

IN THE MATTER OF
BRITISH OXYGEN COMPANY LIMITED, ET AL.
ORDER, OPINION, ETC., IN REGARD TO ALLEGED VIOLATION OF
THE FEDERAL TRADE COMMISSION ACT AND SEC. 7 OF THE
CLAYTON ACT

Docket 8955. Complaint, Feb. 26, 1974—Final Order, Dec. 8, 1975

Order requiring a London, England, manufacturer of industrial gases, among other things to divest itself of all the stocks and assets of Airco, Inc., a Montvale, N.J., producer of industrial gases and medical products, within one (1) year of the issuance of the order. Respondent is further prohibited from acquiring any corporate stocks or assets in any field related to production of industrial gases or medical products for a period of 10 years without prior F.T.C. approval. British Oxygen and Airco, Inc. must also cease any representation on each other's respective boards of directors.

COMPLAINT

The Federal Trade Commission, having reason to believe that British Oxygen Company Ltd. (hereinafter "BOC"), BOC Financial Corporation (hereinafter "BOC Financial"), BOC Holdings Ltd. (hereinafter "BOC Holdings"), and British Oxygen Investments Ltd. (hereinafter "BO Investments"), respondents herein, have violated the provisions of Section 7 of the Clayton Act, as amended (15 U.S.C. §18), and that the above named respondents and Airco, Inc. (hereinafter "Airco"), respondent herein, have further violated the provisions of Section 5 of the Federal Trade Commission Act (15 U.S.C. §45), through the

acquisition by BOC Financial of four million shares of stock of Airco, and that a proceeding in respect thereof would be in the public interest, issues the complaint, stating its charges as follows:

I

Definitions

1. For the purpose of this complaint, the following definitions shall apply:

(a) "Industrial gases" are gases in compressed, liquid and solid form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof.

(b) "Inhalation anesthetic equipment" is equipment and accessories used in the administration of gas for anesthetic purposes.

(c) "Inhalation therapy equipment" is equipment and accessories used in the administration of gas for therapeutic purposes.

(d) "Medical pipeline systems" are networks of equipment used to transport medical gas from hospital storage facilities to patient and operating rooms.

II

British Oxygen Company Limited

2. Respondent, BOC is a United Kingdom Company with principal executive offices at Hammersmith House, London W6, England.

3. BOC is engaged in the manufacture and sale of industrial gases, including rare gases and medical gases; welding equipment; special metals; air separation equipment; medical equipment, including inhalation anesthetic equipment, inhalation therapy equipment and medical pipeline equipment; aircraft breathing equipment; vacuum equipment and instrumentation; and food products. In 1972 BOC group sales totalled 252.6 million pounds sterling, or \$606 million at an exchange rate of \$2.40 to the pound.

4. Since 1968, BOC has actively attempted to enter the United States market and has contacted several smaller U.S. firms in the industrial gases, inhalation therapy equipment, inhalation anesthetic equipment, and medical pipeline system markets regarding possible acquisition by BOC. It is considered to be one of the very few companies with the expertise, capital, incentive, and interest to enter the U.S. markets described above.

5. In October 1973, BOC established Medishield, Inc., a Delaware corporation, to act as a holding company in consolidating BOC medical

product activities in the United States and Canada and in attempting to become a major factor in the United States markets.

6. BOC competes directly with Airco in the United States markets in inhalation anesthetic equipment and inhalation therapy equipment. It is the largest manufacturer and distributor of inhalation anesthetic equipment in the United Kingdom and is a significant competitor in this market in the European Economic Community.

7. BOC is a substantial competitor in the United States market in inhalation anesthetic equipment. It manufactures and distributes inhalation anesthetic equipment in the United States through its subsidiaries, Harris Lake and Fraser Sweatman.

8. BOC is the largest manufacturer and distributor of inhalation therapy equipment in the United Kingdom and is a significant competitor in this market in the European Economic Community. BOC markets inhalation therapy equipment in the United States through its subsidiary, Harris Lake.

9. BOC produces and distributes medical pipeline systems in the United Kingdom and is a significant competitor in this market in the European Economic Community.

10. In 1972, BOC was the second largest producer of industrial gas in the world. In each of the nineteen countries in which it produces industrial gas, BOC is a significant competitor, and in most of these countries BOC is the dominant competitor.

11. At all times relevant herein, BOC, through its subsidiaries, sold and shipped its products in interstate commerce and engaged in "commerce" within the meaning of the Clayton Act and the Federal Trade Commission Act.

III

BOC Financial Corporation

12. Respondent, BOC Financial is a corporation organized and existing under the laws of the State of Delaware, with a business address of 306 So. State St., Dover, Del. BOC Financial was organized solely for the purpose of acquiring shares of Airco, Inc. through a tender offer announced on Dec. 10, 1973. All BOC Financial's common stock is owned by BOC Holdings Limited.

IV

BOC Holdings Limited

13. Respondent, BOC Holdings is a United Kingdom Company with a business address of Hammersmith House, W6, England. BOC

Holdings is engaged in holding various securities of direct and indirect subsidiaries of BOC. All outstanding ordinary shares of BOC Holdings are held by BO Investments.

V

British Oxygen Investments Limited

14. Respondent, BO Investments is a United Kingdom Company with a business address of Hammersmith House, London W6, England. BO Investments is engaged in holding various securities of direct and indirect subsidiaries of BOC. BO Investments is a wholly-owned subsidiary of BOC.

VI

BOC

15. For purposes of this complaint, BOC shall be read to include all subsidiary or related corporations and all successor corporations.

VII

Airco, Inc.

16. Respondent, Airco is a publicly owned corporation, organized and existing under the laws of the State of New York, with its principal place of business in Montvale, N.J.

17. Airco is engaged in the manufacture of industrial gases, including medical gases; ferroalloys and carbide; cryogenic equipment; welding and cutting equipment; carbon; graphite; electronics; metals; and medical equipment, including inhalation anesthetic equipment, inhalation therapy equipment, and medical pipeline equipment. Airco operations in the industrial gas market are conducted through three divisions: Airco Industrial Gases Division, Airco Welding Products Divisions, and Ohio Medical Products Division. Airco is the second largest producer of industrial gas in the United States.

18. Airco operations in the markets for inhalation anesthetic equipment, inhalation therapy equipment, and medical pipeline equipment are conducted through the Ohio Medical Products Division. Airco competes directly with BOC in the United States markets for inhalation anesthetic equipment and inhalation therapy equipment.

19. Airco, through its Ohio Medical Products Division is the leading company in the United States inhalation anesthetic equipment market.

20. Through its Ohio Medical Products Division, Airco is one of the three leading companies in the United States inhalation therapy

equipment market. Through its Ohio Medical Products Division, Airco is the leading company in the medical gas pipeline systems market in the United States.

21. At all times relevant herein, Airco sold and shipped its products in interstate commerce and engaged in "commerce" within the meaning of the Clayton Act and the Federal Trade Commission Act.

VIII

The Acquisition

22. On or about July 25, 1973, BOC and Airco entered into an agreement pursuant to which they agreed to exchange confidential data regarding their respective businesses. The agreement also provided that neither company would make any offer for a period of five years to acquire any securities of the other without the prior approval of the other company's board of directors. On or about Dec. 10, 1973, BOC and Airco entered into a further agreement in which Airco approved a tender offer by BOC for three to four million of Airco's common shares. The agreement also provided for reciprocal representation by BOC and Airco on each other's board of directors. On or about Dec. 10, 1973, BOC Financial made a tender offer on behalf of BOC to purchase three to four million common shares of Airco. BOC Financial subsequently accepted four million of the Airco's common shares which were tendered to it.

IX

Trade and Commerce

23. The value of industry shipments of industrial gas in the United States was approximately \$700 million in 1972. Very high levels of concentration have prevailed in the industrial gas industry the last two decades. The four and eight largest firms during the year 1972 accounted for more than 70 percent and 90 percent respectively of the total industry shipment of industrial gases. Airco, the second largest producer, had sales of over \$120 million in 1972. Entry barriers into the industrial gas industry are high. During the period from 1958 to date, several acquisitions were made in the industry, and the number of significant full-line producers diminished considerably. During the period from 1950 to 1972, sales of industrial gas more than tripled. The only significant entrant within the last ten years was the largest of the few large international industrial gas corporations.

24. Sales of inhalation anesthetic equipment in the United States were over \$25 million in 1972. The four and eight largest firms during

the year 1972 accounted for more than 70 percent and 85 percent respectively of total sales. Airco was the largest producer with over 35 percent of the United States market. BOC, through its United States subsidiaries, Fraser Sweatman and Harris Lake, was the third largest producer with over 8 percent of the market. The barriers to entry are high. The number of significant manufacturers with a substantial line of equipment has diminished considerably over the past ten years. BOC, through its recent acquisitions of Fraser Sweatman and Harris Lake, is the only significant recent entry.

25. Sales of inhalation therapy equipment were over \$75 million in 1972. The four and eight leading firms accounted for over 50 percent and 65 percent respectively of sales. Airco was the second largest factor in the market in 1972. BOC was an actual competitor through sales of its Harris Lake subsidiary. Barriers to entry in the industry are high. The number of significant manufacturers with a substantial line of equipment has diminished considerably in the last ten years. Airco sales in this market were approximately \$10.5 million.

26. Sales of medical pipeline systems in the United States were approximately \$13.5 million in 1972. There were only five companies in the market. Airco is the leading company in the market with 51.5 percent of national sales. Entry barriers into the industry are high. The number of significant manufacturers with a substantial line of equipment has diminished considerably over the past ten years. There has been no recent significant new entrant.

X

Effects of the Acquisition

27. The effect of the acquisition of Airco stock by BOC may be substantially to lessen competition or to tend to create a monopoly in the manufacture, distribution or sale of industrial gases, inhalation anesthetic equipment, inhalation therapy equipment, and medical gas pipeline systems or any submarkets of the above markets throughout the United States, or sections thereof, in violation of Section 7 of the Clayton Act, as amended (15 U.S.C. §18); and the effect of the agreements by which Airco and BOC undertook to eliminate the potential and actual competition between BOC and Airco may be to unreasonably restrain trade, and to hinder or have a dangerous tendency to hinder competition unduly, thereby constituting an unfair act and practice in commerce, in violation of Section 5 of the Federal Trade Commission Act, (15 U.S.C. §45). These effects may occur in the following among other ways:

(a) Substantial potential competition through internal expansion or

toehold acquisition, and substantial actual competition between BOC and Airco may be eliminated;

(b) The restraining influence of BOC as an actual or potential competitor may be eliminated;

(c) The competitive benefits of internal expansion and innovation by BOC may be eliminated;

(d) Already high barriers to entry of new competition may be heightened and increased;

(e) Members of the purchasing public and the ultimate consumer may be denied the benefits of free and open competition;

(f) BOC, a leading international competitor in electrical welding equipment, and gas welding and cutting equipment may be eliminated as a potential entrant into the concentrated United States electrical welding and gas welding and cutting markets by virtue of the acquisition of a large industrial gas company with presently existing substantial lines of electrical welding and gas welding and cutting equipment;

(g) Substantial competition between BOC and other companies for sale of products to Airco may be eliminated;

(h) Airco, a leading competitor may become further enhanced;

(i) Competitors of Airco may become competitively disadvantaged; and

(j) The effect of the stock acquisition may be to entrench or increase already high levels of concentration by encouraging tendencies for combination and merger by actual and potential competitors.

