand for PVC for this purpose is low.

Specialty PVC homopolymer and copolymer resins are used in calendering applications. RX197L-M *In Camera.* According to Occidental, homopolymer resin for calendering obtains a premium price over general purpose homopolymer resin (7 cents to l0 cents per pound) and "therefore deliver[s] a return over [its] high cost." RX197M *In Camera.* The price for copolymer resin used for calendering "averages from $.05 to $.10 above General Purpose [resin] pricing." RX197L *In Camera.* The ability to obtain a price premium for PVC sold in the calendering segment is consistent with the conclusion that the price elasticity of demand for PVC is low. *See* I.D.F. 475 (citing testimony from manufacturer that "passed through to purchasers of the calendered products it produces, the [PVC] price increases . . . implemented throughout 1987 and 1988," with "no substitution [by its customers to end use products made) of alternative materials" occurring "by reason thereof"); I.D.F. 476-77.

The additional evidence in this record leads us to conclude that the elasticity of demand for PVC is lower and varies less among end use products than the Commission in Goodrich thought. We agree with the administrative law judge that the price elasticity of demand for PVC is sufficiently low that a collusive price increase would be profitable.

D. Other Considerations

Other characteristics of a market also are relevant to the ability of firms to collude. These include the number and nature of buyers, the nature of transactions and the availability of information. We hold

that these characteristics in the three relevant product markets are likely to facilitate collusion.

The concentration of the market on the buying side is relevant to whether buyers may have the ability to constrain the exercise of market power by their suppliers. In all three relevant product markets, the large number of customers relative to the small number of producers facilitates the likelihood of collusion. I.D.F. 619-42 (portion *In Camera*). In Goodrich, the Commission concluded that PVC purchasers likely could not, "by virtue of their size, constrain the exercise of market power by PVC producers." 110 FTC at 324. The record in this case also shows that customers in the mass and suspension PVC homopolymer market and the dispersion market are relatively small and numerous, and copolymer buyers, although fewer in number, lack any leverage against their suppliers. I.D.F. 619-42 (portion *In Camera*).

Collusion also is facilitated when transactions are numerous and frequent, because the incentives for cheating on the cartel in any single transaction are reduced and the opportunities for detecting and retaliating against cheating are increased. PVC resin orders generally are placed on a monthly, weekly and sometimes daily basis, and the size of individual orders is small compared to the total market. I.D.F. 638.[113] Long term customer-supplier relationships in the PVC industry and the high probability of repeat sales are likely to enhance the ability of producers to police a collusive agreement, increasing its stability and, therefore, its likelihood. I.D.F. 643-51 (portion *In Camera*). The Commission in Goodrich concluded that longterm customer-supplier relationships and "the frequency and size of transactions in the PVC market increase the likelihood of anticompetitive effects from the acquisition," 110 FTC at 326, and

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[113] PVC supply contracts may not specify the quantity of PVC resin to be supplied (although they may specify a maximum or estimated quantity and may contain volume purchase incentives, *See* note 84 *supra*). Buyers typically predict their needs for the following month and then place their orders on an as-needed basis. Contracts usually specify a price based on the prevailing "market price," require suppliers to give 30-days' notice of price increases, and give buyers price protection clauses, such as most-favored nation clauses and meeting-competition clauses. *See* I.D.F. 655-69; *Goodrich,* 110 FTC at 325; JX1-4, PX61 at 103592 & 595, PX93 & PX94.

the record in this case supports a similar conclusion for each of the three relevant markets. I.D.F. 643-51 (portion *In Camera*).

The ready availability of price information in the industry, I.D.F. 652-59, stable technology, I.D.F. 660-75 (portion *In Camera*), and the declining rate of growth, I.D.F. 676-88 (portion *In Camera*), also are likely to facilitate collusion. Producers of PVC actively monitor the prices of other producers in each of the relevant product markets. *See, e.g.,* JX1(IV), PX32. Customers are a major source of pricing information, and one of the responsibilities of sales representatives is to obtain from customers pricing and other information about other PVC producers. I.D.F. 689-93 (portion *In Camera*); *See, e.g.,* RX217Z36-38 (Occidental memo, "Latest Input on Industry pricing"); JX1-4, PX7B at 900132. The "meeting competition" clauses in PVC sales contracts "ensure that PVC sellers quickly discover price concessions offered by competing firms."[114] *Goodrich,* 110 FTC at 325. This information enables PVC producers to identify the prices offered by other suppliers and to identify the suppliers that are not "supporting" announced price increases. *E.g.,* RX218Z98; RX218Z168 ("maintain market pricing to avoid spiral down"); RX218Z60; RX218Z206-207."[115]

