

207

Complaint

IN THE MATTER OF

THE B.F. GOODRICH COMPANY, ET AL.

FINAL ORDER, OPINION, ETC., IN REGARD TO ALLEGED VIOLATION OF  
SEC. 7 OF THE CLAYTON ACT AND SEC. 5 OF THE FEDERAL TRADE  
COMMISSION ACT

*Docket 9159. Complaint, Jan. 4, 1982—Final Order, Mar. 15, 1988*

This final order requires Goodrich, a corporation with its principal place of business in Akron, Ohio, to divest the vinyl chloride monomer (VCM) plant, in La Porte, Texas, at no minimum price, to a Commission-approved acquirer and also to provide all supporting material to the acquirer. Diamond Shamrock Chemicals Company is prohibited from interfering with the divestiture and, for five years, must continue to supply all utilities, services, and supplies to the acquirer. In addition, Goodrich must, for 10 years, receive FTC approval before acquiring any interest in any producer of VCM located in the United States. The Commission also dismissed part of the complaint concerning the polyvinyl chloride (PVC) market.

*Appearances*

For the Commission: *Rhett Krulla.*

For the respondents: *Tom D. Smith, Jones, Day, Reavis & Pogue,*  
Washington, D.C.

COMPLAINT

The Federal Trade Commission, having reason to believe that respondents, The B.F. Goodrich Company, Diamond Shamrock Corporation and Diamond Shamrock Plastics Corporation, corporations subject to the jurisdiction of the Federal Trade Commission, have entered into an agreement, described in paragraph 11 herein, that, if consummated, would violate the provisions of Section 7 of the Clayton Act, as amended (15 U.S.C. 18), and Section 5 of the Federal Trade Commission Act, as amended (15 U.S.C. 45); that said agreement and the actions of respondents to implement that agreement constitute violations of Section 5 of the Federal Trade Commission Act, as amended (15 U.S.C. 45); and it appearing to the Commission that a proceeding in respect thereof would be in the public interest, the Commission hereby issues its complaint, pursuant to Section 11 of the Clayton Act (15 U.S.C. 21) and Section 5(b) of the Federal Trade Commission Act (15 U.S.C. 45(b)), stating its charges as follows:

## I. DEFINITIONS

1. For purposes of this complaint, the following definitions shall apply: [2]

a. "*Polyvinyl chloride*" or "*PVC*" means any vinyl chloride homopolymer with the repeating unit  $\text{CH}_2=\text{CHCl}$ , and any copolymers of vinyl chloride with varying amounts of other chemicals, including vinyl acetate, ethylene, propylene, vinylidene chloride, or acrylates;

b. "*Bulk and suspension PVC*" includes PVC produced by the bulk or mass process, in which vinyl chloride is polymerized without the addition of other liquids; and PVC produced by the suspension process, in which vinyl chloride monomer droplets are suspended in an aqueous system.

c. "*Dispersion PVC*" includes PVC produced by the emulsion or dispersion process;

d. "*Vinyl chloride monomer*" or "*VCM*", is a gaseous, reactive, acyclic intermediate chemical, used principally in the manufacture of PVC. VCM, also called chloroethylene or monochloroethylene, has a chemical identity  $\text{CH}_2=\text{CHCl}$ .

## II. THE B.F. GOODRICH COMPANY

2. Respondent, The B.F. Goodrich Company ("Goodrich"), is, and at all times relevant herein, has been a corporation organized, existing, and doing business under and by virtue of the laws of New York, with its principal place of business in Akron, Ohio.

3. For the year ending December 31, 1980, Goodrich's net sales were approximately \$3.08 billion, and its net income was approximately \$61.7 million. As of December 31, 1981, Goodrich's bulk and suspension PVC and VCM production capacities were approximately 1.345 billion pounds and 1 billion pounds per year, respectively.

4. Goodrich is a multinational company engaged in the manufacture and sale of a broad line of chemical, plastic, rubber, and other products which are distributed in over [3] 100 countries throughout the world.

5. Goodrich is, and at all times relevant herein has been, engaged in commerce as "commerce" is defined in Section 1 of the Clayton Act, as amended, 15 U.S.C. 12, and is a corporation whose business is in or affecting commerce as "commerce" is defined in Section 4 of the Federal Trade Commission Act, as amended, 15 U.S.C. 44.

## III. DIAMOND SHAMROCK CORPORATION

6. Respondent, Diamond Shamrock Corporation ("Diamond Shamrock") is, and at all times relevant herein has been, a corporation organized, existing, and doing business under and by virtue of the

laws of Delaware, with its principal office and headquarters in Dallas, Texas.

7. For the calendar year ending December 31, 1980, Diamond Shamrock's sales and operating revenues were approximately \$3.143 billion, and its net income was approximately \$201 million. As of December 31, 1981, Diamond Shamrock's bulk and suspension PVC and VCM production capacities were approximately 510 million pounds and 1 billion pounds per year, respectively.