XI

Violations

28. The acquisition of four million shares of Airco stock by BOC and appertaining agreements between Airco and BOC, as alleged above, constitute violations of Section 7 of the Clayton Act, as amended (15 U.S.C. §18) and Section 5 of the Federal Trade Commission Act (15 U.S.C. §45).

INITIAL DECISION BY ERNEST G. BARNES, ADMINISTRATIVE
LAW JUDGE

OCTOBER 18, 1974

Appearances

For the Commission: *K. Keith Thurman, Gordon Youngwood,*

Donald E. Purcell, Daryl A. Nickel, Rhett R. Krulla and John R. Hoagland.

For the respondents: *Jay H. Topkis, Lewis A. Kaplan, and Moses Silverman, Paul, Weiss, Rifkind, Wharton & Garrison*, New York City for The British Oxygen Company Limited. *George J. Wade, R. Bruce MacWhorter, Danforth Newcomb, Foster Wollen and J. R. Hawkins, II, Shearman & Sterling*, New York City for Airco, Incorporated.

PRELIMINARY STATEMENT

Respondents The British Oxygen Company Limited (hereinafter "BOC"), BOC Financial Corporation, BOC Holdings Limited, and British Oxygen Investments Limited (hereinafter collectively "BOC" or "BOC respondents") are charged with violation of Section 7 of the Clayton Act, as amended (15 U.S.C. § 18); and BOC respondents and respondent Airco, Incorporated (hereinafter "Airco") are further charged with violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. § 45) through the acquisition by BOC Financial Corporation of four million shares (35 percent) of the stock of Airco for \$80 million by means of a public tender offer. The Federal Trade Commission issued its complaint on Feb. 26, 1974, approximately two months after the said acquisition occurred.

The complaint alleges that the effect of the acquisition of Airco stock by BOC respondents may be substantially to lessen competition or to tend to create a monopoly in the manufacture, distribution or sale of industrial gases, inhalation anesthetic equipment, inhalation therapy equipment, and medical gas pipeline systems or any submarkets of the above markets throughout the United States, or sections thereof in violation of Section 7 of the Clayton Act, as amended (15 U.S.C. § 18); and the effect of the agreements by which Airco and BOC respondents undertook to eliminate the potential and actual competition between BOC and Airco may be to unreasonably restrain trade, and to hinder or have a dangerous tendency to hinder competition unduly, thereby constituting an unfair act or practice in commerce, in violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. § 45). These effects may occur, the complaint alleges, in the following among other ways:

- (a) Substantial potential competition through internal expansion or toehold acquisition, and substantial actual competition between BOC and Airco may be eliminated;
- (b) The restraining influence of BOC as an actual or potential competitor may be eliminated;
- (c) The competitive benefits of internal expansion and innovation by BOC may be eliminated;

(d) Already high barriers to entry of new competition may be heightened and increased;

(e) Members of the purchasing public and the ultimate consumer may be denied the benefits of free and open competition;

(f) BOC, a leading international competitor in electrical welding equipment, and gas welding and cutting equipment may be eliminated as a potential entrant into the concentrated United States electrical welding and gas welding and cutting markets by virtue of the acquisition of a large industrial gas company with presently existing substantial lines of electrical welding and gas welding and cutting equipment;

(g) Substantial competition between BOC and other companies for sale of products to Airco may be eliminated;

(h) Airco, a leading competitor may become further enhanced;

(i) Competitors or Airco may become competitively disadvantaged; and

(j) The effect of the stock acquisition may be to entrench or increase already high levels of concentration by encouraging tendencies for combination and merger by actual and potential competitors.

On the day this proceeding was commenced, the Federal Trade Commission applied to the United States District Court for the District of Delaware for a temporary restraining order and a preliminary injunction requiring BOC to maintain Airco as a separate company and restraining it from, among other things, voting its Airco stock, having BOC personnel serve on the Airco board of directors, increasing or decreasing its holdings of Airco stock, and exchanging trade secrets and similar material with Airco pending the disposition of the administrative complaint.

On Feb. 28, 1974, the Court issued a temporary restraining order and thereafter, on Mar. 8, 1974, a preliminary injunction requiring BOC to maintain Airco as a separate company and restraining it from, among other things, exchanging trade secrets with Airco on the condition that the Commission expedite the administrative proceeding and file a report at least every ninety (90) days with respect to the status of the matter. The District Court did allow, however, BOC to vote its Airco shares and four representatives from BOC to be seated on Airco's board of directors. *Federal Trade Commission v. British Oxygen Co.*, 1974 CCH Trade Cas. ¶ 75,003 (D. Del. 1974) [9 S&D 887].

Answers were filed by Airco on Mar. 12, 1974, and by BOC respondents on Mar. 14, 1974, admitting in part and denying in part the various allegations of the complaint. On May 24, 1974, BOC respondents filed an amended answer, admitting in part and denying in part the various allegations of the complaint.

On Mar. 12, 1974, BOC respondents moved for a fixed and expedited schedule for the administrative proceeding, which motion was certified to the Commission by the administrative law judge. By order of Apr. 2, 1974, the Commission denied the motion insofar as it sought a fixed

schedule, but ordered that the proceeding be expedited (Order Denying Motion for Fixed Schedule, Apr. 2, 1974).

Prehearing conferences were held in Washington, D.C., on Mar. 12, Mar. 28, Apr. 17, and Apr. 25, 1974. At the prehearing conference held on Apr. 25, 1974, complaint counsel informed the administrative law judge and respondents that they would not offer any proof with respect to the violations alleged in the complaint relating to medical pipeline systems and electrical and gas welding and cutting equipment (PHC. Tr. 134-35).

Discovery motions were subsequently filed by complaint counsel and BOC respondents. Proposed exhibit lists, copies of proposed exhibits, and witness lists were exchanged by the parties before the hearings began. Complaint counsel, on Mar. 15, 1974, filed a statement of issues.

BOC respondents, on Mar. 19, 1974, moved for the issuance of a subpoena directed to the Commission calling for the production of certain documents obtained by the Commission staff during the course of an investigation of the industrial gases industry in the United States, for use in the preparation and defense of this matter. On Apr. 23, 1974, the administrative law judge granted this motion in part. Complaint counsel and several third parties sought interlocutory review of this order by the Commission. Following the conclusion of substantially all of complaint counsel's case-in-chief, the Commission granted the applications for review and upheld the administrative law judge's determination (Order Granting Applications for Review, May 29, 1974). Production of the documents ordered to be made available to respondents began on June 10, 1974, and was completed on June 18, 1974.

Presentation of the case-in-chief began in Washington, D.C., on May 6, 1974, and concluded on May 23, 1974, subject to the right of complaint counsel to offer certain documents into evidence. Presentation of BOC respondents' defense began in New York, N.Y., on June 5, 1974, and concluded in Washington, D.C., on June 18, 1974. Airco presented its defense in Washington, D.C., on June 18, 1974. Rebuttal was presented by complaint counsel in Washington, D.C., on June 27, 1974. The hearings were terminated on June 27, 1974, subject to the right of complaint counsel to offer into evidence certain documents subpoenaed from Stanford Research Institute.

At the hearing on June 27, 1974, the administrative law judge set July 26, 1974 for filing of proposed findings by the parties, and Aug. 5, 1974 for the filing of replies thereto. Pursuant to respondents' request, the administrative law judge issued an order on July 25, 1974, extending the time for filing proposed findings to and including Aug. 2, 1974, and for replies thereto to and including Aug. 12, 1974. Following

the receipt of further documents in evidence, on Aug. 2, 1974, the administrative law judge closed the record for the reception of evidence. Proposed findings and *confidential* proposed findings were filed by complaint counsel on Aug. 2, 1974; proposed findings and proposed findings containing *in camera* material were filed by BOC respondents on Aug. 7, 1974. On Aug. 8, 1974, the administrative law judge extended the time for filing reply briefs to and including Aug. 22, 1974. On Aug. 22, 1974, complaint counsel filed a reply brief and *confidential* reply brief. On Aug. 22, 1974, BOC respondents filed their reply brief and a reply brief containing *in camera* material. Airco's proposed findings and brief were filed on Aug. 5, 1974.

Complaint counsel called a total of twenty (20) witnesses, and respondents eight (8) witnesses. Over five hundred (500) exhibits were received in evidence during the trial.

This proceeding is before the undersigned upon the complaint, answers, testimony and other evidence, proposed findings of fact and conclusions and briefs filed by complaint counsel and by counsel for respondents. These submissions by the parties have been given careful consideration and, to the extent not adopted by this decision in the form proposed or in substance, are rejected as not supported by the record or as immaterial. 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. The findings of fact made herein are based on a review of the entire record and upon a consideration of the demeanor of the witnesses who gave testimony in this proceeding.

For the convenience of the Commission and the parties, the findings of fact made hereinafter include references to the principal supporting evidentiary items in the record. Such references are intended to serve as convenient guides to the testimony and exhibits supporting the findings of fact, but do not necessarily represent complete summaries of the evidence considered in arriving at such findings.

References to the record are set forth in parentheses, and certain abbreviations, as hereinafter set forth, are used:

CCPF—Proposed Findings of Fact, Conclusions of Law and Order submitted by complaint counsel, followed by the Proposed Finding being referenced.

BOC PF—Proposed Findings of Fact, Conclusions of Law and Order (*in camera* material deleted) submitted by BOC respondents, followed by Proposed Finding being referenced.

BOC PF*—Proposed Findings of Fact, Conclusions of Law and Order (*in camera* material deleted) submitted by BOC Respondents, followed by Proposed Finding page or pages being referenced.

CCRB—Reply Brief submitted by complaint counsel, followed by page or pages being referenced.

BOC RB—Reply Brief submitted by BOC respondents, followed by page or pages being referenced.

CX—Commission's exhibit, followed by number of exhibit being referenced.

BOC RX—BOC respondents' exhibit, followed by number of exhibit being referenced.

RAX—Respondent Airco's exhibit, followed by number of exhibit being referenced.

PHC Tr.—Official transcript of the prehearing conferences, followed by the page number being referenced. Reference to the official transcript of the formal hearings is by the page number being referenced preceded by the name of the witness whose testimony is being referenced.

FINDINGS OF FACT

I. Identity and Business of Respondents

A. BOC Respondents

1. Respondent The British Oxygen Company Limited ("BOC") is now, and was at the time of the acquisition, a publicly-held United Kingdom company with its principal executive offices at Hammersmith House, London W6, England (complaint and BOC Answer, Par. 2; Smith 1639, 1642, 1698-99).

2. BOC is engaged in the manufacture and sale of industrial gases, including rare gases and medical gases; welding equipment; special metals; air separation equipment; medical equipment, including inhalation anesthetic equipment; inhalation therapy equipment and medical pipeline equipment; aircraft breathing equipment; vacuum equipment and instrumentation; and food products. In the fiscal year ending Sept. 30, 1972, BOC sales totalled 252.6 millions pounds sterling, or \$606.2 million at an exchange rate of \$2.40 to the pound¹ (complaint and BOC Answer, Par. 3). In fiscal year ended Sept. 30, 1973, BOC had sales of approximately \$766 million (CX 292C).