The trade press and industry consultants are additional sources of price information, both for current and forecast prices. PVC producers routinely announce price increases in advance of their effective dates, allowing other producers an opportunity to respond. *E.g.*, CX161B; CX168; CX9A-B; CX8; JX1(IV), PX45 ("published industry consensus" on price increase); RX209A; RX310D;

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[114] "Meeting competition clauses" permit buyers to cancel purchases if they get a lower price from another supplier but require buyers to give contract suppliers the opportunity to meet the lower price. *See Goodrich*, 110 FTC at 325.

[115] The administrative law judge found that certain evidence "strongly suggests" that post-acquisition increases in the price of PVC "are in large part a result of the acquisition." I.D.F. 759. Occidental disputes this finding. R.R.B. at 18-26. The finding is not necessary to our conclusion that the acquisition violated Section 7 of the Clayton Act, and we do not reach the question.

RX311A-B.[116] These mechanisms allow producers to communicate effectively without explicit collusion. PVC producers also can use these channels to communicate other important information about plant expansions or closings,[117] export activities[118] and other plans with respect to PVC supply. *E.g.*, CX161A (inventory); I.D.F. 689-709 (portion *In Camera*). This ready availability of competitive information contributes to the stability and predictability of the market.

PVC producers take care that their pricing activity is not perceived by their competitors as aggressive or disruptive, "to avoid competitive reaction and subsequent market impact." CXl2A; CX56; CX57. This is evidenced by their willingness to meet but not undercut the pricing of other producers. I.D.F. 711-14 (portion *In Camera*). Similarly, recent capacity expansions have been announced to maintain market position, not to upset the competitive apple cart. *See* RX1L *In Camera*; note 117 *supra*. All these characteristics of the market evidence conditions conducive to collusion.

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[116] "At press time, Formosa Plastics and Occidental Chemical had issued 3 cent/lb increases for their PVC dispersion resins, effective Jan. 1 [1988]. Goodyear Chemical announced it would raise dispersion-resin prices by 4 cents/lb this month. Other suppliers say they had already raised their prices and that announcements from Formosa and Occidental merely brought their prices in line with the rest . . . . [S]ources at Occidental say the company plans to remove all spot discounts from g[eneral]-p[urpose] homopolymer and pipe suspension resins this month. Occidental sources say this move will result in a nominal 2 cent/lb increase. Sources at major suppliers indicate that 2-3 cents/lb across-the-board hikes are likely this month or Feb. l." RX3llA-B.

[117] *See, e.g.*, RX222A (list of announced and contemplated expansions); RX3l2J (Modern Plastics, Jan. 1988, at 76: "Formosa Plastics Corp. plans to add 600 million lb. to its reactor capacity. Shintech says it will raise its stake by 500 million lb.; and Occidental has announced a 200 to 400 million lb./yr. expansion project."); RX222B (Formosa said, "We hope we are doing this [expansion] in such a way as not to stir the marketplace up."); RX236A (announcing expansion, Vista said, "We're tailoring our PVC resin expansion program to match anticipated growth so that Vista will maintain its current 10% share of the overall PVC market."); RXlL *In Camera* (Occidental review of announced expansions: "The sum of these expansions . . . will enable industry capacity to keep pace with the demand growth."); CX166; CX214E; CX29H; CX9B.

[118] CX163B; CX165A; CX165B.

V. CONCLUSION

We affirm the decision of the administrative law judge that the acquisition by Occidental of the PVC business of Tenneco is likely substantially to lessen competition in the markets for mass and suspension PVC homopolymer, copolymer, and dispersion PVC in the United States. Divestiture of the acquired assets is the appropriate remedy for a violation of Section 7 of the Clayton Act. *United States v. E.I. du Pont de Nemours & Co.*, 366 U.S. 316, 331 (1961); *See also Ford Motor Co. v. United States*, 405 U.S. 562, 573 (1972).

Divestiture of Tenneco's Pasadena plant is appropriate to remedy the violation in the mass and suspension homopolymer market, and divestiture of Tenneco's Burlington plant is appropriate to remedy the violation in the copolymer and dispersion markets.[119] The attached order is intended to remedy the anticompetitive effects of the acquisition by requiring Occidental to divest the Pasadena, Texas, and Burlington, New Jersey, PVC plants that it acquired from Tenneco.