8. Diamond Shamrock is a diversified international corporation involved in the exploration and production of natural gas and crude oil, the refining and marketing of petroleum products, and the production of coal, chemicals, plastics, and technology.

9. Diamond Shamrock is, and at all times relevant herein has been, engaged in commerce as "commerce" is defined in Section 1 of the Clayton Act, as amended, 15 U.S.C. 12, and is a corporation whose business is in or affecting commerce as "commerce" is defined in Section 4 of the Federal Trade Commission Act, as amended, 15 U.S.C. 44. [4]

#### IV. DIAMOND SHAMROCK PLASTICS CORPORATION

10. Diamond Shamrock Plastics Corporation ("DSPC") was established by Diamond Shamrock in 1980 in order to facilitate divestiture of Diamond Shamrock's Plastics Division. Upon establishment of DSPC as a wholly-owned subsidiary, Diamond Shamrock transferred all of its PVC and VCM assets and business to DSPC and has continued to conduct these businesses through DSPC. Diamond has subsequently restructured DSPC to include only those assets it has agreed to transfer to Goodrich. Diamond Shamrock will establish a new corporation to hold the remaining PVC assets and business of the company pending their disposition by Diamond Shamrock.

#### V. THE ACQUISITION

11. Under the terms of the agreement between Goodrich and Diamond Shamrock, on or about December 31, 1981, Goodrich will acquire from Diamond Shamrock all the stock of DSPC for \$131 million. Pursuant to Diamond Shamrock's agreement with Goodrich, prior to its acquisition by Goodrich, DSPC has been restructured to include a one-billion pound-per-year capacity VCM plant at La Porte Texas, and a 280 million pound-per-year capacity suspension PVC plant (plant No. 5) at Deer Park, Texas, selected research and development equipment, process and application equipment, and personnel and other assets required to operate those plants. Consummation of the transaction is subject to the execution of agreements between Goodrich and Diamond Shamrock concerning feedstock supplies.

## VI. TRADE AND COMMERCE

12. For purposes of this complaint, the relevant lines of commerce are VCM, bulk and suspension PVC, dispersion PVC and any submarket thereof. [5]

13. For purposes of this complaint, the relevant geographic market is the United States as a whole, and any submarket thereof.

14. In 1980, approximately 6.47 billion pounds of VCM were produced in the United States. The VCM market is concentrated. In 1981, the two leading manufacturers accounted for approximately 37.9 percent of industry nameplate (design) capacity, the four leading manufacturers accounted for 58.4 percent; and the eight leading manufacturers accounted for 92.1 percent.

15. Goodrich and Diamond Shamrock are tied as the third leading manufacturer of VCM, each holding 10.3 percent of industry nameplate capacity in 1981.

16. Goodrich and Diamond Shamrock are direct, substantial, and actual horizontal competitors in the VCM market.

17. Barriers to entry into the VCM market are significant and substantial.

18. In 1980, approximately 4.88 billion pounds of bulk and suspension PVC were produced in the United States.

19. The bulk and suspension PVC market is moderately concentrated. In 1981, the two leading manufacturers accounted for approximately 29.3 percent of industry nameplate capacity, the four leading manufacturers accounted for 48.0 percent, and the eight leading manufacturers accounted for 78.9 percent.

20. Goodrich is the leading producer of bulk and suspension PVC, with approximately 17.4 percent of industry nameplate capacity in 1981.

21. Goodrich has grown through acquisition in the bulk and suspension PVC market. In 1979, Goodrich acquired a 200 million pound-per-year bulk and suspension PVC plant in Plaquemine, Louisiana, from The Goodyear Tire and Rubber Company. At [6] the time of this acquisition, Goodrich held 15.5 percent of industry capacity. The acquired plant gave Goodrich an additional 3.1 percent of industry capacity.

22. Diamond Shamrock is the sixth leading producer of bulk and suspension PVC with approximately 6.6 percent of industry nameplate capacity and 8.9 percent of practical production capacity in the market in 1981. Pursuant to the transaction, approximately half of Diamond Shamrock's production capacity will be transferred to Goodrich, raising its market share to approximately 20.8 percent of industry nameplate capacity.

23. Goodrich and Diamond Shamrock are direct, substantial, actual, horizontal competitors in the bulk and suspension PVC market.

24. Barriers to entry into the bulk and suspension PVC market are significant.

25. In 1979, approximately 496 million pounds of dispersion PVC were produced in the United States.

26. The dispersion PVC market is highly concentrated. In 1980, the two leading manufacturers accounted for approximately 51.7 percent of industry nameplate capacity, the four leading manufacturers accounted for 78.3 percent, and the eight leading manufacturers accounted for 100 percent.

27. Goodrich is the leading producer of dispersion PVC with approximately 26.6 percent of industry nameplate capacity in 1980.

