PVC plants are durable and highly specialized (Goodrich, slip op. at 36, n.85; Klass 4397, 4621-24; Disch Dkt. 9159, 686; *See* Disch 652).

270. PVC plants are specialized in that one cannot normally make materials other than PVC in a PVC plant (Goodrich, slip op. at 36, n.85; Goodrich F 63; Disch 686). It is very difficult to convert a PVC plant to another use, and it may be easier to start fresh and build a new plant (Goodrich F 63; H. Wheeler 1724-25, 1744-45). Sunk costs represent 75-80% of the total value of a PVC plant (Goodrich F 63; H. Wheeler 1744-45; Schaefer Dkt. 9159, 1219). Total costs for an efficient sized plant could exceed as much as $100 million (Goodrich F 63; Schaefer Dkt. 9159, 1211-12; Dkt. 9159 CX 6S).

271. The significance of the specialized nature of PVC plant assets upon the conditions of entry is not merely a theoretical one. The industry recognizes that investment in a new plant entails considerable risk (Goodrich F 63; DiLiddo Dkt. 9159, 3134-3137). Should it become necessary to close the plant, virtually the entire investment could be lost (Goodrich F 63; Liao Dkt. 9159, 1519-22; *cf.* DiLiddo Dkt. 9159, 3396).

272. Theoretically, it is possible that the magnitude of sunk costs required for construction of either a dispersion PVC plant or a suspension PVC copolymer plant could be reduced by conversion of such plant to suspension PVC production, if entry into the intended market proved unsuccessful. However, conversion of a dispersion PVC plant to suspension PVC production would not likely be practical (Boyer CX 185C-D ¶ 5-6). It would require changes in the reactor, changes in raw material tanks and changes in the VCM stripping and recovery system (Boyer CX 185C ¶ 5; *See also* Flammer CX 184C ¶ 5, describing, for the same reasons, the conversion of a suspension plant to a dispersion plant as "economically impractical"). Mr. Boyer also noted that the use of spray-dryers in the resin drying system is specialized to the production of dispersion PVC (Boyer CX 185C ¶ 5). A spray dryer with an annual capacity of 50 million pounds would have a capital cost of approximately $15-20 million (JX 3, PX 8 at 74 ln. 19 - 75 ln. 4). [##] (Hill CX 183C ¶ 5 *In Camera*; Hornack CX 182B-C ¶ 6 *In Camera*; Flammer CX 184C ¶ 5; JX 3, PX 15 at 83; JX 3, PX 20 at 30). [##] (Hornack CX 182B-C ¶ 6 *In Camera*; Hill CX 183C ¶ 5

In Camera). These investments would be wasted in the event the plant is converted to homopolymer production. In addition, investment in a grassroots dispersion or suspension PVC copolymer plant requires, at a minimum, the same magnitude of sunk investment per pound of capacity that is required of a suspension PVC plant.

E. Vertical Integration in the PVC Industry Increases the Difficulty of Entry into the Relevant Markets

273. If complete ownership integration as to VCM and PVC occurs, a new entrant may be required to enter the PVC and VCM industries simultaneously (Kaserman Dkt. 9159, 2338-39). Such a trend could make entry into the relevant PVC markets that much more difficult (Kaserman Dkt. 9159, 2340-41).

274. Vertical integration between two stages of production may make entry into one stage more difficult if (1) the vertical integration makes it necessary to enter both stages rather than just one, and (2) if two-stage entry is more difficult then entry at only one level (Kaserman Dkt. 9159, 2337-40). Two-stage entry might be more difficult because entry at the second stage might be more difficult than at the first (Kaserman Dkt. 9159, 2337-40). For example, where the size of the minimum efficient size plant is larger at the second stage than at the first, the new entrant will have to enter both stages at the larger size (Kaserman Dkt. 9159, 2337-40).

275. In mass and suspension PVC the requirement of simultaneous entry into VCM would make entry more difficult since the size of a minimum efficient sized VCM plant is 800 million to one billion pounds per year, as compared to the 300 to 600 million pounds per year needed for mass or suspension PVC (*See* Goodrich, slip op. at 40). Simultaneous two-stage entry would require entering at both levels at the larger size. This disparity would be even greater for entry into suspension PVC copolymer or dispersion PVC.