STATEMENT OF COMMISSIONER DEBORAH K. OWEN CONCURRING IN PART AND DISSENTING IN PART

I agree with the majority in this matter that the acquisition by Occidental Petroleum Corporation ("Occidental"), of the polyvinyl chloride ("PVC") business of Tenneco, Inc. ("Tenneco") may substantially lessen competition in the manufacture and sale of suspension PVC copolymer and dispersion PVC in the United States, in violation of Section 7 of the Clayton Act, 15 U.S.C. 18, and Section 5 of the Federal Trade Commission Act, 15 U.S.C. 45. I also concur in the decision of the majority to order the divestiture of the former Tenneco plant in Burlington, New Jersey, to remedy the violations in these markets.

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[119] Counsel for Occidental maintained in *FTC v. Occidental Petroleum Corp.*, Civ. No. 86-0900 (D.D.C. 1986), in defending against the imposition of a preliminary injunction, that "any aspect of this acquisition [of Tenneco] can be divested without trouble." JX1(II), Tr. 973.

I respectfully dissent, however, with respect to the majority's finding of a similar violation in the market of mass and suspension PVC homopolymer in the United States, and consequently, with respect to their decision to order divestiture of the former Tenneco plant in Pasadena, Texas. I adopt the reasoning of the majority, except to the extent that it may be inconsistent with the analysis herein.

I. INTRODUCTION

Section 7 of the Clayton Act, prohibits acquisitions[1] where the effect "in any line of commerce or in any activity affecting commerce . . . may be substantially to lessen competition, or to tend to create a monopoly." 15 U.S.C. 18. Such activity may also violate Section 5 of the FTC Act, if it constitutes an "unfair method of competition." 15 U.S.C. 45. The "unifying theme" of merger analysis is that "mergers should not be permitted to create or enhance market power or to facilitate its exercise." U.S. Department of Justice & Federal Trade Commission Horizontal Merger Guidelines ("Merger Guidelines"), Section 0.1, reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,104.[2] Market power is "the ability profitably to maintain prices above competitive levels for a significant period of time," *Id.*, or to "lessen competition on dimensions other than price, such as product quality, service, or innovation." *Id.* at n.6; *See also Owens-Illinois, Inc.*, Dkt. No. 9212 (Feb. 26, 1992), slip op. at 4-5 (quoting 1984 U.S. Department of Justice Merger Guidelines).

Evaluating whether a merger may result in market power necessitates determining, first, the relevant product and geographic market, the level of concentration in that market, and the change in concentration from the merger. However, that is only the starting point. Given that market structure, the Commission must determine

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[1] The terms acquisitions and mergers are used interchangeably in this opinion to refer to any transaction subject to Section 7 of the Clayton Act.

[2] The Merger Guidelines "update the Merger Guidelines issued by the U.S. Department of Justice in 1984 and the Statement of Federal Trade Commission Concerning Horizontal Mergers issued in 1982." Merger Guidelines, Section 0. n.4.

also: (1) whether potential anticompetitive effects are demonstrable; (2) whether entry into the market would be timely, likely and sufficient to counteract the potential for anticompetitive effects; (3) whether there are any efficiency gains specific to the merger, and if so, their magnitude; and (4) whether, absent the merger, one of the firms will fail and exit from the market. *See generally* Merger Guidelines, Section 0.1 and *passim;* Owens-Illinois, *passim.*

Applying these principles, I reach a different conclusion from the majority in one market. While I agree that the manufacture and sale of mass and suspension PVC homopolymer is a relevant market, I believe that the level of concentration in that market, and the increase in concentration due to the merger, may be less than the majority calculates. In my view, the acquisition increases concentration to just above the threshold that potentially raises competitive concerns,[3] and is, thus, truly a marginal case based on market structure alone. I therefore agree with the majority that additional analysis beyond market concentration is necessary to determine actual competitive effects.

When I analyze the potential competitive effects of this merger, I find, on balance, that anticompetitive effects are unlikely in the mass and suspension PVC homopolymer market; therefore, an examination of entry, efficiencies, or business failure is unnecessary. I conclude that the acquisition does not violate Section 7 of the Clayton Act or Section 5 of the FTC Act in the mass and suspension PVC homopolymer market.