28. Diamond Shamrock is the fourth leading producer of dispersion PVC with approximately 11.8 percent of industry nameplate capacity in the market in 1980. Following the transaction with Goodrich, Diamond Shamrock is likely to shut down or sell its dispersion PVC plant facilities. These facilities are not currently included in the Goodrich acquisition. [7]

29. Goodrich and Diamond Shamrock are direct, substantial, actual, horizontal competitors in the dispersion PVC market.

30. Barriers to entry into the dispersion PVC market are significant.

#### VII. EFFECTS OF THE ACQUISITION

31. The effect of the aforesaid acquisition may be substantially to lessen competition or to tend to create a monopoly in the relevant lines of commerce in violation of Section 7 of the Clayton Act, as amended, 15 U.S.C. 18, and Section 5 of the Federal Trade Commission Act, as amended, 15 U.S.C. 45, in the following ways, among others:

a. It will eliminate actual competition between Goodrich and Diamond Shamrock in the relevant lines of commerce;

b. It will increase concentration in the relevant lines of commerce and reduce the number of firms competing in those markets. In the VCM market, two-firm concentration will increase from approximately 37.9 percent to 42.6 percent and four-firm concentration will increase from approximately 58.4 percent to 68.7 percent. In the bulk and suspension PVC market, two-firm concentration will increase from approximately 29.3 percent to 32.9 percent and four-firm concentration will rise from approximately 48.0 percent to 51.7 percent.

32. Diamond Shamrock may also be eliminated as a competitor in the production and distribution of dispersion PVC which is a separate

line of commerce from bulk and suspension PVC as defined above. Although Diamond Shamrock's dispersion PVC capacity will not be transferred to Goodrich under the terms of the agreement described in paragraph 11 herein, by virtue of that agreement, Diamond Shamrock may exit this [8] market as a substantial competitor.

#### VIII. VIOLATIONS CHARGED

33. The steps taken to consummate the acquisition of the stock and assets of DSPC by Goodrich from Diamond Shamrock, as set forth in paragraph 11 herein, and the agreements pursuant to which that acquisition is to be effected, constitute violations of Section 5 of the Federal Trade Commission Act, as amended, 15 U.S.C. 45.

34. The proposed acquisition of the stock and assets of DSPC by Goodrich from Diamond Shamrock, as set forth in paragraph 11 herein, if consummated, would violate Section 7 of the Clayton Act, as amended, 15 U.S.C. 18, and would violate Section 5 of the Federal Trade Commission Act, as amended, 15 U.S.C. 45.

#### INITIAL DECISION BY

THOMAS F. HOWDER, ADMINISTRATIVE LAW JUDGE

SEPTEMBER 20, 1985

#### PRELIMINARY STATEMENT

The Commission issued its complaint in this proceeding on January 4, 1982, charging that the acquisition of Diamond Shamrock Plastics Corporation ("DSPC") by The B.F. Goodrich Company ("Goodrich") from Diamond Shamrock Chemicals Company ("Diamond Shamrock" or "Diamond") (formerly Diamond Shamrock Corporation) violated Section 7 of the Clayton Act, 15 U.S.C. 18; and that both the acquisition and the concomitant agreement and steps taken to consummate the transaction violated Section 5 of the Federal Trade Commission Act, 15 U.S.C. 45.

The complaint alleged that the effect of the challenged acquisition would be to eliminate actual competition between Goodrich and Diamond and increase the levels of concentration in two product markets, *viz.*, bulk and suspension polyvinyl chloride ("PVC"),<sup>1</sup> and vinyl chloride monomer ("VCM").<sup>2</sup>

<sup>1</sup> Unless otherwise indicated herein, the initials "PVC" will refer to "bulk and suspension" PVC, not to other formulations of PVC.

<sup>2</sup> The complaint also alleged violation in a third market, *viz.*, "dispersion" PVC. However, complaint counsel elected not to pursue this allegation and no evidence was offered concerning it (see complaint counsel's trial brief, p. 2, n. 2).

Following extensive discovery, and various prehearing conferences, adjudicative hearings commenced on November 24, 1984 and continued at intervals until March 22, 1985. The evidentiary record was closed on March 26, 1985. The parties have submitted detailed proposed findings and briefs in support of their respective positions.

Any motions not heretofore or herein specifically ruled upon, either directly or by the necessary effect of the conclusions in this decision, are hereby denied.