276. [##] (Goodrich F 76; Dkt. 9159 CX 667 *In Camera*). [##] (Dkt. 9159 CX 17Z14 *In Camera*; Dkt. 9159 CX 16R *In Camera*; Dkt. 9159 CX 67N *In Camera*; *See* CX 310C *In Camera*; CX 11L *In Camera*; Dkt. 9159 CX 50B; Dkt. 9159 524X *In Camera*; Dkt. 9159 RX 1061L-O). The increase in vertical integration has caused concern that a prospective PVC entrant might also need to enter

VCM in order to secure a VCM supply (Disch Dkt. 9159, 727; *See* Goodrich, slip op. at 78, n.174).

277. [##] (Goodrich F 76; Dkt. 9159 CX 667I-J *In Camera*). However, the degree of vertical integration has increased since the time of the Goodrich proceeding. Occidental's successive acquisition of Tenneco's PVC operations and Shell's VCM manufacturing facilities, has eliminated both Tenneco and Occidental from the ranks of non-integrated PVC producers, and has eliminated Shell as a source of VCM for prospective entrants into PVC manufacture. The increasing degree of vertical integration does act as an additional deterrent to new entry, although to the extent that it is not complete, the deterring effect is reduced (Goodrich ID at 92; Kaserman Dkt. 9159, 2340-41). If the degree of vertical integration were to proceed to completion it would make entry that much more difficult (Kaserman Dkt. 9159, 2340-41).

F. Entry into the Relevant Markets Takes a Long Period of Time

278. The lead time required for a new entrant to enter the industry and begin production is significant (Kaserman JX 1, 324 ln. 25 - 325 ln. 14; *See* Klass Dkt. 9159, 5289-91). First, this provides incumbent firms with a period of time to profit from anticompetitive behavior without the risk of entry response (Goodrich at 30; Kaserman JX l, 324 ln. 25 - 325 ln. 8; Kaserman Dkt. 9159, 2326-27). Second, this provides incumbent firms the opportunity to engage in strategic response, measures, increasing the risk of new entry (Goodrich, slip op at 30 & n.70; Kaserman JX l, 324 ln. 25 - 325 ln. 14; Kaserman Dkt. 9159, 2326-27). [##] (Kaserman Dkt. 9159, 2326-27; Dkt. 9159 CX 14D *In Camera*; DiLiddo Dkt. 9159, 3187-88, 3396; Dkt. 9159 CX 114 *In Camera*).

279. [##] (Goodrich, slip op. at 31; Goodrich F 64; Goodrich ID at 92; JX 3, PX 8 at 76 ln. 13 - 80 ln. 8; JX 3, PX 92; Dkt. 9159 CX 15A *In Camera*; Dkt. 9159 CX 16B-Z 10; Dkt. 9159 CX 182I *In Camera*; Dkt. 9159 CX 196A *In Camera*; Dkt. 9159 CX 439B; Dkt. 9159 CX 446C; *See* DSCC Admission 445, Dkt. 9159 CX 6S *In Camera*). This long lead time increases the likelihood and potential duration for anticompetitive behavior in each of the relevant markets (Kaserman JX l, 325 ln. 15-17; Kaserman Dkt. 9159, 2328).

280. Actual physical construction of a PVC plant is likely to take as long as two years (Goodrich, slip op. at 32; Goodrich F 65; JX 3, PX 11 653 ln. 4-20; JX 3, PX 8 79 ln. 25 - 80 ln.2; JX 3, PX 18 at 47; JX 3, PX 20 at 30; Schaefer Dkt. 9159, 1134; McMath Dkt. 9159, 1938-40, Disch Dkt. 9159, 653; *See also* Dkt. 9159 CX 446C).

281. In the present governmental climate, it is necessary to obtain environmental permits prior to beginning plant construction[19]

---

[19] Air emissions from VCM and PVC resin plants are subject to the restrictions of the Clean Air Act, as amended, 42 U.S.C. 7401-7642. PVC plants are subject to specific air-quality standards restricting vinyl chloride emissions from manufacturing facilities in accordance with the National Emissions Standard for Vinyl Chloride, 40 CFR 61.60-.68, promulgated pursuant to the National Emission Standard for Hazardous Air Pollutants (NESHAP), 42 U.S.C. 7412. In addition, the Prevention of Significant Deterioration (PSD) regulations include vinyl chloride as a pollutant covered under the regulations, with a one ton per year emission rate as the triggering amount. 40 CFR 51.24(b)(23), 52.21(b)(23). New PVC plants, as well as major expansions of existing PVC manufacturing facilities, may otherwise be subject to federal PSD requirements as major potential sources of any of the other air pollutants subject to regulation under the Clean Air Act, including the need to obtain preconstruction permits. 42 U.S.C. 7470-7479; 40 CFR 51.24, 52.21. Federal PSD air emission requirements apply only to sources locating in areas presently meeting the National Ambient Air Quality Standards (NAAQS). 42 U.S.C. 7407(d), 7475. For new or existing sources locating or located in "nonattainment areas," a more stringent set of regulations applies. 42 U.S.C. 7501-7508; 40 CFR 52.24. *See also* 40 CFR Part 51, Appendix S ("Emission Offset Interpretative Ruling").