3. In 1972 and 1973, BOC was the leading manufacturer of industrial gases in the United Kingdom (BOC Admissions, Pars. 32, 33, filed Apr. 12, 1974), and produced and marketed industrial gases in a number of countries throughout the world including Ireland, Australia, New Zealand, South Africa, India, Pakistan, Singapore, Malaya, Hong Kong, Canada, East Africa, Rhodesia, Zambia, Indonesia, Thailand, Fiji,

¹ Pounds sterling have been converted into dollars at the rate of \$2.40 per pound throughout this initial decision.

New Guinea, the Philippines, Bangladesh, and Italy. BOC has also recently entered the industrial gases market in Brazil (complaint and BOC Answer, Par. 10; Smith 1644-45, 1790, 1801-1806).

4. In the United Kingdom, BOC manufactures and distributes both inhalation anesthetic equipment and inhalation therapy equipment (complaint and BOC Answer, Pars. 6, 8).

5. BOC and Airco engaged in a joint venture from 1967 to 1971 for the manufacture and sale of air separation plants in the United States (BOC and Airco Admissions, Pars. 87, 88, filed Apr. 10, 1974 and Apr. 12, 1974; Smith 1716-19, 1810; Giordano 1948-50; Laister 2535).

6. Respondent BOC Financial Corporation is a corporation organized and existing under the laws of the State of Delaware, with a business address of 306 So. State St., Dover, Del. All BOC Financial Corporation's common stock is owned by BOC Holdings Limited. BOC Financial Corporation was organized by BOC solely for the purpose of acquiring Airco common stock shares through a tender offer. It presently owns the Airco stock, which acquisition is challenged in this proceeding (complaint and BOC Answer, Par. 12; CX 125 B-D).

7. Respondent BOC Holdings Limited is a United Kingdom company with a business address of Hammersmith House, London W6, England. BOC Holdings Limited is engaged in holding various securities of subsidiaries (direct or indirect) of BOC. All outstanding ordinary shares of BOC Holdings Limited are held by British Oxygen Investments Limited (complaint and BOC Answer, Par. 13; CX 125 B-D).

8. Respondent British Oxygen Investments Limited is a United Kingdom company with a business address of Hammersmith House, London W6, England. British Oxygen Investments Limited is engaged in holding various securities of subsidiaries (direct or indirect) of BOC. British Oxygen Investments Limited is a wholly-owned subsidiary of BOC (complaint and BOC Answer, Par. 14; CX 125 B-D).

9. In 1973, BOC Holdings Limited acquired all of the capital stock of Harris Lake, Inc. (BOC Admission, Par. 61, filed Apr. 12, 1974). In 1972, Harris Lake, Inc. had net sales of \$1,511,901, and sold in the United States, products it purchased from BOC (BOC Admissions, Pars. 54, 84, filed Apr. 12, 1974). At the time of the acquisition of Airco stock by BOC, Harris Lake, Inc. manufactured and sold inhalation anesthetic equipment in the United States (complaint and BOC Answer, Par. 7; BOC Admission, Par. 27, filed Apr. 12, 1974), and marketed inhalation therapy equipment in the United States (complaint and BOC Answer, Par. 8; BOC Admission, Par. 28, filed Apr. 12, 1974).

10. Prior to the acquisition of Airco stock by BOC, BOC acquired Cyprane, Ltd., a United Kingdom corporation of which Fraser

Sweatman, Inc., a United States corporation, was a subsidiary, and the related Canadian company, Fraser Sweatman, Ltd. (complaint and BOC Answer, Par. 7; BOC Admission, Par. 34, filed Apr. 12, 1974; CX 11L). Fraser Sweatman, Inc. manufactured inhalation anesthetic equipment in 1972, and had sales of such equipment in the United States for the fiscal years ending in 1972 and 1973 of \$2,145,484 and \$2,498,146, respectively (BOC Admissions, Pars. 51, 58, 59, filed Apr. 12, 1974). Sales of inhalation anesthetic equipment by Cyprane, Inc. in the United States for the fiscal year ending in 1972 were \$258,499 (BOC Admission, Par. 60, filed Apr. 12, 1974).

11. In or about October 1973, BOC established Medishield, Inc., a Delaware corporation, which presently owns, and owned at the time of the Airco acquisition, all of the common stock of Harris Lake, Inc. and Fraser Sweatman, Inc., which are domestic corporations, and Fraser Sweatman (Canada) Limited, a Canadian corporation (complaint and BOC Answer, Par. 5).

12. BOC respondents are engaged, and at the time of the acquisition were engaged, in commerce within the meaning of the Clayton Act and the Federal Trade Commission Act (complaint and BOC Answer, Par. 11). BOC respondents have additionally consented to the jurisdiction of the Federal Trade Commission (Topkis 126-27).

B. Respondent Airco

13. Respondent Airco, Inc. (Airco) is a publicly-held corporation, organized and existing under the laws of the State of New York, with its principal place of business in Montvale, N.J. (complaint and Airco Answer, Par. 16).

14. Airco is engaged in the manufacture of industrial gases, including medical gases; ferroalloys and carbide; cryogenic equipment; welding and cutting equipment; carbon-graphite products; electronics; metals; high-vacuum equipment; calcium carbide; and medical equipment, including inhalation therapy equipment, inhalation anesthetic equipment, and medical pipeline equipment (complaint and Airco Answer, Par. 17; Giordano 1897-1906; Dillon 2583-84; RAX 7). In 1973, Airco had net sales of \$583,811,000 and net income from continuing operations of \$19,111,000 (RAX 7, p. 45). As of Apr. 1, 1973, Airco had 95 physical plant locations and 134 sales offices and warehouses (Airco Admissions, Pars. 1-2, filed Apr. 10, 1974).

15. Airco operations in the industrial gases market are conducted through three divisions: Airco Industrial Gases Division, Airco Welding Products Division, and Ohio Medical Products Division (complaint and Airco Answer, Par. 17). Airco operations involving inhalation anesthetic

equipment and inhalation therapy equipment are conducted through its Ohio Medical Products Division (complaint and Airco Answer, Par. 18).

16. At the time of the acquisition of Airco stock by BOC, Airco Industrial Gases Division operated plants at Albion, Mich.; Chester, W. Va.; Bethlehem, Pa.; Buffalo, N.Y.; Butler, Pa.; City of Industry, Calif.; Claymont, Del.; East Alton, Ill.; Fairfield, Ala.; Johnstown, Pa.; New Orleans, La.; Phoenix, Ariz.; South Acton, Mass.; Vancouver, Wash.; Warren, Ohio; Hopewell, Va.; Lawrence, Kan.; Pedricktown, N.J.; Riverton, N.J.; Decatur, Ala.; and Richmond, Calif., and also operated a gaseous hydrogen plant in the United States (Airco Admissions, Pars. 8, 9, filed Apr. 10, 1974).

17. At the time of the acquisition of Airco stock by BOC, Airco produced acetylene, argon, nitrogen, oxygen, nitrous oxide, medical gases, rare gases, carbon dioxide, hydrogen, and mixtures and combinations of gases (Airco Admission, Par. 7, filed Apr. 10, 1974).

18. At the time of the acquisition of Airco stock by BOC, Airco's subsidiary, Airco Cryopplants Corp., was engaged in the design and construction of air separation plants (Airco Admission, Par. 10, filed Apr. 10, 1974).

19. At the time of the acquisition of Airco stock by BOC, the Ohio Medical Products Division of Airco was engaged in the manufacture and sale of inhalation anesthetic equipment and inhalation therapy equipment in the United States (complaint and Airco Answer, Pars. 17-19; Airco Admission, Par. 37, filed Apr. 10, 1974). Airco sales of inhalation anesthetic equipment in the United States exceed those of any other company (complaint and Airco Answer, Par. 19). On Apr. 1, 1973, the Ohio Medical Products Division of Airco operated plants at Berkeley, Calif.; Cleveland, Ohio; Fort Myers, Fla.; Houston, Tex.; Madison, Wis.; and Richmond, Calif. (Airco Admission, Par. 5, filed Apr. 10, 1974).

20. At all times relevant herein, Airco sold and shipped its products in interstate commerce and engaged in "commerce" within the meaning of the Clayton Act and the Federal Trade Commission Act (complaint and Airco Answer, Par. 21).

II. *The Acquisition*

21. Airco's stock is traded on the New York Stock Exchange and, as of June 1973, was widely held. Airco had approximately 43,000 stockholders with 11.4 million shares outstanding in June 1973, with its largest shareholder holding approximately 345,000 shares, or approximately 3 percent of the outstanding common stock (Dillon 2585-86).

22. Over the years prior to 1973, BOC and Airco had had a number of commercial contacts, including the joint venture during 1967-1971 for

the manufacture and sale of air separation plants in the United States. As a result of these contacts, various members of the senior managements of BOC and Airco became acquainted with one another (Finding of Fact No. 5; Dillon 2585; Giordano 1933; Laister 2537; Smith 1721).

23. One of BOC's managing directors, Peter Laister, learned in June 1973 of rumors relating to an impending tender offer for Airco stock from a group of investment bankers who made a call on Mr. Laister (Laister 2541). Shortly thereafter, Mr. Laister discussed Airco's vulnerability to such a bid with a vice president of Airco during a social occasion (Smith 1721; Laister 2542-43). Mr. Laister also informed Mr. Leslie Smith, BOC's chairman, of the rumors concerning Airco. BOC immediately implemented a study of the possibility of BOC's acquiring Airco (Laister 2542, 2544-46; *in camera exhibits*: CX 72A-N, 73A-J, 74A-B, 75A-K, 76A-U, 77A-B, 78A-D).

24. The Airco vice president reported to Airco officials the conversation he had had with Mr. Laister of BOC wherein it was suggested by Mr. Laister that BOC and Airco have some closer association. Airco determined to "sort out what the real interest was" (Giordano 2033). Thereafter, on June 30, 1973, Richard Giordano, president of Airco, met with Mr. Smith, chairman of BOC, in London and proposed an amalgamation between BOC and Airco (Giordano 1995-97). At that time, Mr. Giordano was not aware that BOC was already considering making a bid for Airco (Giordano 1997).

25. As a result of the June 30, 1973 meeting, Mr. Giordano and Mr. Smith agreed to form a working party of senior executives of both companies to study the possibility of an amalgamation between BOC and Airco (Smith 1723-24; Giordano 1972; Laister 2546-47; CX 78-A, *in camera*). The parties also agreed for an exchange of confidential information between the two companies regarding their respective businesses, such as sales, profits and capital investments (Giordano 1972-73; Laister 2546-47; CX 88A-C, CX 301A-Q, *in camera*; RAX 83). Subsequently, on July 25, 1973, BOC and Airco entered into a written agreement which provided for an exchange of confidential information. The agreement also provided that neither company would make any offer for a period of 5 years to acquire any securities of the other without the prior approval of the other company's board of directors. It was also agreed that the information exchanged would not be disclosed to third parties (CX 99A-D; Giordano 1972-73).