This proceeding is before me upon the complaint, answers, testimony and other evidence, and the proposed findings of fact and conclusions of law filed by counsel supporting the complaint and by counsel for respondents. The proposed findings of fact, conclusions and arguments of the parties have been considered, and those findings not adopted either in the form proposed or in [3] substance are rejected as not supported by the evidence or as involving immaterial issues not necessary for this decision.<sup>3</sup>

Having heard and observed the witnesses, and after having reviewed the entire record in this proceeding, I make the following findings:

#### FINDINGS OF FACT

##### I. THE RESPONDENTS

###### A. *The B.F. Goodrich Company*

1. Respondent Goodrich, the acquiring company, is a New York corporation headquartered in Akron, Ohio. [ ] (Complaint ¶ 3; Goodrich Answer ¶ 3; CX 8B; CX 109E *in camera*; RX 192Z-58 *in camera*; RX 312A). For the year ending December 31, 1980, Goodrich had net sales of approximately \$3.08 billion, with net income of approximately \$61.7 million. Its total assets at that time were listed at approximately \$2.2 billion (Complaint ¶ 3; Goodrich Answer ¶ 3; CX 8Z-30, 31).

2. [ ] (CX 4Z-73; CX 22 *in camera*, CX 23A; CX 299P-S *in camera*). [ ] (CX 23A; CX 336C *in camera*; CX 662D *in camera*).

3. At the time of the acquisition, Goodrich owned and operated a

<sup>3</sup> Certain abbreviations, including the following, are used in this decision:

CX - Commission's exhibit

CPF - Complaint counsel's proposed finding

RX - Respondents' exhibit

RPF - Respondents' proposed finding

The transcript of testimony is usually referred to with the last name of the witness and the page number or numbers upon which the testimony appears.

VCM plant at Calvert City, Kentucky. [ ] (CX 4Z-73; CX 109Z-3 *in camera*; DiLiddo 3353). [4]

#### B. Diamond Shamrock Chemicals Company

4. Respondent Diamond Shamrock, the seller of the acquired company, is a Delaware corporation headquartered in Dallas, Texas. It is a diversified international company involved in the exploration and production of natural gas and crude oil, the refining and marketing of petroleum products, the production of coal, chemicals and plastics, and the development of technology (Complaint ¶ 7; Diamond Answer ¶ 7; CX 104Z). For the year ending December 31, 1980, Diamond's sales and operating revenues were approximately \$3.143 billion, with net income of approximately \$201 million. Its total assets at that time were listed at approximately \$2.8 billion (*ibid.*; CX 401B; CX 401Z-12).

5. At the time of the acquisition, Diamond Shamrock conducted the major portion of its PVC operations at Deer Park, Texas. This consisted of several suspension production facilities designated Plants # 1, # 3, # 4, # 4X and # 5, and one dispersion resin unit designated Plant # 2 (CX 371H-I; CX 418B). [ ] (Schaefer 1070-71; Becker 1253; CX 11B *in camera*; CX 351Q,U; CX 511B *in camera*). The combined annual nameplate capacity at Deer Park amounted to approximately 500 million pounds per year (CX 371I). [ ] (CX 11C *in camera*; CX 367A *in camera*; CX 371L; CX 418B; CX 511B *in camera*; Diamond Adm. 23-24; CX 6Z-9).<sup>4</sup>

6. Located adjacent to the Deer Park complex was Diamond Shamrock's Independence VCM facility at LaPorte, Texas. [ ] (Diamond Adm. 1 and 274; CX 6A and 6L; CX 295Z-44, 45 *in camera*; CX 11B *in camera*; CX 405Z; CX 414A).

#### C. Diamond Shamrock Plastics Corporation

7. Diamond Shamrock Plastics Corporation ("DSPC") was organized as a wholly-owned subsidiary by Diamond Shamrock in 1980 as a successor to Diamond Shamrock's Plastics Division. [5] [ ] (Diamond Adm. 308; CX 6M; CX 30Z-18; CX 367A *in camera*).

8. [ ] (Complaint ¶ 10; Answer of Diamond Shamrock ¶ 10; Goodrich Adm. 298-99; CX 4Z-12; Diamond Adm. 333-34; CX 6N; CX 295Z-94 *in camera*). [ ] (Goodrich Adm. 25; CX 4E; Arp 3502; CX 295Z-85 *in camera*; CX 11D *in camera*). [ ] (CX 3Z-583 *in camera*).

<sup>4</sup> In addition, Diamond Shamrock held a [ ] percent interest in a [ ] million pounds-per-year bulk PVC plant in Alberta, Canada, through a joint venture with Alberta Gas Trunkline Company, Ltd. (CX 401Z-38; CX 300Z-11-13 *in camera*; CX 371A).



## II. JURISDICTION

9. The question of jurisdiction is not in dispute. Both respondents Goodrich and Diamond Shamrock filed answers admitting to being subject to the jurisdiction of the Federal Trade Commission. In addition, both corporations admitted to having engaged in commerce and to being corporations whose business is in or affecting commerce within the meaning of the relevant statutes cited in the complaint (Complaint, Introductory Paragraph and ¶¶ 5, 9; Introductory Paragraphs of both Answers; Goodrich Answer ¶ 5; Diamond Answer ¶ 9).