Effluent discharges from PVC plants are subject to the restrictions of the Clean Water Act, as amended by the Federal Water Pollution Control Act, 33 U.S.C. 1251-1376. Vinyl chloride has been specifically designated by the EPA as a toxic pollutant under the Act (33 U.S.C. 1317; 40 CFR 401.15), and PVC manufacturing facilities have been identified as a category of pollutant discharge point sources (33 U.S.C. 1316(B)((1)(A)). *See* 40 CFR 401.12, 416.10-.15. New and existing PVC manufacturing facilities are therefore subject to the permit requirements of the National Pollutant Discharge Elimination System (NPDES) program as potential sources of the discharge of pollutants (33 U.S.C. 1342). A PVC plant may also be subject to local regulatory authority preconstruction permits, particularly land-use requirements.

Because these pre-permit monitoring requirements are relatively new, few if any firms had to comply regarding new plants constructed in the past. It is, therefore, a factor that is likely to make the lead time for future plants longer than in the past. Furthermore, a longer lead time means a higher cost both for monitoring and in accumulated interest charges on expenses attendant to pre-permit applications.

(Goodrich, slip op. at 32-33; Goodrich F 66; Schaefer Dkt. 9159, 1133; Dkt. 9159 CX 597; Dkt. 9159 CX 642; Dkt. 9159 CX 643; DS Admission 443, Dkt. 9159 CX 6S; Dkt. 9159 CX 4Z23). Securing the necessary permits is a costly and time consuming process (Goodrich, slip op. at 33; Goodrich F 66; JX 3, PX 6 98 ln. 20 - 99 ln. 3; DS Admission 415, Dkt. 9159 CX 6Q). [##] (Goodrich, slip op. at 31; Goodrich F 66; JX 3, PX 92; Schaefer Dkt. 9159, 1133, Dkt. 9159 CX 38V *In Camera*; Dkt. 9159 CX 506B *In Camera*; Dkt. 9159 CX 592 *In Camera*). The time required for securing regulatory permits should be increasing as enforcement of Federal emission standards tightens (CX 162A-B). [##] (Dkt. 9159 CX 196A *In Camera*. *See also* Goodrich, slip op. at 32- 34; Dkt. 9159 CX 67Z7 *In Camera*; Dkt. 9159 CX 183D *In Camera*).

282. Substantial engineering work must be done prior to applying for necessary regulatory permits because detailed data must be presented in the permit application (Goodrich, slip op. at 31-32 & n.74; Goodrich F 67; DiLiddo Dkt. 9159, 3337). [##] (Goodrich F 67; DiLiddo Dkt. 9159, 3337; Dkt. 9159 CX 183D *In Camera*). The engineering work necessary before filing for permits is likely to take six months (Goodrich, slip op. at 31-32; Goodrich F 67; DiLiddo Dkt. 9159, 3337). In 1980, EPA amended its Prevention of Significant Deterioration Regulations to require that air quality near the site may have to be monitored for a period of time prior to applying for the permits (Goodrich slip op. at 33; Goodrich F 67; 40 CFR 51.24(m), 40 CFR 52.21(m)). This change may add additional time to the process of obtaining permits. DSCC, now part of Occidental, observed that:

On August 7, 1980 EPA amended its Prevention of Significant Deterioration (PSD) Regulations. These Regulations outline the requirements for obtaining a federal air pollution construction permit for grass root plants and plant expansion in attainment areas - areas presently meeting the National Ambient Air Quality Standards.

The major impact of these regulations is the requirements for continuous air monitoring data to be presented prior to the processing of a permit application. This could add up to one year to the time it takes to get a construction permit. This means it will take from one to two years to get a PSD Permit before construction can begin.

(Goodrich, slip op. at 33; Dkt. 9159 CX 446D). A consultant working for Tenneco noted the significance of the new regulations:

> [A]n action plan is proposed to ensure that unnecessary delays are not encountered in the permitting stages of the project development. It is important to option the site as soon as possible since prime industrial tracts that satisfy this project's requirements are becoming scarce in the river region.
>
> It is critical that the Prevention of Significant Deterioration (PSD) permit be submitted by early December before the proposed revisions to the PSD regulations are scheduled to be instituted. Under the revised regulations, one year ambient air quality monitoring will likely be required before the preconstruction permit can be submitted.