II. SETTING THE FRAMEWORK FOR THE ANALYSIS

A. The Relevant Market

Relevant markets are markets in which the parties to the merger compete, or which in some way may be affected by the merger at

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[3] Merger Guidelines, Section 1.51(b). The Guidelines presume that the merger is likely to create or enhance market power or facilitate its exercise only when the post-merger Herfindahl-Hirschmann Index ("HHI") exceeds 1800, and the increase in the HHI due to the merger exceeds 100. *Id.*, Section 1.51(c). This case is not close to those levels.

issue, the area of "effective competition." *United States v. E.I. du Pont de Nemours & Co.*, 353 U.S. 586, 593 (1957); *Brown Shoe Co. v. United States*, 370 U.S. 294, 324 (1962). Relevant markets must be economically meaningful. An economically meaningful market is one in which market power may be exercised, *i.e.*, "'any grouping of sales whose sellers, if unified by a hypothetical cartel or merger, could raise prices significantly above the competitive level.'" *Owens-Illinois,* slip op. at 4 (quoting *H.J., Inc. v. International Telephone & Telegraph Corp.*, 867 F.2d 1531, 1537 (8th Cir. 1989)).

The willingness and ability of customers to switch to other products determines whether sellers could significantly raise prices, and ultimately defines the extent of the market. *Id.* at 5. The extent to which customers will switch products, and thus the extent of the product market, may be defined "either in terms of the 'cross-elasticity of demand' or the 'reasonable interchangeability of use' between the product in question and potential substitutes." *Olin Corporation,* Dkt. No. 9196 (June 13, 1990), slip op. at 5 (quoting *Grand Union Co.*, 102 FTC 812, 1041-42 (1983)), *aff'd,* No. 90-70452 (9th Cir. Feb. 26, 1993).

Based on these criteria, I agree with the majority that one relevant market in which to analyze this acquisition is the production and sales of mass and suspension PVC homopolymer in the United States.

B. Market Concentration

"A merger is unlikely to create or enhance market power or to facilitate its exercise unless it significantly increases concentration and results in a concentrated market. . . ." Merger Guidelines, Section 1.0. To determine the level of concentration, it is necessary to identify the participants in that market and the extent of their involvement. "Participants" include all firms that are now producing or selling in the relevant market. Merger Guidelines, Section 1.31. In addition, if "suppliers not presently producing the product are likely to redirect existing facilities . . . to supply the product, their short-run output may prevent price from rising." *Owens-Illinois*, slip op. at 5. To the extent that suppliers would, within one year, redirect existing facilities in the event of a small but significant, nontransitory price increase, and without the expenditure of significant sunk costs,

such suppliers should be included in the market. Merger Guidelines, Section 1.32.

Using the now familiar Herfindahl-Hirschmann Index to measure concentration, the majority calculates a post-merger HHI of 1278, based on 1985 actual production, and 1305, based on operating capacity, with an increase due to the merger of 156 and 158, respectively. Slip op. at 27. Included in these calculations are suspension PVC copolymer plants that could instead produce suspension PVC homopolymer. The majority observes that such switching is unlikely and, therefore, including these plants in the market is unnecessary. Slip op. at 7-8. This suggests that the HHI understates concentration in the mass and suspension PVC homopolymer market.

I disagree and believe the HHI calculations overstate the level of concentration. First, I find it necessary, and not an act of discretion, to include producers of suspension PVC copolymer in the relevant market. There has been switching of capacity, in fact, at the existing premerger price levels, between copolymer and homopolymer production. *See, e.g.,* slip op. at 12 n.32. Second, I believe that existing imports of mass and suspension PVC homopolymer should be included in the market and in the calculation of the HHI.[4]

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[4] As the majority notes, slip op. at 27 n.61, in B.F. Goodrich, the Commission likewise did not include imports of mass and suspension PVC in the relevant market, *See* 110 FTC at 307- 309, Tables I and II, having determined that imports did not significantly constrain domestic pricing discretion. *Id.* at 301. While that conclusion may be sufficient to limit the geographic market to the United States, I do not believe that it is appropriate to ignore the imports that are currently entering the country when calculating market shares and concentration.

The Merger Guidelines support including imports in the market share calculations by including as participants in the market all firms that currently produce or sell in the relevant market. Section 1.31. The Merger Guidelines then calculate a market share for all participants "based on the total sales or capacity currently devoted to the relevant market. . . ." Section 1.41. In this case, that should include current import sales.