26. Confidential information was exchanged by BOC and Airco representatives at a meeting in New York on July 26 and 27, 1973 (BOC and Airco Admissions, Par. 64, filed Apr. 10, 1974 and Apr. 12, 1974; Smith 1723-24; Giordano 1973-77; Laister 2546-47; *in camera exhibits*:

CX 93A-I; CX 96A-J; CX 301A-Q; RAX 83A-U). After the meeting, BOC and Airco continued to explore the possibility of an amalgamation between the two companies and held subsequent discussions in September and October (Laister 2549-50; *in camera exhibits*: CX 95A-E; CX 97A-D; CX 98A-C).

27. On Nov. 2, 1973, the chairman of Curtiss-Wright Corporation informed Airco's senior officers that his company was prepared to make a tender offer for 2 million Airco shares at a price 25 percent over the then market price, or approximately \$16-\$17 per share (Dillon 2588, 2611). Airco's executives responded that the Airco board of directors would have to consider the Curtiss-Wright proposal and consult their advisers before making a substantive response to the Curtiss-Wright statement (Dillon 2589). Airco also immediately contacted BOC about the Curtiss-Wright proposal and sent Mr. Giordano to London to confer with BOC officials (Dillon 2592).

28. Airco commenced a brief study of Curtiss-Wright (Dillon 2589-90), and invited Curtiss-Wright to make a presentation to the Airco board of directors about the proposed tender offer. At the time of the board meeting, it had been concluded that the Curtiss-Wright proposal would be opposed (Dillon 2592-94). Airco had also concluded that a successful Curtiss-Wright offer would effectively preclude any closer association with any other company, including BOC (Dillon 2599). Airco's chairman informed Curtiss-Wright's chairman of the decision by the Airco board and the latter responded that Curtiss-Wright would not make the offer under those circumstances (Dillon 2595; Laister 2551). Airco and BOC thereafter returned to a study of a closer association between the two companies (Smith 1725; Dillon 2595-96). Working parties were set up to examine the various forms of closer association (Dillon 2595-96), and it was anticipated that additional meetings would take place after the first of the year, 1974 (Dillon 2596).

29. On Dec. 3, 1973, Curtiss-Wright made a public tender offer for 2.4 million shares of Airco's common stock at \$18 per share (Dillon 2594-98, 2601; CX 125Z-14). Airco notified BOC of the Curtiss-Wright offer (Laister 2551; Dillon 2597). Airco opposed the Curtiss-Wright tender offer (Dillon 2596-97) and recommended that Airco's shareholders not accept it (Dillon 2606; Giordano 2013-14). On Dec. 4, 1973, Airco sent a letter to its shareholders urging them to reject the Curtiss-Wright offer and asking them to wait to consider possible alternatives to that offer (CX 125Z-9).

30. BOC and Airco entered into a memorandum agreement dated Dec. 10, 1973, in which Airco consented to BOC making an offer for up to 4 million Airco shares. The agreement further provided for reciprocal representation by BOC and Airco on each other's board of

directors. Additionally, the agreement provided that Airco would have first right to purchase or to designate a purchaser for any Airco shares purchased by BOC should BOC subsequently decide to sell (CX 108A-C; Dillon 2599-2601). Also, on Dec. 10, 1973, BOC announced a tender offer through its subsidiary, BOC Financial Corporation, to purchase up to 4 million common shares of Airco at a price of \$20 a share (CX 125A-Z-31). Airco consented to BOC's offer, provided BOC access to Airco's shareholder list, and had its transfer agent at BOC's expense mail BOC's offer to Airco's shareholders (Giordano 2014-15; Dillon 2601-02). Further, Airco's board of directors sent letters to Airco's shareholders informing them that Airco's board had consented to BOC's offer and that a closer association of Airco and BOC would be beneficial to both companies (CX 125Z-9).

31. At the expiration of BOC's tender offer on Dec. 21, 1973, over 6 million shares had been tendered, of which BOC Financial Corporation subsequently purchased 4 million on a pro rata basis (CX 125Z-10, CX 293C; complaint and BOC and Airco Answers, Par. 22; RAX 7, p. 2). The cost to BOC of purchasing 4 million shares of Airco was \$80 million plus estimated expenses of \$2.8 million (CX 293C). The 4 million Airco shares represented approximately 35.3 percent of Airco's outstanding common stock and gave BOC effective working control over Airco (CX 170B). Subsequently, Airco's board of directors was enlarged from 12 to 16 directors to provide for four representatives of BOC. In return, BOC invited Airco's chairman and its president to join BOC's board of directors (CX 293E; CX 171C-D; Giordano 2015-17; RAX 7, pp. 2-3). On Feb. 26, 1974, the Federal Trade Commission issued its complaint challenging this acquisition (complaint).

III. *Industrial Gases*

A. Relevant Product Market

32. The complaint alleges that one of the effects of the acquisition of Airco stock by BOC may be substantially to lessen competition or tend to create a monopoly in the manufacture, distribution or sale of industrial gases, or any submarkets thereof throughout the United States, or any section thereof (complaint, Par. 27). "Industrial gases" are defined in the complaint as "gases in compressed, liquid and solid form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof." (complaint, Par. 1(a)). "Rare gases" include xenon and krypton (Giordano 1910-11; Baker 364). "Medical gases" include nitrous oxide, cyclopropane and oxygen (Kimerling 854-56; Giordano 1900; Loveman 603-10).

33. The term "fuel gases," used by witnesses in this proceeding, refers to gases which are burned in order to provide heat (Kridl 2137, 2143; Flamm 286; Cunningham 934). "Fuel gases" include both gases that are specifically mentioned in the definition of industrial gases contained in the complaint and gases that are not. Among the fuel gases are acetylene (Flamm 286; Loveman 611-12; Smith 1997-98; Giordano 2003), propane (Flamm 286; Cunningham 934), propylene (Flamm 286; Giordano 1912-13; Perkins 780-81, 798), MAPP (Flamm 286; Cunningham 935; Giordano 2004; Loveman 497-99; Perkins 798), Oxy-MAPP (Giordano 1897), Apache (Heckel 740-41; Cunningham 935), acetogen (Heckel 740-41), and thermogen (*ibid.*).

34. "Atmospheric gases," a term used throughout this proceeding, are gases generated commercially by the liquifaction and fractional distillation of air: oxygen, nitrogen and argon, and the rare gases—xenon and krypton (Baker 364). Atmospheric gases are produced in air separation plants and constitute the most substantial segment of the industrial gases market; for example, such gases account for 75-80 percent of the dollar sales by Union Carbide (Linde) and Air Products, 70 percent of dollar sales by Liquid Air, Inc., 65 percent of value of shipments by Chemetron, and 50 percent of the value of shipments by Airco (Flamm 240; Baker 368-70; Dempster 515-16; Cunningham 923; Giordano 1981-82). The above companies are generally acknowledged to be among the largest firms in the industrial gases industry.

35. Complaint counsel have conceded that the various industrial gases are "not substitutable in most cases" (Thurman 278). Rather, each gas is almost invariably used for its unique chemical properties which make them highly desirable for specific purposes. Other products are not readily substitutable for industrial gases (Flamm 276, 279-85; 349-50; Baker 370-72; Kridl 2142). The principal use of oxygen is in the manufacture of steel (Flamm 279-80). Oxygen is used also in the manufacture of glass (Flamm 281), chemicals (CX 232W-Z; Baker 440; Kridl 2164), aluminum (Giordano 1909-10), in welding and cutting (*ibid.*), and for medical purposes (Flamm 276). The principal characteristics of nitrogen are its chemical inertness and its refrigeration capabilities (Flamm 274). A major use of nitrogen is in the manufacture of ammonia (Kridl 2162-63). Nitrogen is also used extensively for blanketing in order to exclude oxygen and thereby prevent explosions (Giordano 1910). Its principal purchasers are oil companies, chemical companies and electronics companies (Giordano 1910). Nitrogen is used also as a refrigerant for food freezing and in-transit preservation of food (Flamm 281-83). Argon is an inert chemical element; its principal use is in stainless steel welding (Giordano 1910; Kridl 2157). Xenon is an inert chemical element used in electronic applications and sold in very small

quantities (Giordano 1910-11). Krypton is an inert chemical element sold in very small quantities (*ibid.*). Helium is an inert chemical element. It is used in gas shielding processes to exclude the atmosphere, in leak detection, in research, and in balloons (Giordano 1911). Hydrogen is a combustible gas used in a variety of applications including annealing of steel, hydrogenation of foods, as a rocket propellant and in the manufacture of ammonia (Giordano 1911; Kridl 2133). Carbon dioxide is used primarily in the beverage industry for the carbonation of soft drinks. It is used also as a refrigerant in the food industry and as a shielding gas in certain welding applications (Giordano 1911-12). Carbon dioxide and nitrogen are not normally interchangeable in food freezing and refrigeration applications (Flamm 281-83). Acetylene is of unique utility in welding and cutting (Kridl 2168). Nitrous oxide is used by the medical and dental professions as an analgesic or anesthetic (Giordano 1900). Cyclopropane is a human anesthetic (Giordano 1900). MAPP is used primarily for cutting metal. The equipment used for that purpose differs from acetylene cutting equipment (Giordano 1912). Propylene is a fuel gas similar to MAPP. The cutting equipment used with propylene is the same or similar to equipment used with MAPP (Giordano 1913). Propane has two principal uses: heating, including cutting, and the synthesis of propylene (Giordano 1912-13; Kridl 2137). The principal use of butane is in the chemical industry (Kridl 2138). Apache, acetogen and thermogen are fuel gases used for their heating properties (Heckel 740-41).

36. The Bureau of the Census classifies the production and marketing of industrial gases as a separate and distinct line of commerce under Standard Industrial Classification (SIC) 2813 (CX 296A-F, CX 312A-K). The industrial gases industry has been classified by Census as a separate economic entity since at least 1945 (CX 340A-B, CX 341A-B). The United States industrial gases industry has been defined by Census from at least 1945 through the present as those establishments primarily engaged in manufacturing gases for sale in compressed, liquid and solid forms (CX 340A-B, CX 336A-B, CX 338A-B; CX 339A-B, CX 296A). The gases classified by Census as industrial gases are acetylene, carbon dioxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other elemental gases, and compressed and liquified gases (CX 299D, CX 300A-D, CX 312C-D). The same group of gases have been classified as industrial gases by Census since at least 1954 (CX 337A-C).

37. Firms engaged in the production and marketing of industrial gases recognize the industrial gases industry as a separate and distinct line of business (Flamm 210-11, 213-14; Baker 363-64; Dempster 513; Loveman 577; Muller 648, 650; Heckel 730; Perkins 780; Kimerling 854;

Cunningham 917). Industry executives who testified in this proceeding identified as their competitors companies who produce and distribute industrial gases and each invariably named the same companies as being engaged in this line of business (Flamm 223-24; Baker 364-65; Dempster 516-17; Loveman 578-79; Heckel 732-33; Kimerling 857; Cunningham 918).