(Goodrich, slip op. at 33; Dkt. 9159 CX 574J; *See also* Kienholz Dkt. 9159, 803-04).[20]

283. Since the site for the plant must be known at the time of the permit application, the site must be selected prior to filing. Selection of a site is a "complicated" process (Goodrich F 68; *See* DiLiddo Dkt. 9159, 3335-36). [##] (Goodrich F 68; Dkt. 9159 CX 574I & M-U *In Camera*; *See also* Dkt. 9159 CX 193B *In Camera*; Dkt. 9159 CX 643; Dkt. 9159 CX 594A-B; Dkt. 9159 RX 1061 D-E; Dkt. 9159 RX 1304; Dkt. 9159 RX 1308).

284. A new entrant may also need to take time to evaluate and license PVC manufacturing technology. Such work is likely to take approximately one year (Goodrich, slip op. at 32; Disch Dkt. 9159, 645-47; Schaefer Dkt. 9159, 1133).

285. Since entry into any of the relevant markets is a major strategic decision involving substantial amounts of sunk capital, a new entrant is likely to make an extensive study of the market prior to any entry decision (*See* Goodrich F 71; Dkt. 9159 CX 594A-B; Dkt. 9159 CX 53A).

---

[20] Because these pre-permit monitoring requirements are relatively new, few if any firms had to comply with it for new plants constructed in the past. It is, therefore, a factor that is likely to make the lead time for future plants longer than in the past. Furthermore, a longer lead time means a higher cost both in monitoring costs and in accumulated interest charges on expenses attendant to pre-permit applications.

286. Given the time required for construction and permitting, and the extensive efforts needed to obtain technology, find a site, conduct the necessary strategic studies, and complete the pre-permit engineering and air quality monitoring, a lead time of four years (two years for construction, one year to obtain permits, and one year for pre-permit engineering, air quality monitoring, site selection, licensing of technology, and strategic analysis) is a fairly conservative estimate of the amount of time required for *de novo* entry (Goodrich, slip op. at 30-31; Goodrich ID at 92).

287. Actual entry experience buttresses the conclusion that the likely lead time to enter any of the relevant markets is about four to five years (Goodrich, slip op. at 34-35). Formosa Plastics began looking for a site for its PVC/VCM complex in the latter half of 1978 (Liao Dkt. 9159, 1523-24), and began full production in the first quarter of 1983 (Goodrich F 70; Liao 1534-35). This time period -- approximately four and one-half years -- does not include any strategic analysis done prior to Formosa's search for a site. Furthermore, Formosa had some advantages over other possible entrants in that it already had its own PVC production technology (Liao Dkt. 9159, 1539), and had prior experience in the United States market through its participation in the Rico Chemicals project (Liao Dkt. 9159, 1519-22; Goodrich F 15).

288. [##] (Goodrich, slip op. at 35; Goodrich F 71; DiLiddo Dkt. 9159, 3337; Dkt. 9159 CX 36S *In Camera*). Prior to its July 1979 announcement, Goodrich had completed an extensive PVC/VCM strategy study over an eight-month time period (Goodrich, slip op. at 35; Goodrich F 71; DiLiddo Dkt. 9159, 3334-35; Dkt. 9159 CX 53A). During these eight months Goodrich had also completed a complicated site relation process and chosen the Convent, Louisiana site (Goodrich, slip op. at 35; Dkt. 9159 DiLiddo 3335-36; *See Weyerhaeuser Co.*, 106 FTC at 287-88 & n. 69). The lead time for the Convent project was likely to be shorter than that for other potential entrants, since Goodrich was utilizing its own technology (DiLiddo Dkt. 9159, 3336), obviating the need for obtaining needed licenses from other companies.

289. In 1981, Diamond Shamrock projected the lead time for a new Diamond Shamrock suspension PVC homopolymer plant at Deer Park, Texas, using existing Diamond Shamrock technology, to be

four to five years (Goodrich, slip op. at 35; Goodrich F 2; Dkt. 9159 CX 439B).

290. [##] (Dkt. 9159 CX 185Z2 *In Camera*; *See also* Dkt. 9159 CX 182I *In Camera*).

291. [##] (Goodrich, slip op. at 36 n. 85; *Cf.* DiLiddo Dkt. 9159, 3162-64; Dkt. 9159 CX 51Y-Z *In Camera*).