## III. THE ACQUISITION

10. [ ] (Goodrich Adm. 297-98; CX 4Z-12; Diamond Adm. 332; CX 66N *in camera*; DiLiddo 3203; CX 2Z-17,18 *in camera*; CX 11N *in camera*; CX 452).

11. [ ] (CX 2C,R *in camera*; CX 3Z-586-97 *in camera*).

12. [ ] (DiLiddo 3206-07; Schaefer 1113-14, 1175-76; Arp 3498-99; CX 2Z-10,11 *in camera*; CX 2Z-326-32 *in camera*; CX 555A *in camera*), [ ] (CX 2Z-5,6 *in camera*), [ ] (CX 3Z-285-333 *in camera*), [ ] (CX 2Z-107-18 *in camera*), [ ] (CX 2Z-326-32 *in camera*). [6]

13. [ ] (Schaefer 1177; CX 2Z-333-63 *in camera* and CX 2Z-374-412 *in camera*); (DiLiddo 3205-07; Schaefer 1113-16; CX 3Z-226-44 *in camera*; CX 561 *in camera*). [ ] (CX 3Z-217-23 *in camera*; CX 414Z-7; CX 453), [ ] (CX 2Z-420-587 *in camera*).

14. [ ] (Schaefer 1183; CX 300Z-25 *in camera*; CX 353J *in camera*; CX 555A *in camera*). [ ] (CX 300Z-24 *in camera*). [ ] (Schaefer 1118-19; CX 555D *in camera*). [ ] (CX 555A *in camera*). Diamond permanently closed these remaining plants in December 1983 (CX 455).

## IV. RELEVANT GEOGRAPHIC MARKET

15. The parties have stipulated that the United States as a whole is the relevant geographic market within which to evaluate the likely competitive impact of the challenged acquisition (CPF 4.06, 21.01).

## V. RELEVANT PRODUCT MARKET

16. The parties have also stipulated that bulk and suspension PVC is a relevant product market within which to evaluate the likely competitive impact of the acquisition (CX 4J-K; CX 6D,Z-37). The parties, however, disagree as to whether VCM constitutes a relevant market. For purposes of this decision, however, VCM has been treated as a relevant market.

### A. Bulk and suspension PVC

17. Stated simply, PVC is a thermoplastic resin derived basically from the chemicals ethylene and chlorine. These chemicals are first converted into ethylene dichloride ("EDC"), from which the product VCM is manufactured by a cracking [7] process. The VCM molecules are thereafter linked together by a polymerization process to form PVC. PVC resin is manufactured in the form of white powder granules (Disch 626; McMath 1894; CX 427H).

18. [ ] (see Becker 1269-73, 1276, 1303, 1307-11, 1316-17, 1324; Eades 1464-65; Liao 1540; H. Wheeler 1727-28, 1752-53; Weber 1806-08; McMath 1895-96; Belt 1988; Yu 2093-94; RX 140Z-26 *in camera*; RX 287E-F; RX 938 *in camera*).<sup>5</sup>

#### 1. PVC manufacturing processes

19. All PVC is produced by a polymerization process which links VCM molecules together in a vessel commonly referred to as a reactor, under specific temperatures in the presence of catalysts (CX 427I-K; see Disch 642; RX 125T-U; RX 218D). Reactors range in size from less than 2,500 gallons to about 50,000 gallons (see Disch 638, 640; Schaefer 1071; RX 305).

20. Within the broad category of PVC resins there are essentially three types; (1) suspension resins, (2) dispersion (or emulsion) resins, and (3) bulk (or mass) resins (CX 30G; CX 427I-K).

21. Suspension resins are produced by a polymerization process which adds suspension agents to VCM. This results in the formation of relatively large particles of PVC, and permits a low energy consumptive process to be used in the drying stage (Disch 617-29; RX 125U-W). Suspension resins account for about 85 percent of all PVC manufactured in the United States (Disch 627-28; CX 30G; RX 125T).

22. Dispersion resins are produced by a polymerization process known as emulsion polymerization, during which emulsifying, rather than suspension, agents are added to VCM to prevent the coalescence of polymer particles (Disch 630; RX 125W- [8] Y). As a result, very small particles of PVC are formed, and an expensive, energy intensive spray process must be used in the drying stage (Disch 630). [ ] (CX 518G *in camera*). As noted *supra*, n. 2, dispersion resins are not at issue in this proceeding.