The Merger Guidelines approach is consistent with the Commission's treatment of import sales in Owens-Illinois, which included import sales in the calculation of market share even though the geographic market was limited to the continental United States. *See Owens-Illinois,* slip op. at 26-27 (adopting the Initial Decision which (at 45) shows import sales included in the calculation of market concentration).

Including the sales of imported mass and suspension PVC, the post-acquisition HHI is between 1164 and 1187, with an increase of over 140. Slip op. at 27 n.61. Finally, in a result in which I concur, the majority orders the divestiture of the former Tenneco plant in Burlington, New Jersey. Although its share of the mass and suspension PVC homopolymer market is relatively small, the divestiture of this plant will further lower the post-merger HHIs.[5] These three adjustments -- greater emphasis on suspension PVC copolymer, inclusion of imports, and exclusion of the Burlington plant -- lower the HHI appreciably. Nevertheless, even after these adjustments, the post-acquisition HHI still exceeds 1100 and the increase exceeds 100, thus necessitating a review of the potential competitive effects of the merger.

III. THE STANDARDS FOR DETERMINING THE LIKELY COMPETITIVE EFFECT

A. The Significance of Market Concentration

Measuring market concentration is the first step in identifying the effects of an acquisition on the relevant market. *See, e.g., United States v. Philadelphia National Bank*, 374 U.S. 321 (1963). As a general principle, "'[a]s . . . industry concentration increases . . . the

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[5] I believe it appropriate, and consistent with Commission practice, to take the Burlington divestiture into account in assessing the remainder of the acquisition. For instance, the Commission regularly considers the impact of partial divestitures in considering whether proposed settlements of merger cases are sufficient to protect the public interest in competition.

At the oral argument, Occidental urged this approach, arguing that with the ordered divestiture of the New Jersey plant, the transaction should be treated as an acquisition solely of the Pasadena, Texas plant. This, according to Occidental, would result in a post-acquisition HHI of 1218, with a change in the HHI due to the merger of 105, based on practical production capacity; a post-acquisition HHI of 1267, with a change in the HHI due to the merger of 121, based on operating capacity; and a post-acquisition HHI of 1138, based on actual production plus imports. Transcript of Oral Argument (March 29, 1990) at 72-73. It is unclear how Occidental arrived at these numbers, and I have been unable to replicate them completely. Without knowing the identity of the purchaser of the divested plant, the resulting HHI cannot be precisely calculated; however, it is clear that it will fall somewhat.

likelihood of anticompetitive effects from an acquisition consequently increases as well. . . ." *Owens-Illinois,* slip op. at 27 (quoting *B.F. Goodrich*, 110 FTC at 303); *See also* Merger Guidelines, Section 1.51 ("Market concentration is a useful indicator of the likely potential competitive effect of a merger."). Increases in concentration magnify the likelihood of collusive behavior since "[t]he fewer the competitors in a market, the easier it becomes for the firms to coordinate price and output decisions." *Olin* slip op. at 21; *See also* Merger Guidelines, Section 2.0. However, while market concentration is a screen that helps identify mergers that may reduce competition, it is not always a precision tool.

The Merger Guidelines divide markets into three categories according to concentration. Markets with a post-merger HHI under 1000 are unconcentrated; markets with a post-merger HHI between 1000 and 1800 are moderately concentrated; and markets with a post-merger HHI over 1800 are highly concentrated. Merger Guidelines, Section 1.51. In this case, as in *B.F. Goodrich,* 110 FTC at 310, the mass and suspension PVC homopolymer market, is moderately concentrated, as the majority notes. Slip op. at 27.

Within each category, the Guidelines also look to the amount of increase resulting from the acquisition. In a moderately concentrated market, an increase of less than 100 in the HHI is "unlikely to have adverse competitive consequences." Merger Guidelines, Section 1.51(b). An increase of more than 100, however, "potentially raise[s] significant competitive concerns" depending on how likely it is that there will be a lessening of competition through coordinated interaction or unilateral effects, and factors relating to entry, efficiencies, and business failure. *Id.* In this case, there were no allegations of unilateral anticompetitive effects from the acquisition, therefore our focus is on whether the acquisition increases the likelihood of coordinated actions or collusive anticompetitive behavior.

The bright-line division between unconcentrated and moderately concentrated markets is somewhat illusory. As the Merger Guidelines observe, "[a]lthough the resulting regions provide a useful framework for merger analysis, the numerical divisions suggest greater precision than is possible with the available economic tools and information." Merger Guidelines, Section 1.5. The imprecision