292. That long lead times increase the risk that industry conditions will change between the time the decision is made to enter and the completion of a new plant is supported by actual experience in the mass and suspension PVC market. In the late 1970's several firms decided to build new plants, including Goodrich, Borden and Formosa Plastics (*See* DiLiddo Dkt. 9159, 3131; Liao Dkt. 9159 1523-24). [##] (DiLiddo 3187-88, 3396; *Cf.* Dkt. 9159 CX 114 *In Camera*). [##] (Dkt. 9159 CX 302F *In Camera*; Liao 1534-35). [##] (Dkt. 9159 CX 14F *In Camera* [##]).

G. New Entry into the Relevant Markets Is Unlikely Despite High Prices and Profits Realized by Incumbent Firms

293. Some PVC producers have recently announced expansions to their existing plant capacities, with the greatest expansions on the part of Occidental, Shintech and Formosa, three of the larger mass and suspension PVC homopolymer producers (*See, e.g.,* CX 165A). These expansions would substantially increase the risk of new entry into the mass and suspension PVC market. A potential new entrant would necessarily evaluate the risks and benefits of entry in terms of the likelihood that demand would be strong enough to support current capacity, announced expansions, and the additional capacity that would be added by a new entrant. The announced capacity expansions therefore increase the risk that, with a change in business conditions, entry into the production of PVC would be unprofitable. This factor thus makes new entry into the production of PVC the more unlikely, especially in view of the experience of the PVC industry during the early 1980's.

294. Excess existing capacity in an industry makes new entry less likely by affording incumbent firms the opportunity to deter entry through strategic behavior (Kaserman Dkt. 9159, 2328-29).

295. [##] (Goodrich ID at 92; Dkt. 9159 CX 666H *In Camera*). The magnitude of excess capacity has declined significantly since that time as the industry has recovered from a substantial temporary decline in demand during the recent recession (*See* CX 165A; DiLiddo Dkt. 9159, 3116-18; Eades Dkt. 9159 1471-73). [##] (Donnelly CX 176B-C ¶ 3 *In Camera*; Kulkaski CX 195C ¶ 4 *In Camera*; CX 165A).

296. However, given the excess capacity that as recently as the early 1980's was a significant factor in the PVC industry, the ability of producers in these markets to deter entry through strategic behavior remains enhanced (*See* Kaserman Dkt. 9159, 2328-29). Potential new entrants would probably be unwilling to risk a large amount of the needed sunk capital costs, given the experience of producers who entered into PVC markets in the late 1970's and early 1980's, when growth projections for PVC were optimistic.

297. Announced incremental capacity expansions by Occidental, Shintech, and Formosa, three of the larger-firms in the industry, serve to deter both potential new entry into mass and suspension PVC homopolymer production, and possible larger expansion by smaller mass and suspension PVC producers who might otherwise have sought to attain increased market share.

298. [##] (Goodrich, slip op. at 36 n. 85 (DiLiddo Dkt. 9159, 3151-53; Dkt. 9159 CX 51Z2, Z16 *In Camera*; Dkt. 9159 CX 47B; Dkt. 9159 CX 226I-M)). [##] (DiLiddo Dkt. 9159, 3151-53; Dkt. 9159 CX 51Z2, Z16 *In Camera*; Dkt. 9159 CX 226I-M; Dkt. 9159 CX 47B). Similarly, Occidental's strategy in its planned expansion of its Pasadena plant is to "maintain its position as the recognized market leader" (RX 1L).

299. Industry members recognize that entry into the relevant markets is difficult (Goodrich, slip op. at 36). In developing its preemptive strategy, Goodrich concluded that "[r]elatively high barriers to entry should prevent a large number of expansions or new entries" (Goodrich, slip op. at 36; Dkt. 9159 CX 199Z76; *See also* Dkt. 9159 CX 199Z82). [##] (Dkt. 9159 CX 248E *In Camera*).

300. [##] (Goodrich, slip op. at 36; Goodrich ID at 92; Kaserman Dkt. 9159, 2341-44; Dkt. 9159 CX 664G-W *In Camera*).[21]

301. Three important factors made entry and expansion easier in mass and suspension PVC during the 1970's than exist at present. First, during the 1970's the industry substantially converted from small to large reactor technology (Disch Dkt. 9159, 637-42). New firms entering with modern large reactor plants had a cost advantage over those incumbent firms with old small reactor facilities (Kaserman Dkt. 9159, 2344). Second, extensive EPA and OSHA regulation of the PVC industry was instituted during the 1970's (Goodrich, slip op. 32 n.76; Disch Dkt. 9159, 698-53). One effect of these regulations was to force some plants to shutdown, and to temporarily reduce the effective capacity of many other plants (Disch Dkt. 9159, 652-53; Dkt. 9159 CX 447J; Dkt. 9159 CX 505T; DS Admission 439, Dkt. 9159 CX 6R; Goodrich Admission 396, Dkt. 9159 CX 4Z23). This reduction of capacity created opportunities for new entry and construction of new plants by incumbent firms (Kaserman Dkt. 9159, 2344-45; Klass Dkt. 9159, 5355). Finally, demand for PVC grew rapidly during the 1970's, and this rapid growth created opportunities for entry and for construction of new plants by incumbent firms (Kaserman Dkt. 9159, 2344-45).