23. Bulk resins are produced by a process which differs from the manufacture of suspension and dispersion resins, in that the VCM is

<sup>5</sup> A number of manufacturing methods are used in the production of bulk and suspension PVC end-use fabricated products. The extrusion process consists of forcing PVC resin through a die. In calendering, the resin is pressed between rolls or plates to form thin sheets. Various kinds of molding can also be employed, including injection molding for pipe fittings, compression molding for phonograph records, and blow molding for bottles (CX 427M; CX 642Z-23).

polymerized without the addition of other liquids (Disch 629; RX 125Y). Bulk polymerization consists of a two-stage process, which yields a resin comparable to suspension resin in appearance and characteristics. However, the final product is considered purer because of the absence of emulsifiers or suspension agents (CX 50V-W; CX 427K). Consequently, bulk polymerization is important for end-use applications where greater optical clarity is desired, such as in the case of packaging materials (Disch 631; see CX 427L).<sup>6</sup>

24. Within a general range of applications, PVC resins produced by either bulk or suspension polymerization are interchangeable. Either process can produce resins of varying molecular weight, density, particle size, and porosity. The major distinction, as noted, is purity (Disch 631-36; CX 12A).

25. Within the wide range of bulk and suspension resins, there are numerous types or grades. While there may be some disagreement as to how the various grades should be classified, industry members generally divide them into three broad categories: pipe and extrusion grade resins, general purpose grade resins, and film or specialty grade resins (Schaefer 1121; Becker 1262-63; McMath 1893).

26. The end use for a particular resin determines what molecular weight or density is required (H. Wheeler 1726-27; CX 427H). Low molecular weight resins are used to produce bottles, flooring, certain types of film, pipe, pipe fittings and other products formed by injection molding. Medium molecular weight resins are used to produce sheet, film and coated fabrics. [ ] (H. Wheeler 1726-27; McMath 1911-12, 1920; RX 266B-E *in camera*). [9]

## 2. PVC history

27. [ ] (CX 200M *in camera*). [ ] (DiLiddo 3106; CX 92G; CX 40Z-2 *in camera*).

28. The initial real growth and development of bulk and suspension PVC occurred in the 1950's and 1960's, as flexible (plasticized) PVC resin found end-use markets in wire and cable, calendered sheet, and specialty applications. [ ] (RX 639H *in camera*; see DiLiddo 3106-08).

29. [ ] (RX 639H *in camera*). [ ] (RX 639H,P *in camera*). As demand for bulk and suspension PVC resin shifted toward large volume, commodity grade end-use applications, PVC manufacturers began to install large reactors of from [ ] to [ ] gallon capacity to service this demand. [ ] (Disch 641, 648-653; CX 374G,Q *in camera*; CX 405R; CX 420F; CX 428Z-12).

<sup>6</sup> Mr. Disch of Tenneco referred in his testimony to a fourth PVC manufacturing process called solution, in which "[r]ather than water or some other medium, they use various solvents and solutions as the medium." He testified that this was "a very specialized area," accounting for less than 1 percent of U.S. capacity, with the world's only solution facility located in the U.S. (Disch 630-31).

### B. VCM

30. The manufacturer of PVC depends upon a single critical feedstock—VCM—described in the Complaint as a “gaseous, reactive, acrylic intermediate chemical” (Complaint, ¶ 1.d., Goodrich Adm. 39, CX 4G; CX 427H).

31. With minor exceptions, VCM’s only use is in the manufacture of PVC. [ ] (DiLiddo 3301; L. Wheeler 918-19; CX 46A; CX 200M *in camera*; CX 376L *in camera*; CX 404Z-15; CX 427W; CX 642Z-7).

32. VCM is produced by thermally cracking purified EDC at high temperatures (Wheeler 918-26; Keinholtz 756-58); the EDC having been produced in a VCM plant by two related processes: oxyhydrochlorination of ethylene and direct chlorination of ethylene. [ ] [10] (Goodrich Adm. 44-45; CX 4G; Diamond Shamrock Adm. 44-45; CX 6C; L. Wheeler 917, CX 18A; CX 355B *in camera*; CX 427I).<sup>7</sup>

## VI. PVC QUANTITATIVE ANALYSIS

### A. U.S. PVC producers

33. At the time of the acquisition in January 1982, there were seventeen producers of bulk and suspension PVC in the United States.<sup>8</sup> [ ] (CX 664U; CX 661Z-14 *in camera*).

34. [ ] (CX 662D *in camera*), [ ] (CX 662F *in camera*). [ ] (CX 661Z-16 *in camera*; [11] CX 664R *in camera*). [ ] (CX 664C,J,R *in camera*).

35. Diamond Shamrock ranked [ ] in industry nameplate capacity and [ ] in industry practical production capacity at the time of the acquisition. [ ] (CX 662D *in camera*; CX 662F *in camera*). The Deer Park, Texas Plant #5, the one acquired by Goodrich, represented [ ] percent of 1982 industry nameplate capacity and [ ] percent