38. The industrial gases industry is represented by two trade associations, the Compressed Gas Association (CGA) and the International Oxygen Manufacturers Association (IOMA) (Flamm 230-31; Baker 394-95; Loveman 581; Hines 757-58; 764; Perkins 789; Kimerling 858-59; Cunningham 924). The purpose of the associations is to provide for exchange of information and ideas and keep their members abreast of developments in the industrial gases industry (Flamm 230-31; Baker 395; Hines 758; Kimerling 860). Only producers of industrial gases qualify for membership in IOMA (Hines 758, 763-64).

39. There is common industry recognition that the atmospheric gases—oxygen, nitrogen, argon, xenon and krypton—are industrial gases and are marketed by industry members. Industry witnesses who testified in this proceeding also identified hydrogen, helium, carbon dioxide and acetylene as industrial gases and as being marketed by their companies (Flamm 213, 270; Baker 364, 427; Dempster 514-15; Loveman 577; Muller 648; Heckel 730; Perkins 780; Kimerling 854; Cunningham 917). There is no unanimity of view as to gases such as carbon monoxide, nitrous oxide, and the various fuel gases *other* than acetylene, which is clearly recognized by the industry as an industrial gas (Flamm 215, 218, 270, 275; Baker 372, 426-27; Dempster 514, 555; Loveman 597-98; Perkins 780, 798; Kimerling 854). Fuel gases such as propane, butane, and propylene are not classified by the Bureau of the Census as industrial gases and are specifically excluded from SIC 2813 (CX 312A, CX 312 n. 10). These fuel gases are hydrocarbon products and are part of the petroleum industry (Baker 426; Perkins 798; Cunningham 933-34). The small amount of these gases sold by members of the industrial gases industry are used in metal cutting, which is one of the uses of acetylene. Such gases are not, however, used for welding, which is a major use of acetylene (Giordano 1912; Kridl 2138-39). These latter gases and mixtures thereof, are specialty gases, and are sold by some companies and not others. However, such gases constitute a very small and insignificant percentage of total industry sales (Flamm 214, 218, 270, 275; Dempster 514-15, 569; Loveman 612; Heckel 750; Kimerling 854-55; Cunningham 934; Smith 1891; Giordano 1984).

40. Industrial gases companies in the U.S. market a broad range of industrial gases although they may not produce all of them (Flamm 213-15; Baker 363, 372-73; Heckel 730; Kimerling 855; Cunningham 917,

923-24). The principal industrial gases companies market essentially the same products (Baker 373). As one industry witness stated, the industrial gases business consists basically of the heavy investment in air separation gases and such others of a "package of gases" as can be marketed profitably (Dempster 555; Flamm 213-15; Baker 363, 372-73; Heckel 730; Kimerling 855; Cunningham 917, 923-24). Both BOC and Airco market a wide range of industrial gases (Smith 1797-99; Giordano 1904-05, 1913-14). Industrial gases companies market industrial gases that they do not produce in order to provide their direct customers and their dealers a synergistic or total marketing package (Flamm 215-16; Cunningham 923). It is necessary for industrial gases companies to market a full or broad line of gases in order to compete effectively (Flamm 215-16; Baker 373-74; Heckel 730; Kimerling 855). Customers of industrial gases companies prefer to purchase their total gases requirements from a single supplier (Baker 374; Heckel 730-31; Smith 1800). While some industries may use certain industrial gases more than others, most industries generally use a wide range of industrial gases (Baker 431-32; Dempster 569).

41. The production, transportation and marketing of industrial gases require substantial, complex and specialized technical knowledge and expertise (Flamm 233-37; 351; Baker 383-86; Dempster 526-27; Kimerling 872-73). The atmospheric gases—oxygen, nitrogen, argon, krypton and xenon—are produced commercially by the cryogenic liquifaction and fractional distillation of air. Air consists of about 78 percent nitrogen, 21 percent oxygen, and 1 percent argon and traces of other elements, including krypton and xenon (CX 335Z). It is cooled to approximately -300° F, at which point it is a liquid, and the elements are separated by virtue of their different boiling points (Kridl 2132-33, 2139; Flamm 264-66; Baker 368). Air separation plants necessarily produce oxygen and nitrogen as co-products, although in many instances only one product is marketed while the other will be vented (Kridl 2159-61). These plants can be designed so as to derive argon, krypton and xenon in addition (Dempster 515; Kridl 2165). Regardless of the purpose for which it is used, all oxygen is identical and is produced in similar plants (Baker 372; Loveman 603; Cunningham 954; Kuehn 1145). Gases produced in air separation plants accounted for over 63 percent of the total value of all industrial gases shipments by primary manufacturers in the United States in 1972 as reported by the Bureau of the Census (CX 312C-D). The science of cryogenics or low temperature is also used in the production of other industrial gases such as helium and hydrogen (Flamm 271-72, 275). Other industrial gases such as hydrogen and carbon monoxide are also produced together in the same plants (Baker 425). Operation of cryogenic

facilities for the production of industrial gases requires highly specialized knowledge and can be quite hazardous to the people concerned as well as surrounding communities (Baker 384).

42. The industrial gases industry has two marketing aspects: tonnage and merchant. Tonnage refers to the supply to customers whose demand at a particular location is sufficient to justify the construction of a plant at or near the customer's facility which is devoted entirely or primarily to providing that customer with gaseous product delivered through a pipeline (Flamm 317-19; 329; Giordano 1914-15, 1917-18). Typical tonnage users include Ford Motor Company, U.S. Steel, Bethlehem Steel, Armco Steel, Republic Steel, Allied Chemical, McLough Steel and National Steel (Giordano 1917; Baker 442-43; Perkins 802-03; Flamm 290-96). Merchant refers to other sales of gases, which take place in much smaller quantities and in which the gas is transported to the customer by truck or rail (Giordano 1985-86). The merchant side of the business is also composed of two segments: bulk liquid and cylinders. Bulk liquid refers to gases shipped in relatively large quantities in liquid form (Giordano 1914-15; Flamm 318-19). In cylinder distribution, the gas is distributed in gaseous form under high pressures in small metal cylinders (Giordano 1926). The only gases which are produced and sold in the United States on a tonnage basis are oxygen, nitrogen and hydrogen (Giordano 1918). Gases distributed as bulk liquid include oxygen, nitrogen, argon, hydrogen, carbon dioxide and helium (Giordano 1927-28). All of the gases are sold in cylinders.

43. Gases that are manufactured as liquids for economics of distribution are transported in bulk form in tank cars or trucks. Bulk liquid gases are used either as liquids or are converted by vaporization and used as gases (Flamm 317-19; Giordano 1913-16, 1927-28). Plants used to supply gases to customers either in liquid form or as gas in cylinders are referred to as merchant plants. It is common, however, for onsite tonnage plants to have merchant capacity, *i.e.*, incremental to that required to supply onsite users, and used to supply other customers (Flamm 317-19; Giordano 1913-14, 1917-18, 1927-28; Baker 2740-41). The marketing of bulk liquid gases and cylinder gases requires special skills and equipment designed to withstand extreme temperatures. The products are shipped over highways in conformance with rather strict Federal regulations and delivered to especially designed containers where it is stored and released to meet individual customer needs. All of this equipment is very specialized and used almost exclusively within the industrial gases industry (Baker 384; Kridl 2137). Industrial gases are also marketed through a network of

independent distributors (Flamm 218-19, 300, 344-45; Baker 428, 2757; Dempster 574; Loveman 578; Cunningham 923).

44. The cluster of products and services offered by industrial gases companies, the common technology and specialized equipment utilized in the production, distribution and marketing of industrial gases by the industry, the identity of marketing methods and customers, the recognition and identification by the industry members of only other industrial gases producers and sellers as their competitors, trade associations which recognize only industry members, and the reporting system utilized by federal agencies over a long period of time all clearly establish the industrial gases industry as a relevant line of commerce for analyzing the effects of the challenged acquisition (Findings of Fact 32-43).

B. Relevant Geographic Market

45. The three largest industrial gases companies in the United States—Linde, Air Products, and Airco, all produce and market industrial gases throughout the United States (Flamm 231; Baker 395-96; Giordano 1922, 1938, 2005-06; Airco Admissions, Pars. 8, 9, filed Apr. 10, 1974). Airco bids for both tonnage and merchant accounts nationwide (Giordano 1922). Chemetron, Inc., another major producer, markets industrial gases throughout virtually all the United States (Cunningham 920). The smaller companies which sell industrial gases in tonnage quantities do not sell nationwide. Big 3 sells only in the Southern part of the country (Flamm 321). Liquid Air sells no significant amount in the Northeast and Midwest (Dempster 544). Burdett of Cleveland sells primarily in the Midwest (Loveman 580). The other smaller companies are even more localized; *i.e.*, Northern Gases (Milwaukee and Wisconsin), and Alabama Oxygen (Alabama, parts of Florida, Georgia, Mississippi, and Tennessee) (Heckel 731; Kimerling 856-57).

46. The cost of distributing merchant quantities of industrial gases is substantial and this high distribution cost limits the distance to which most industrial gases can be shipped economically. Oxygen and nitrogen are usually not shipped more than 100 to 300 miles (Flamm 316-17; Baker 448-49; Kimerling 882-83; Giordano 1928, 2019-20; Kridl 2180). Argon can be shipped somewhat longer distances (Flamm 320-21; Giordano 1928), but carbon dioxide is normally shipped shorter distances (Giordano 1928; *see* Flamm 338). Hydrogen can be marketed within 200 to 600 miles of the producing plant (Kimerling 882-83; Giordano 2007). Helium, since it is not commercially available in many parts of the world, is shipped much greater distances than are other industrial gases (Giordano 1928). The major producers are able to

market merchant gas nationwide because they have numerous producing plants located throughout the United States; *i.e.*, Linde has 70 to 100 plants, Air Products has a substantial number of plants, and Airco has at least 51 plants (Flamm 231; Baker 2740; RAX 7).

47. BOC was interested in becoming a nationwide competitor in the U.S. industrial gases market. According to BOC's Chairman, BOC would need more than 5 percent of the national market in order to become a viable competitor; and that had BOC acquired a small company, BOC would have been interested in expanding it into a national company (Smith 1837). The scope of Airco's operations throughout the United States was one of the primary reasons BOC chose to acquire a stock interest in Airco; it gave BOC national scope in one jump (Smith 1732-36).

48. Since the major industrial gases companies compete nationwide in both the tonnage and merchant segments of the industrial gases market, and since BOC's interest in the United States industrial gases market was on a nationwide basis, the relevant section of the country or geographic market in which to determine the probable competitive effects of BOC's stock acquisition of Airco with respect to the industrial gases market is the United States as a whole (Findings of Fact 45-47).

C. Market Performance and Concentration

(1) Growth and Demand

49. The United States industrial gases market is the largest industrial gases market in the world (Baker 391; Dempster 541; Smith 1728; Laister 2557). The industrial gases market in the United States is growing rapidly and many new applications for industrial gases have been developing (Flamm 245-46; Baker 391, 2718-19, 2722-23; Heckel 735; Cunningham 925-26). Industry witnesses anticipate an annual growth rate of up to 10 percent over the next 5 years (Baker 2719; Flamm 246). The U.S. market is, in fact, the most dynamic of the industrial gases markets in the world and presently provides more new business opportunities than all the other industrial gases markets in the world combined (Baker 2718).