302. The conditions that facilitated entry in the 1970's have changed drastically during the 1980's, making entry more difficult. The large reactor technology has become widely diffused through the industry (Goodrich F 198; Klass Dkt. 9159, 5488-89; *See* generally Disch Dkt. 9159, 637-428). Furthermore, the rate of technological change in PVC has become slow, as PVC manufacturing technology has approached its limitations (Goodrich F 197, 232; Dkt. 9159 CX 642Z50-51). Thus, a firm presently seeking to enter any of the relevant markets through new-plant construction would not have a technological or cost advantage over incumbent firms. Moreover, PVC firms have adjusted to the imposition of environmental and safety regulations, and current and planned capacity is sufficiently geared to meet demand (Goodrich F 232; Disch Dkt. 9159, 649-51;

[21] [##] (Goodrich F. 70 & n. 15, F. 56; CX 318A,D *In Camera*; Liao Dkt. 9159, 1519-22; Dkt. 9159 CX 308D-E; Dkt. 9159 CX 333A; Dkt. 9159 CX 354B).

Dkt. 9159 CX 642Z6, Z49-Z137). Finally, demand growth is slow compared to the 1970's, making entry more difficult (Goodrich F 232, 235-36; CPF 272-278). These changed conditions thus help to explain the lack of *de novo* entry since the mid-1970's (Kaserman Dkt. 9159, 2345-47).

H. Barriers to New Entry into PVC Production

303. As the Commission stated in Goodrich, more stringent environmental regulations not only increase the lead time required for new entry into PVC production, but also "may be characterized as a barrier to entry into the PVC market" (Goodrich, slip op. at 35). The difficulty that a new entrant would have in obtaining permits "represent a new cost that incumbent firms did not have to bear" (*Id.*).

I. Entry into the Suspension PVC Copolymer Market Through Conversion of an Existing Suspension PVC Homopolymer Plant Is Unlikely

304. An existing producer of suspension PVC homopolymer would have little advantage relative to other firms in attempting to enter the suspension PVC copolymer market (Flammer CX 184D ¶ ¶ 6-7; Disch JX 3, PX 8 at 86 ln. 5-23). [##] (Hill CX 183C ¶ 5 *In Camera*; Flammer CX 184C ¶ 5; Fisher CX 208D ¶ 4; Disch JX 3, PX 8 at 68 ln. 14-22; Lull JX 1, 509 ln. 9-510 ln. 13).

305. The minimum efficient size of a suspension PVC copolymer plant converted from a suspension PVC homopolymer plant would be approximately 70-80 million pounds of capacity (Disch JX 3, PX 8 at 67 ln. 3-9).

306. In the suspension PVC copolymer market, a minimum efficient scale of 70 to 80 million pounds would be significant (Kaserman JX 1, 327 ln. 25-328 ln. 8). [##] (Goodrich, slip op. at 41; Kaserman JX 1, 328 ln. 9-18; *See* Boyer CX 185G ¶ 16; Hill CX 183B ¶ 3 *In Camera*; Hornack CX 182C ¶ 7 *In Camera*).

307. [##] (Hornack CX 182C ¶ 7 *In Camera*; Hill CX 183F ¶ 16 *In Camera*; Boyer CX 185G ¶ 16; Flammer CX 184D ¶ 7; JX 3, PX 6 at 82 ln. 11-23; JX 3, PX 8 at 18 ln. 7-15; JX 3, PX 98 at 40885). This projected decline makes it unlikely that a suspension PVC homopolymer producer would enter the suspension PVC copolymer

market (Kaserman 329 ln. 13-17; Boyer CX 185G ¶ 16; Flammer CX 184D ¶ 7; JX 3, PX 8 at 89 ln. 16-90 ln. 2; Schaefer JX l, 585 ln. 21-586 ln. 14; JX 3, PX 136 at 91 ln. 24-92 ln. 20).

308. Air Products exited the suspension PVC copolymer market because the size of the market was insufficient, in light of the existing capacity and projected decline in demand, to allow Air Products "to produce and sell a sufficient volume of suspension copolymer resin to cover its production costs at the Calvert City plant" (Fisher CX 208B ¶ 2).