<sup>7</sup> Initially, VCM was produced by the hydrochlorination of acetylene (CX 40Q *in camera*; CX 39T *in camera*; CX 200H *in camera*). Prior to 1960, virtually all VCM in the United States was made using acetylene as the primary feedstock (RX 57U *in camera*). However, acetylene supply became inadequate to support the growing demand for VCM following World War II. As a result, the VCM industry began shifting to ethylene-based technology during the 1950's, when development in the petrochemical industry provided a plentiful ethylene supply (CX 40R *in camera*; CX 39U *in camera*; CX 200I *in camera*; RX 57U *in camera*). In 1963, Goodrich developed the “oxyhydrochlorination” process, which, by utilizing the byproduct from the primary production stage, completely eliminated acetylene from the VCM process (CX 40R *in camera*; CX 39U *in camera*; CX 92G). Today, ethylene-based technology, with its subsequent refinements, continues to be the VCM production technology of choice world-wide (CX 40R *in camera*; CX 39U *in camera*). All VCM plants that have been built since the late 1960's have employed the ethylene technology (see, e.g., RX 57W-X *in camera*; Goodrich Adm. 43, CX 4G; Diamond Shamrock Adm. 43, CX 6C).

<sup>8</sup> These seventeen producers were: The B.F. Goodrich Company, Tenneco Polymers, Inc., Georgia-Pacific Corporation, Shintech Incorporated, Occidental Chemical Corporation, Diamond Shamrock Chemicals Co., Conoco, Inc., Borden, Inc., Air Products & Chemicals, Inc., CertainTeed Corporation, Formosa Plastics Corporation, Stauffer Chemical Company, The General Tire & Rubber Co., Ethyl Corporation, Great American Chemical Corp., Keysor-Century Corporation, and Pantasote, Inc.

of industry practical production capacity.<sup>9</sup> [ ] (CX 661Z-16 in camera; CX 664B in camera).

36. Tenneco Polymers, Inc. ranked [ ] among bulk and suspension PVC producers in both industry nameplate and practical production capacities at the time of the acquisition. [ ] (CX 662D,F in camera). [ ] (CX 661Z-28 in camera; CX 6640,U in camera).

37. [ ] (CX 662D,F in camera). [ ] (CX 661Z-28 in camera; CX 664Q in camera).

38. Shintech Incorporated ranked [ ] in practical production capacity and [ ] in nameplate capacity immediately prior to the acquisition. [ ] (CX 662D,F in camera). [ ] (CX 661Z-28 in camera; CX 664T in camera). [12]

39. In January 1982, Conoco, Inc., ranked [ ] in industry nameplate capacity and [ ] in industry practical production capacity. [ ] (CX 662D,F in camera). [ ] (CX 661Z-28 in camera; CX 664P in camera).

40. [ ] (CX 662D in camera). [ ] (CX 313A-Q in camera; CX 662F in camera). [ ] (CX 664S in camera).

41. (CX 662D,F in camera). In 1981, Borden also ranked [ ] in bulk and suspension PVC production, with a market share of [ ] percent (CX 661Z-28 in camera; CX 664P in camera).

42. Air Products and Chemicals, Inc., ranked [ ] in the production of bulk and suspension PVC by all measurements in January 1982. [ ] (CX 662D,F in camera). [ ] (CX 661Z-28 in camera; CX 664"O" in camera).

43. CertainTeed Corporation was the [ ] ranking PVC producer in all categories of measurement prior to the acquisition. [ ] (CX 662D,F in camera). [ ] (CX 661Z-28 in camera; CX 664 in camera).

44. Formosa Plastics Corporation ranked [ ] in PVC production capacity in January 1982. At the time of the acquisition Formosa accounted, respectively, for [ ] percent and [ ] percent of PVC nameplate and practical production capacities (CX 662D,F in camera). In 1981, Formosa ranked [ ] in the production of PVC with a market share of [ ] percent (CX 661Z-28 in camera; CX 664Q in camera). [ ] (CX 662D,F in camera). [13]

45. Prior to the shutdown of its Long Beach, California suspension PVC plant in March 1982, Stauffer Chemical Company ranked [ ] in 1982 nameplate and practical production capacity, with a market share by these respective measurements of [ ] and [ ] percent (see CX 318A-Q in camera; CX 662D-F in camera). Stauffer ranked [ ] in

<sup>9</sup> Viewed as a stand alone entity, Diamond's PVC Plant # 5 would have ranked as the [ ] largest firm in the bulk and suspension PVC industry in both nameplate and practical production capacity. And Diamond's remaining Deer Park PVC operations would have ranked [ ] in nameplate capacity with a market share of [ ] percent and [ ] in practical production capacity with a market share of [ ] percent (CX 662D,F in camera).

1981 bulk and suspension PVC production, holding a market share of [ ] percent (CX 661Z-28 *in camera*; CX 664T *in camera*).

46. At the time of the acquisition, General Tire & Rubber Company (renamed "GenCorp") ranked [ ] in nameplate capacity with a market share of [ ] percent, and [ ] in practical production capacity with a market share of [ ] percent (CX 662D,F *in camera*). The 1981 figures place GenCorp [ ] in PVC production, with a market share of [ ] percent (CX 661Z-28 *in camera*; CX 664I *in camera*).