50. Two significant new applications for industrial gases in the United States have been the development of nitrogen food freezing and the use of industrial gases in sewage treatment. The shortage of petroleum products has brought about additional new applications for industrial gases. Industrial gases are now being used in the production of synthetic natural gas or low-BTU gas that can be used for commercial purposes or in power generation. The elevated price of oil

has also led to the production of gas for pipeline transmission by the combustion of coal with oxygen. Additionally, industrial gases are now being used to generate basic chemical feedstock for a number of chemical products such as fertilizers and methanol. These new applications have created demand for large tonnage plants by public utilities and by chemical companies. The scarcity of natural gas has also made economically prohibitive the use of ammonia for generating nitrogen for metallurgical processes. This has further increased demand for nitrogen produced by air separation. Another new application for industrial gases is by the steel industry. The high price of scrap metal has resulted in steel companies using liquid pig metals to produce more steel rather than melting scrap. This new technique increases the requirements of steel companies for oxygen (Baker 439-41, 2716-18, 2724-25; Heckel 735; Cunningham 925-26). The industrial gases market as of 1974 is "very buoyant," one industry witness testified (Baker 2716).

51. The new applications for industrial gases and the very high level of economic activity in the United States have led to substantial growth of the U.S. industrial gases market (Baker 2718). During the last 2 years, the volume of industrial gases shipments by Air Products, for example, has increased 50 percent for merchant gases and 25 percent for tonnage gases (Baker 2723). Further, Air Products' sales of industrial gases increased 25 percent from 1972 to 1973 (Baker 2771-72). The demand for the principal industrial gases products, particularly tonnage oxygen, has increased to such an extent that the engineering and manufacturing capacity of the U.S. industry is insufficient to meet the demand for construction of new plants (Baker 2727). Air Products has recently had to tell customers that it was unable to supply their requirements for new industrial gases plants (Baker 2760). Many of the industrial gases, particularly the air separation gases, have been in short supply in the U.S. in the last year to two years (Flamm 239-40; Baker 403-04, 437-38; Dempster 543-44, 556-57; Perkins 787; Kimerling 871-72; Cunningham 924-25). Some industrial gases are, in fact, in such short supply that Linde has had to allocate customers (Flamm 240).

(2) Pricing

52. Prices for industrial gases have also increased in the last 2 years (Baker 403, 2723; Kimerling 879; Cunningham 925). Linde increased prices 10-15 percent in April 1974, which was followed by Airco (Flamm 304). The price controls of the Cost of Living Council, however, prevented industrial gases prices from rising as significantly as they might have (Cunningham 950). Mr. Baker of Air Products testified that prices have firmed since 1970, that marginal costing and marginal

pricing have disappeared and full costing and full pricing have become the standard (Baker 2723).

53. There is no price data in the record as such. BOC respondents contend that price competition in the industry is extremely rigorous, and reference is made to testimony of industry executives (Dempster 556; Baker 436-37; Flamm 305). This testimony is, however, somewhat equivocal. Mr. Flamm of Linde stated that between Linde, Air Products and Airco—"they argue their service is equal, I would say a fair amount of vigorous price competition." (Flamm 305). Further, this testimony, which is of the most general nature, must be viewed in perspective with the supply-demand situation existing during the past 2 years, and testimony that prices have firmed, marginal pricing has disappeared and full pricing has become the standard. Respondents also rely upon the observations in the Perham-Greenfield (BOC) report on the United States industrial gases market as of 1969-1970 (BOC RX 62). This report is, however, unreliable for the purpose of establishing actual price competition in the market, or the degree of price competition that actually existed. The report is not only self-serving, but it is double hearsay, consisting of what BOC officials reported industry executives told them. The report also covers the period 1969-early 1970. The supply-demand situation and industry pricing practices changed substantially from early 1970 to the end of 1973 when the challenged acquisition occurred (Findings of Fact 50-52).

54. BOC respondents placed several charts in evidence which demonstrate that actual unit value of major industrial gases has declined in recent years (BOC RX 246; BOC PF 123). Conclusions regarding prices have been drawn from data compiled by the Bureau of the Census on the total value and quantity of shipments of the various gases, f.o.b. plant, with the unit value (*i.e.*, the ratio of total value of shipments to total quantity of shipments) used as an approximation of price. These conclusions have some validity when applied to the tonnage segment of the market because pipeline distribution is cheap and distribution expense is not a significant cost element. In the merchant segment of the market the conclusions are meaningless because distribution costs are a significant factor in pricing, and the f.o.b. plant values utilized by BOC do not take into account such expenses. Further, declining unit value has little significance in establishing that the marketplace is highly competitive. The basic pattern in the industry has been an increase in volume purchased by individual customers and a trend toward pipeline delivery. Thus, the increasing use of tonnage oxygen with low delivery costs has had an averaging-down effect on the unit value of shipments. Economics of

scale in production and delivery has also effected lower unit costs (Baker 2745-46).

(3) Structural Features

55. BOC respondents also contend that there are structural features of the industry which assure price competition and prevent oligopolistic pricing practices. These features are backward integration by tonnage users, the high fixed costs in the industry, concentration and economic power on the buyers' side, and product homogeneity (BOC PF 130, *et seq.*). There has been some vertical integration by large users of industrial gases into producing their own requirements of certain gases. The record, however, does not reflect any trend towards vertical integration, nor does it show any significant existing threat that customers will back integrate. The probable pricing effect of the threat of back integration is speculative; no direct evidence of effect has been presented. Back integration is not practical for all industrial gases. The record does not establish the percentage of potential customers which have vertically integrated. Further, the potential for integration is confined to tonnage customers; it has no effect on the merchant market. The record does establish that potential customers which might seek to back integrate must look, in large measure, to industrial gases companies to construct a plant (Smith 1669). In periods of shortage, such as existed in the market in 1973-1974, industrial gases companies were over-committed and were refusing requests to construct plants (Baker 2727). Thus, the threat of back integration is minimal. Back integration by large buyers is present in many industries and there is no showing that the effect of such possibility on pricing in the industrial gases industry is more significant or as significant as in other industries. In fact, the record does contain evidence that back integration has had little effect on pricing. Air Products, a major industry factor, normally makes a profit on tonnage gases (Baker 2741). Industry witnesses testified that companies that have back integrated normally sell any surplus production to an industrial gases company for distribution to the general market (Baker 2744; Flamm 345). Further, the companies that have to some extent back integrated, are not looked upon as possible entrants into the industrial gases industry (Baker 443, 2743-44).

56. A significant feature of the industrial gases industry is the fact that fixed costs are quite high in relation to the total cost of producing atmospheric gases. The largest elements of cost are depreciation on the physical plant and power cost. Because of this, BOC respondents argue that as a matter of economic theory, there should be extreme price competition in the industry, citing F. Scherer, *Industrial Market*

Structure and Economic Performance, 192-198 (1970). As complaint counsel point out (CCRB, p. 28), according to Dr. Scherer, as a matter of economic theory there should be price competition in high fixed cost industries during periods of oversupply and overcapacity, but in actual practice firms in high fixed cost industries avoid price competition. As explained by Mr. Scherer:

Recognizing the temptations confronting them, firms in high fixed cost industries seem to exercise extraordinary restraint in their pricing actions, and when tacit restraint fails, they have an unusually high propensity to scurry into formal collusive agreements. (*Id.* at 195).

In recent periods, there has been a very tight supply situation in industrial gases. Thus, the economic theory relied upon by BOC respondents can be given little weight in establishing extreme price competition.

57. For reasons already stated, BOC respondents' other two arguments, economic power of the buyers and product homogeneity, afford little proof of extreme price competition. A substantial part of the industrial gas market—the merchant market—is composed of small purchasers. Even the large purchasers of certain gases purchase other gases in small quantities. Thus, the economic power of the buyers is lessened by other market factors. The effect of product homogeneity on pricing is tempered by an emphasis on service competition (Flamm 305). There is some indication that instead of extreme price competition, the dominant firms in the industrial gases market engage in interdependent and parallel behavior. At a private meeting on Sept. 6, 1973, Airco's Chairman, George Dillon, told Mr. Smith, BOC's Chairman, that the U.S. industrial gases market had stabilized, and "the three main competitors no longer encroach on each others' area of domination." (CX 95D). Therefore, the evidence of record does not support a finding of extreme price competition.

(4) Profitability

58. BOC respondents contend that the industrial gases industry has not been profitable in comparison to other manufacturing and chemical industries (BOC PF 151, *et seq.*). BOC's reliance is based upon consolidated returns of industrial gases companies which are engaged in many lines of business (BOC RX 254). Consolidated returns of corporations engaged in several lines of commerce shed little light on the profitability of individual segments of their business. RAX 7, Airco's 1973 annual report, shows that in 1973, industrial gases, cryogenic, welding and cutting equipment accounted for 44.9 percent of sales and 52.7 percent of earnings; in 1972, these divisions accounted for

48.7 percent of sales and 60.8 percent of earnings. Thus, this segment of Airco's business was more profitable than the other segments. BOC respondents also claim, on the basis of Dr. Andrew Kridl's testimony, that the industrial gases operations of the diversified companies are less profitable than their other operations (Kridl 2196-98). Dr. Kridl's testimony, however, is diametrically opposed by the Stanford Research Institute study in which Dr. Kridl participated. The S.R.I. study concludes that the industrial gases portion of the operations of these diversified companies is more profitable than the other activities of the companies (CX 345J, *in camera*; see CX 345C, *in camera*). The S.R.I. study also indicates that the U.S. industrial gases market is more profitable than industrial gases markets in Western Europe (CX 345I, *in camera*; see also 345M, *in camera*). Thus, the record evidence on profitability is equivocal at best. No hard evidence on rate of return on industrial gases was placed in the record. BOC's attempt to utilize information in the Commission's investigative files on rates of return produced summaries of doubtful probative value (BOC RX 254; Topkis 2693). The record is clear, however, that no industrial gases company has abandoned the market, or any segment of the market because of low profitability. In fact, the major companies are expanding capacity rapidly (Flamm 289, 322-23; Baker 438, Dempster 558; Giordano 1962-63, 1991-92).

(5) Concentration

59. Firms that produce and sell industrial gases are required by law to report to the Bureau of the Census the quantity and net selling value, f.o.b. plant, of the industrial gases produced and shipped by them (CX 299A-D; CX 300A-D; CX 298A-D). The Bureau of the Census publishes annual reports entitled "Current Industrial Reports" of the yearly shipments of industrial gases by manufacturers classified in the industrial gases industry, SIC 2813 (CX 312A-K).

60. The Bureau of the Census also publishes a "Census of Manufacture" report which sets forth for every fifth year the value and quantity of industrial gases shipments by all manufacturers (CX 296A-F). The manufacturers not classified under SIC 2813 that produce industrial gases are those companies which produce industrial gases as other than their primary product at a given establishment; generally such gases are produced for their own use. These companies occasionally have surplus gases which they generally wholesale to industrial gases companies on a spot basis (Flamm 345, 354-55; Baker 2743-44). These companies do not market industrial gases on the open market and are not considered by industrial gases companies to be part of the industrial gases industry (Flamm 345-46; Kimerling 885;

Cunningham 952-53; Baker 2743-44). Accordingly, those companies are not part of the relevant market in this proceeding (Finding of Fact 67).