309. [##] (Hornack CX 182A ¶ 2 *In Camera*), [##] (Hornack CX 182A-B ¶ 4 *In Camera*). [##] (Hornack CX 182D ¶ 8 *In Camera*). [##] (Fisher CX 208C ¶ 3; *See* Boyer CX 185G ¶ 7; Hill CX 183B ¶ 4 *In Camera*; Flammer CX 184D ¶ 6). [##] (CX 114 *In Camera*). [##] (Disch CX 219E *In Camera*). Tenneco does not shift capacity between suspension PVC homopolymer and suspension PVC copolymer in response to changes in the relative prices of the two resins (Disch JX 3, PX 8 at 32 ln. 7-11). The production of these resins are "two distinct situations" (*Id.*).

310. [##] (Disch CX 219D *In Camera*). [##] (Hornack CX 182D ¶ 8 *In Camera*; Fisher CX 208C ¶ 3). [##] (Fisher CX 208C ¶ 3; Hornack CX 182D-E ¶ 9 *In Camera*). Mr. Boyer agreed that contamination problems would reduce the value of the plant output relative to what would be experienced in a plant that had dedicated capacity (Boyer CX 185G ¶ 15).

311. [##] (CX 126C *In Camera*). [##] (CX 72 *In Camera*; CX 61B *In Camera*). [##] (CX 61B *In Camera*). [##] (CX 125 *In Camera*). [##] (CX 126E *In Camera*). Armstrong, perhaps the largest purchaser of suspension PVC copolymer, would not purchase copolymer resin from a supplier that produced resin on an "intermittent basis" throughout the year, because it is "interested in long-term stable consistent sources of supply" (Beveridge JX l, 85 ln. 1-7).

312. [##] (Hornack CX 182D ¶ 8 *In Camera*). [##] (Hornack CX 182D ¶ 8 *In Camera*). [##] (Hornack CX 182D ¶ 8 *In Camera*). Mr. Fisher testified that even with thorough cleaning of the reactors, a process which would require shut down of the reactors for a number of days, it is was likely that contamination problems could never be completely avoided (Fisher CX 208C-D ¶ 3). Thus, he noted that frequent swinging of capacity would reduce overall reactor

productivity, resulting in increased production costs (Fisher CX 208D ¶ 3). He further testified that making infrequent switches between copolymer and homopolymer, in an attempt to reduce the cost of swinging, would not likely present a less costly alternative, noting the additional significant inventory carrying and dedicated storage costs (Fisher CX 208D ¶ 3).

313. Mr. Schaefer, an Occidental Vice-President, testified regarding the likelihood of entry through conversion of existing homopolymer facilities. Mr. Schaefer stated that Occidental would not consider reopening a shut-down PVC facility at Perryville, Maryland, to produce suspension copolymer resin, even if the price would increase three or four cents a pound and stayed at that level for a year (Schaefer JX 1, 585 ln. 21-586 ln. 1). This is the exact question the *DOJ Merger Guidelines* asks to assess the likelihood of entry. *DOJ Merger Guidelines, supra*, Section 3.3, 2 Trade Reg. Rep. (CCH) ¶ 4493 at 6879-15. In addition to the one-year period in which Occidental would not even consider entry, there must be added the additional time it would take to enter at Perryville, if Occidental should ever consider it. Mr. Schaefer testified that it would take 18 months to get the shut-down plant up and running, and would take two to four years to find a market for the output of the plant (Schaefer JX 1, 585 ln. 9-15). Under any set of circumstances, the time for entry -- if Occidental were to change its mind and consider entry -- would extend beyond the two-year period set forth in the *DOJ Merger Guidelines, supra,* Section 3.3.

314. [##] (Schaefer JX 1, 585 ln. 21-586 ln. 4; *See also* Flammer CX 184D ¶ 7 *In Camera*). This is consistent with the statement in the *DOJ Merger Guidelines*: "Entry is generally facilitated by the growth of the market and hindered by its stagnation or decline." *DOJ Merger Guidelines, supra,* Section 3.3 n.21, 2 Trade Reg. Rep. (CCH) ¶ 4493 at 6879-15.

315. Mr. Schaefer also testified that Occidental would not convert additional capacity to copolymer at Pottstown, Pennsylvania, where Occidental presently produces copolymer (Schaefer JX 1, 586 ln. 24-587 ln. 3). The reason advanced for not converting additional capacity at Pottstown was again because no additional market existed for the product (Schaefer JX 1, 587 ln. 2-6).