47. Ethyl Corporation ("Ethyl") was the [ ] ranking PVC producer measured by industry nameplate capacity with a market share of [ ] percent prior to the acquisition (CX 662D *in camera*). Ethyl and Stauffer both ranked [ ] in PVC practical production capacity for the same period, each accounting for [ ] percent of the market (CX 662F *in camera*). In 1981, Ethyl ranked [ ] in actual PVC production, with a market share of [ ] percent (CX 661Z-28 *in camera*).

48. At the time of the acquisition, Pantasote accounted for less than [ ] percent of PVC industry capacity (CX 662D,F *in camera*). During the year prior to the acquisition Pantasote ranked [ ] in bulk and suspension PVC production with a market share of [ ] percent (CX 661Z-28 *in camera*; CX 664S *in camera*).

As for Talleyrand, Great American Chemical Corporation and Keysor-Century Corporation, each accounted for less than [ ] percent of the bulk and suspension PVC market in 1981 (CX 661Z-28 *in camera*). In September 1981, Talleyrand ceased production and exited the market (CX 319B). Great American and Keysor-Century individually accounted for less than [ ] percent of 1982 bulk and suspension industry capacity (CX 662D,F *in camera*).

#### *B. Concentration in the bulk and suspension PVC market*

##### *1. The effect of the acquisition on concentration*

49. Goodrich's acquisition of Diamond Shamrock's Deer Park, Texas, suspension PVC Plant # 5 resulted in an increase in concentration in the bulk and suspension PVC market. Measured by the Herfindahl-Hirschman Index ("HHI"), nameplate capacity increased by 113 points to a level of 1,098, while the practical production HHI rose 112 points to a level of 1,079 (CPF 5.27-.28). [14]

50. By virtue of the acquisition, four-firm concentration in PVC nameplate capacity rose 4.0 percent to a level of 54.2 percent, rounded to the nearest decimal (CPF 5.27). Four-firm concentration in PVC practical production capacity also increased, rising 4.3 percent to a level of 53.5 percent (CPF 5.28).

51. As for eight-firm concentration figures, in nameplate capacity the acquisition increased concentration by 0.8 percent, to a level of

82.4 percent (CPF 5.27), while there was no change in the practical production capacity figure of 81.5 percent (CPF 5.28).

52. Goodrich's leading position in the PVC market was enhanced by virtue of the acquisition. Its share of PVC nameplate capacity increased from [ ] percent to [ ] percent, and its share of practical production capacity rose from [ ] percent to [ ] percent (CPF 5.27-.28).

53. Because actual production figures attributable to Plant # 5—apart from Diamond's overall output—could not be identified in the record, changes in concentration calculated on that basis were not included in the proposed findings. However, a comparison of 1981 and 1982 market shares in actual PVC production shows that Goodrich's market share increased from [ ] percent to [ ] percent, while Diamond Shamrock's share of industry production fell from [ ] percent to [ ] percent (CX 661Z-16 *in camera*; CX 664P,R *in camera*). Four-firm concentration also increased between 1981 and 1982, rising from [ ] percent to [ ] percent (CX 661Z-16 *in camera*).<sup>10</sup> And the Herfindahl Index rose 221 points to 1131 (CX 661Z-16 *in camera*).

## 2. Concentration trends

54. The record shows an overall increase in concentration in the bulk and suspension PVC market over the past several years. From 1977 to 1985, nameplate capacity HHI increased from 720 in 1977, to 1203 in 1985 (see table at CPF 5.69). In this period, eight-firm concentration also increased from [ ] percent in 1977 to [ ] percent in 1985. Four-firm concentration increased from [ ] percent in 1977 to [ ] percent in 1985, while the two-firm figures are [ ] percent and [ ] percent. Practical production capacity and actual production data reflect similar increases in concentration over the same time period (see CX 664M,N *in camera*). [15]

55. It appears that from 1970 to 1975, entries offset exits in the PVC business. Between 1974 and 1975, Georgia Pacific, Formosa, Certain-Teed and Shintech (a joint venture between Shin-Ebi of Japan and Robintech) began production of bulk and suspension PVC (CPF 5.69; CX 344B). [ ] (CX 321B *in camera*; CX 357A *in camera*; CX 359F; CPF 5.69). In addition, several PVC producers sold their manufacturing facilities to newcomers and exited the industry during this period (CX 442B-C). In 1970, Airco, Inc. sold its Chemical and Plastics Division to Air Products & Chemicals, Inc. (CX 323A). And in 1973, Allied Chemicals Corporation sold its polyvinyl chloride manufacturing facility to Robintech Incorporated (CX 325A). By 1975, there were

<sup>10</sup> Two-firm concentration increased from [ ] percent in 1981 to [ ] percent in 1982; eight-firm figures are [ ] percent in 1981 and [ ] percent in 1982 (CX 661Z-16 *in camera*).