61. The total value of industrial gases shipments f.o.b. plant in the U.S. for 1972 reported to the Bureau of the Census by those firms primarily engaged in the manufacturing of industrial gases for sale was \$595 million (CX 296A). The total value of industrial gases shipments f.o.b. plant in the U.S. for 1972 reported to the Bureau of the Census by all manufacturers was \$649 million (CX 296A).

62. See Confidential Finding of Fact.

63. The total value of industrial gases shipments f.o.b. plant for 1972 reported to the Bureau of the Census by the four largest U.S. producers and marketers of industrial gases was \$414 million. The total value of industrial gases shipments reported by the four largest producers and marketers of industrial gases accounted for 69.6 percent of the total value of industrial gases shipments for 1972 by all primary manufacturers of industrial gases and 63.8 percent of the total value of industrial gases shipments for 1972 by all manufacturers (Confidential Finding of Fact 62).

64. The eight largest producers and marketers of industrial gases in the United States in 1972 were Linde, Air Products, Airco, Chemetron Corporation, Liquid Air, Inc., Big Three Industries, Liquid Carbonics Corporation, and Burdett Oxygen Company of Cleveland (Flamm 227-29; Baker 366-67; Heckel 746; Hines 757; Kimerling 864; Cunningham 921-22). The total value of industrial gases shipments f.o.b. plant for 1972 reported to the Bureau of the Census by the eight largest producers and marketers of industrial gases in the United States was \$514 million, as adjusted on a *pro forma* basis to include the acquisitions of Liquid Air (Confidential Finding of Fact 62). The total value of industrial gases shipments reported by the eight companies accounted for 86.5 percent of the total value of industrial gases shipments for 1972 by all primary manufacturers and 79.3 percent of the total value of industrial gases shipments for 1972 by all manufacturers (Confidential Finding of Fact 62).

65. Over the past 5 years, top four concentration in the U.S. industrial gases market has increased significantly from 67 to 70 percent while top eight concentration has increased from 84 to 86.5 percent, based on total shipments by all primary manufacturers of industrial gases.

Initial Decision

86 F.T.C.

Concentration Ratios From 1967 to 1972 Industrial Gases; SIC
2813

Value of Industry Shipments²

Year	Top 4 Concentration	Top 8 Concentration	Source
1967	67	84	BOC RX 72F
1972	70	86.5	CX 296A; CX 325A, in camera; Flamm 221;

(Confidential Finding of Fact 62)

66. The increase in concentration in the U.S. industrial gases industry, as shown above, is also demonstrated by record evidence that there has been a considerable decrease in the number of industrial gases firms in the last 15 years as a result of acquisitions and mergers. Both Air Products and Liquid Air, Inc. have made significant acquisitions of industrial gases companies during this period. Air Products acquired three industrial gases producers in 1961: Southern Oxygen Company, Delta Oxygen Company, and Hill Industrial Gas Company. At the time of their acquisitions, these three companies had sales of approximately \$12 million, \$3 million and \$1.5 million, respectively (Baker 409-11). Canadian Liquid Air Ltd. entered the U.S. industrial gases market in 1968 by acquiring American Cryogenics, Inc. American Cryogenics, Inc. later became Liquid Air, Inc. Subsequently, Liquid Air, Inc. acquired Industrial Air Products of Oregon in 1969, Gulf Oxygen Company of Lake Charles, La., and Dye Oxygen of Phoenix, Ariz., as of 1973. At the time of its acquisition, American Cryogenics had industrial gases sales of approximately \$13.5 million per year. The other companies at the time of their acquisition by Liquid Air had industrial gases sales of approximately \$7.7 million, \$3 million and \$6 million, respectively (Dempster 511, 518-19, 528-30, 552). A number of other small companies have also gone out of existence during this period through acquisitions and mergers (Kimerling 861-62; Baker 407-08).

67. BOC contends the Census universe relied upon by complaint counsel is not a meaningful universe because the value of shipments excludes gases produced for consumption in the producing plant; the data excludes hydrocarbon gases such as propane, butane, propylene; sulphur dioxide and chlorine; and the value of helium produced in government plants (BOC PF 161-65). BOC's contentions, while

² Value of industry equipment figures as reported for 1967 are not strictly comparable with 1972 data. Shipments included in 1967 data but not included in 1972 data are values of all secondary products primary to other industries, values of miscellaneous receipts for contract work on materials owned by others, scrap, salable refuse, repairs, etc., and value of resales *i.e.*, products resold in the same condition as bought (RX 72F, n. 3).

factually accurate, are without merit. The relevant market, as previously found, is the production and distribution of industrial gases by the industrial gases companies. Industrial gases produced for in-house consumption are not part of this market as such gases are not resold in the marketplace (Flamm 345). Further, the industrial gases industry does not consider such production a part of the industrial gases business (*see* Flamm, 294-95). Hydrocarbon gases such as propane, butane and propylene are not considered part of the industrial gases industry, but a part of the petroleum industry (*see* Finding of Fact 39; Baker 426). Chlorine is not considered an industrial gas (Flamm 319; Kridl 2140). The record contains little evidence of the value of helium produced in government plants; however, the government does not participate in the industrial gases industry and hence is not part of the relevant market in this proceeding.

68. The Census figures showing value of shipments of industrial gases produced by *all* producers is \$649 million in 1972, as compared to value of shipments of industrial gases produced by plants classified in the industrial gases industry of \$595 million. This difference in value of \$54 million could be accounted for by production by back-integrated producers who have a surplus, or by petroleum companies and chemical companies that have a surplus of in-house industrial gases production. The record establishes that this production is primarily sold to industrial gases companies which resell in the marketplace (Flamm 272, 354-55; Giordano 1924-25). Thus, this production is marketed by industrial gases companies although not reflected in Census figures for the industrial gases industry.

69. The universe figures utilized by complaint counsel and adopted by this Initial Decision do not include industrial gases sold by industry companies but not reported to the Bureau of the Census in SIC 2813, such as propane, etc. To this extent the total universe figures are understated. However, as previously found, these gases account for an insignificant percentage of sales by industrial gases companies (*see* Finding of Fact 39).

70. In sum, industry concentration figures proposed by complaint counsel based on Bureau of the Census reports and heretofore found (*see* Findings of Fact 62-65) appear to be an accurate basis upon which to assess industry concentration and to evaluate the economic effects of the challenged acquisition of Airco by BOC.

(6) Barriers to Entry

71. There are substantial barriers to entry into the production and marketing of industrial gases in the United States. The principal barriers to entry into the U.S. industrial gases market are high capital

cost, technical knowledge and expertise, and marketing capability (Flamm 233-37; Baker 383-86, 2734-35; Dempster 526-27; Kimerling 872-73; Cunningham 944).

72. The production and marketing of industrial gases in the United States is capital intensive. Substantial capital is needed for production plants. For example, the cost of a 250-ton air separation plant and related equipment is \$7 or \$8 million dollars (Cunningham 944). Large plants cost up to \$16 million (Giordano 1939-40). There is a considerable time lapse between the decision to build and the actual construction of an industrial gases plant. The time for bringing an air separation plant on stream can be as long as two years (Flamm 235).

73. A high degree of technical expertise, particularly in the field of chemical engineering, is required to produce and transport industrial gases. The cryogenic facilities which produce atmospheric gases are operated at extremely low temperatures and can be hazardous to employees and the surrounding community if misoperated. Many industrial gases are distributed at low temperatures in bulk liquid form and must be transported in specially constructed vessels and equipment designed to withstand extreme temperatures. Additionally, there are strict federal regulations which must be adhered to in shipping industrial gases (Baker 384; Giordano 1915-16).

74. The marketing of industrial gases requires an in-depth understanding about how the gases are produced and purified and how their integrity is maintained. Marketing also requires a thorough knowledge of the physical and chemical properties of industrial gases as the gases are used in a wide range of industries and each industry has many different applications. Knowledge of the unique applications of industrial gases by customers in different industries is therefore paramount to success in the marketing of industrial gases (Baker 384-85; Dempster 527; Kimerling 872). Further, a firm needs an established reputation as a technically sound supplier of industrial gases before its products will be accepted in the marketplace. A company that is not known in the marketplace as a technically sound supplier of industrial gases cannot achieve marketing success in the U.S. market simply by employing three or four people with previous marketing experience (Flamm 351-52; Baker 2734-35; Laister 2671).

75. The necessity of technical and marketing experience and capabilities for successful entry into the U.S. industrial gases market is clearly demonstrated by the unsuccessful attempt by Standard Oil of New Jersey (now Exxon, Inc.) to enter the U.S. industrial gases market by acquiring American Cryogenics, Inc. Standard's expertise was not in the industrial gases field and American Cryogenics, Inc. at the time Standard sold it to Canadian Liquid Air was losing \$4 million a year on

sales of \$20 million. Canadian Liquid Air did have the necessary expertise and capabilities to produce and market industrial gases and consequently turned American Cryogenics, Inc. into a profitable operation (Dempster 518-21, 526-27).

76. In contrast to the many U.S. industrial gases firms that have gone out of existence in the last 15 years, there have been only two entrants of any consequence that have come into the market during the period, both entering by acquisition. Canadian Liquid Air entered the U.S. market by acquiring American Cryogenics, and Houston Natural Gas entered by acquiring Liquid Carbonic (Baker 406; Dempster 518-19).

D. Competitive Impact of the Acquisition

(1) The Combination of BOC and Airco

77. Airco produces and markets industrial gases throughout the United States, and it is one of the largest firms in the industrial gases market in terms of value of shipments (Giordano 1922, 38; Finding of Fact 62, *in camera*). Airco is therefore not a toehold (Topkis 913).

78. BOC produces and markets industrial gases in a multitude of countries and is reportedly the second largest industrial gases company in the world (Flamm 262; see also Smith 1801-08). Prior to BOC's stock acquisition in Airco, BOC was the only one of the three largest industrial gases companies in the world that was not operating in the United States. The largest industrial gases company in the world prior to BOC's acquiring a stock interest in Airco was thought to be L'Air Liquide, and the third largest was Linde (Flamm 262). L'Air Liquide and Linde are already in the U.S. industrial gases market. L'Air Liquide entered in the U.S. market through its Canadian affiliate, Canadian Liquid Air, which acquired American Cryogenics, and operates in the United States as Liquid Air, Inc. (Dempster 518-19).

79. See Finding of Fact, *in camera*.

(2) Elimination of BOC as a Perceived Potential Entrant

80. BOC was recognized by members of the industrial gases industry in the United States as one of the few firms possessing the capital resources, technical knowledge and expertise and marketing capability required to successfully enter the U.S. industrial gases market (Flamm 237-38, 248-51; Baker 385-86; Dempster 543, 561; Muller 681; Giordano 1992). Further, BOC was recognized by Linde and Air Products, two of the largest firms in the industry, as the firm most capable of entering the U.S. industrial gases market (Flamm 250; Baker

390). Additionally, BOC was one of a few firms perceived by members of the industrial gases industry in the United States as being able to enter and likely to enter into the U.S. industrial gases market (Flamm 251-52, 335; Baker 393; Loveman 594; Muller 681-83; Kimerling 876). Linde and Air Products perceived BOC as the firm most likely to enter the U.S. industrial gases market (Flamm 251-52; Baker 393). Linde had considered BOC a potential entrant for the past two to three years (Flamm 335). Mr. Loveman of Burdett of Cleveland testified that "* * * over the next five years, I would expect that they [BOC] would [enter the U.S. market] in some connection." (Loveman 594).