316. Mr. Schaefer also testified generally as to the likelihood of entry into copolymer. He concluded that there was no scale at which a company could profitably enter copolymer as long as the outlook for consumption continued to be one of negative growth (Schaefer JX 1, 587 ln. 7-11). Entry at any scale would have too much of a depressing effect on price (Schaefer JX 1, 587 ln. 12-14; *See also* Harris JX 1, 902 ln. 6-15; Flammer CX 184D ¶ 7; *See* Goodrich, slip op. at 41).

317. Mr. Schaefer's testimony is supported by the testimony of other PVC producers. Air Products is one producer identified by Occidental as having previously had suspension PVC copolymer capacity. Mr. Fisher testified that an increase of less than 30-50% in the price of suspension PVC copolymer, relative to the price of suspension PVC homopolymer, would not induce Air Products to consider entry into the copolymer market (Fisher CX 208C ¶ 3). Similarly, Mr. Boyer of Formosa testified that a 10-percent increase in the price of copolymer resin would not induce Formosa to enter the market (Boyer CX 185G ¶ 16). Formosa's Delaware City plant had previously been used by Stauffer Chemical in the production of copolymer resin (Boyer CX 185G ¶ 15). Mr. Boyer testified that entry by Formosa would, because of the small size of the market, and the declining demand for copolymer resin, create excess supply of resin and drive the market price of the resin down to an unprofitable level (Boyer CX 185G ¶ 16). [##] (Hornack CX 182C ¶ 7 *In Camera*). *See* generally Goodrich, slip op. at 41.

318. [##] (CX 210C *In Camera*). [##] (CX 210D *In Camera*),

319. Long-term, fixed-price contracts between potential entrants and prospective customers, or backward-integration by suspension PVC copolymer customers, would not solve the problem of lack of profitability of entry. Entry would expand the available supply of suspension PVC copolymer in the market, and would drive the post-entry price down to unprofitable levels, notwithstanding the profits currently realized by incumbent firms in the market. PVC customers who have signed a long-term, fixed-price contract to induce entry would be at a severe disadvantage compared with their competitors. For this reason, fixed-price contracts are not observed in the suspension PVC copolymer market (Kaserman JX 1, 340 ln. 5-342 ln. 16).

320. The construction time required for conversion of a suspension PVC homopolymer plant to suspension PVC copolymer production would be approximately 9-10 months, if the plant, or part of the plant being converted, were shut down during such construction *(See e.g.*, JX 3, PX 8 at 66 ln. 18-25 ; Lull JX l, 517 ln. 7-14; JX 3, PX 98 at 40891, 40909; Schaefer 585 ln. 1-12). [##] (Hill CX 183C-D ¶ 7 *In Camera*). [##] (Hill CX 183D ¶ 7 *In Camera*).

321. The time required for conversion of a suspension PVC homopolymer plant to suspension PVC copolymer production would also include the time required for ordering the necessary equipment. That time would involve at least three to four months (JX 3, PX 8 at 69 ln. 20-70 ln. 1).

322. The time for planning and making the decision with respect to the conversion of a suspension PVC homopolymer plant to suspension PVC copolymer could take as long as two years (JX 3, PX 8 at 76 ln. 20-77 ln. l, 78 ln. 9-12).

323. New environmental permits, which would add to the lead time required for entry, may also be required, due to the addition of the vinyl acetate in the suspension polymerization process (Goodrich, slip op. at 32-33 & n. 76; *See e.g.*, Lull JX l, 532 ln. 11-533 ln. 9; JX 3, PX 8 at 77 ln. 24-78 ln. 8; JX 3, PX 98 at 40891). [##] (Hill CX 183C ¶ 6 *In Camera*). [##] (CX 5D-E *In Camera*). [##] (Lull JX 1, 533 ln. 3-9; *See* Hill CX 183C ¶ 6 *In Camera*).

324. It would take a total of two to two and one-half years, including equipment-ordering lead time and environmental permitting, to convert a suspension PVC homopolymer plant to the production of suspension PVC copolymer resin (Flammer CX 184D-E ¶ 8; *See* JX 3, PX 25 at 9, 15, 24 (projects with capital expenditures greater than one million dollars required a minimum of three years, as many as four, from the date of the initial proposal to completion of the project); Schaefer JX l, 585 ln. 1-17). Essentially only the reactors, boilers, and other infrastructure could be used (Flammer CX 184E ¶ 8).

325. Further, after completion of the physical conversion of the plant, at least 3 to 6 months of trial production operations would be required before a marketable copolymer resin could be produced (Flammer CX 184E ¶ 8).