81. BOC's interest in entering the U.S. industrial gases market was well known throughout the U.S. industrial gases industry. BOC participated in the manufacturing and selling of industrial gases production facilities in the United States through a joint venture with Airco from 1967 through 1971 (Finding of Fact 5; Smith 1717-19, 1810; Giordano 1948-50; Laister 2535). During 1969-1970, BOC investigated the industrial gases industry in the United States for the purpose of entering the market and while doing so contacted numerous industrial gases firms in the U.S. market (CX 232A-Z-47, *in camera*). Further, in every year from 1970 through 1973, BOC representatives met with firms in the U.S. industrial gases industry to consider possible acquisition of those firms by BOC (*see infra*, Findings of Fact 90, 93, 96-102). It was generally known throughout the industrial gases industry in the United States that BOC had contacted firms in the industry about possible acquisition (Flamm 257-58; Dempster 545-46). Industry witnesses on cross-examination testified that their pricing and marketing decisions had not been affected by the perceived potential entry of BOC (Flamm 336-37; Dempster 567-68; Kimerling 881-82; Baker 446).

82. Aside from BOC, the only other firms considered by members of the industrial gases industry in the United States as possible entrants into the U.S. market were Messer Greisheim and Linde A.G., both of Germany, and AGA of Sweden (Flamm 250; Baker 390). Messer Greisheim and Linde A.G. operate as a joint venture in entering markets outside of Germany (Baker 2747-48). Linde A.G. lacks BOC's marketing skills as it is primarily a manufacturer of industrial gases plants for sale to others. Its marketing area for industrial gases is limited to Germany, Central Europe and South Africa (Muller 719-20). Messer Greisheim does not have the technology nor marketing capabilities of BOC and does not market industrial gases to any extent outside of Germany (Muller 720-22). BOC was of the opinion that Messer Greisheim's interests lay in other directions than industrial gases (CX 76L, *in camera*). AGA of Sweden was perceived as having

some of the prerequisites for entry; however, its resources were questionable (Smith 1760; CX 76L). Although Japanese companies have the resources and technology to enter the U.S. industrial gases market, none has ever invested in industrial gases markets outside Japan (Smith 1761).

83. None of the companies in the United States which operate industrial gases plants for their own use [vertically integrated] are considered potential entrants into the industrial gases market by members of the U.S. industrial gases industry, nor are they considered to have the expertise and capabilities needed to enter into the open market sales (Flamm 346; Baker 443-44, 2743-44; Dempster 564). None has entered the industrial gases market to date; all have sold their surplus production, if any, to industrial gases firms (see Finding of Fact 55). Thus, it is concluded that BOC was the most likely potential entrant into the U.S. industrial gases market and was so perceived by members of the industrial gases industry.

(3) Elimination of BOC as an Actual Potential Entrant

(a) *BOC's Incentives for Entry Into the U.S. Market*

84. The Board of Directors of BOC was convinced that it was in BOC's economic interest to further expand its international operations. On Feb. 25, 1974, in a statement to shareholders, Mr. Smith, chairman of BOC, declared that the acquisition of 4 million shares of Airco stock enabled BOC to pursue its "long-term objective." Further, Mr. Smith explained that BOC's future lies in expanding its international operations, especially in industrial gases and equipment (CX 292D, H).

85. The history of BOC demonstrates its commitment to expansion of its industrial gases operations throughout the world. BOC began as a small Scottish company toward the end of the last century. Its industrial gases operations eventually extended throughout the United Kingdom and Ireland. By 1956, BOC had expanded beyond the U.K. into the following countries: Australia, South Africa, Canada, India, Pakistan, Singapore, Malaya, Hong Kong, East Africa, Rhodesia, the Philippines, Fiji, and New Guinea (Smith 1800-03). Since 1956, BOC has expanded into Italy, Indonesia, Thailand, Bangladesh, and most recently into Brazil (Smith 1806-07). On August 18, 1969, BOC's Chairman stated that it was BOC's "declared policy" to become more "truly international." (CX 36A-B; Muller 652; Smith 1723, 1822). BOC officials realized that BOC could not operate as a truly international industrial gases company without being in the U.S. industrial gases market (Smith 1728-29, 1731; Laister 2557, 2659).

86. In addition to BOC's commitment to becoming a truly interna-

tional company (which would involve entry into the U.S. market), there were several other significant incentives for BOC's entry into the industrial gases market in the United States. First, the U.S. market is the largest industrial gases market in the world and also the most important and advanced market in the world (CX 36A-B; Smith 1728; Laister 2557). BOC also regarded the United States as the strongest economy in the world, and one that still enjoyed a respectable growth rate (Giordano 2000-01). Over the past two years, the growth rate in the United States for industrial gases has been substantial and this growth is projected to continue (Baker 2722-23).

87. Further, BOC desired to be "in tune" with the U.S. industrial gases market not only because of its size and opportunity for growth, but also because it is a source of substantial new technology (Smith 1728). The U.S. market presently provides more new applications for industrial gases than all the other industrial gases markets in the world combined (Baker 2718; Findings of Fact 49-51). Also BOC had determined that it was to its advantage to be in the U.S. market, as its major international competitors participate therein (Smith 1729; Laister 2658). BOC planning documents prepared in August 1969, stated that "[T]here must be competition with American-based international corporations on their home grounds, at least in certain selected businesses, if [BOC] is to be confident of survival internationally against American-based firms." (CX 38C.)

*(b) BOC has the Capital Resources, Technical Knowledge and
Marketing Expertise for Entry into the U.S. Industrial Gases
Market*

88. BOC has the necessary capital to enter the U.S. industrial gases market (Topkis 237, 874; Smith 1760). The establishment by BOC of approximately 40 subsidiaries in countries around the world attests to BOC's immense capital resources (Smith 1644-45). Sales in fiscal 1973 for the BOC group were approximately \$765 million (CX 292Q). Capital employed in 1973 for the group was over \$715 million (CX 272Z-3), total assets were \$906,412,000 as of September 30, 1973, with current liabilities and provisions of only \$272,467,000 (CX 292S).

89. BOC has the technical and marketing expertise to enter the U.S. industrial gases market and was so viewed by Airco and other industry members (Topkis 237, 874-75; Flamm 248, 249; Baker 383-85; Dempster 543; Muller 697; Smith 1760; Giordano 1950, 1992). BOC's history of entering industrial gases markets around the world clearly demonstrates BOC's marketing, organizational and managerial skills. Of the 19 countries outside the U.K. that BOC has entered for the production and marketing of industrial gases, 14 were *de novo* entries; 5 were

entries by acquisition of small companies (Smith 1803-07). BOC has become the dominant company in many of the industrial gases markets it has entered (CX 301Z, *in camera*). The executive of the largest industrial gases company in the United States testified that the same marketing expertise BOC exploited in entering industrial gases markets throughout the world could be used by BOC to enter the industrial gases market in the United States (Flamm 238). Further, BOC has already had the benefit and experience of participating in the U.S. industrial gases market from 1967 to 1971 through its joint venture with Airco in the marketing of industrial gases production plants (Airco Admissions, Pars. 87, 88, filed April 10, 1974; Kimerling 876; Smith 1717-19, 1810; Giordano 1948-50; Laister 2535).

(c) *BOC's Investigation of Methods of Entry Into the U.S.
Industrial Gases Market*

(i) Dr. Muller's Consultancy

90. BOC has actively pursued various possible means of entering into the U.S. industrial gases market since at least 1968. In April 1968, BOC entered into a consulting agreement with Dr. Albert Muller. One of the primary responsibilities of Dr. Muller was the development of promising business opportunities for BOC in the United States (CX 111A). Dr. Muller has a strong background in industrial gases (Muller 648). On behalf of BOC, Dr. Muller contacted several U.S. companies in 1968, including the Clinton Oil Company, for the purpose of a possible joint venture in helium, Will Ross, Inc., with respect to the possible acquisition of its Mathieson Special Gases Division by BOC, and Gardner Cryogenics ("Gardner") regarding possible acquisition of that company by BOC (CX 186L-N; Muller 654-55). Canox, the Canadian subsidiary of BOC, had previously considered acquiring Gardner, which is a producer and marketer of helium in the United States (CX 208Z-66). At the time of Dr. Muller's contact, BOC gave serious consideration to acquiring Gardner. Dr. Muller held several meetings with William Gardner, president of Gardner. BOC also had a study made of the possibility of acquiring Gardner (CX 15A-Z-8, CX 17).

91. In 1969, BOC adopted a policy of becoming more truly international and accordingly sought "profitable opportunities to extend its operations in the world's most important and advanced market." (CX 36A). BOC's management had decided that BOC should enter the U.S. market in its major lines of business (Muller 653, 656-57). In order that more attention could be devoted to this task, J. A. Perham, president of Canox, was directed to assume responsibility for all such activity. To permit Mr. Perham to devote the necessary time to

this task, A. R. Dow was appointed executive vice president of Canox, relieving Mr. Perham of the responsibility for day-to-day operations of Canox (CX 36A-B; Muller 653, 656). Dr. Muller and Mr. Perham worked together in assessing and recommending profitable business opportunities in the United States to BOC (CX 29A). They were to devote their attention to product lines which were the same or complimentary to BOC's. They were to seek companies having sales between \$1-50 million. Acquisition candidates with sales of \$5-20 million were considered desirable by BOC (CX 29C-D).

92. In October 1969, Dr. Muller was told by the chairman of BOC to terminate all activities other than searching for opportunities for BOC in the U.S. industrial gases field (CX 42, CX 248A-B). In December 1969, the chairman of BOC informed Dr. Muller that BOC was going to be represented in the United States; the only questions were what, how, when and where (CX 47A).

93. As part of an overall study of the industrial gases market in the United States conducted by BOC between December 1969 and February 1970, Dr. Muller contacted several distributors of industrial gases in the United States for BOC (Muller 661-62; CX 121A).

94. In the spring of 1970, when Dr. Muller's consultancy contract expired, BOC instructed Dr. Muller to continue to forward to BOC any attractive prospects he discovered in the United States (CX 113, 114; Muller 669-70). In the summer of 1970, BOC employed Dr. Muller to assist Allan Perham in a further effort to acquire Gardner (Muller 679-80). Throughout Dr. Muller's association with BOC, BOC continually stressed its intention to enter the U.S. industrial gases market (CX 42, 47A; Muller 668).

(ii) Perham-Greenfield Study

95. By 1969, BOC had made a definite decision to enter the U.S. industrial gases market (CX 40A, CX 246). In the fall of 1969, BOC's planning group prepared a detailed study of the U.S. industrial gases market (CX 44, CX 246). In December 1969, BOC decided to investigate in depth the U.S. industrial gases market (CX 47). An extensive investigation was undertaken during which BOC contacted many U.S. industrial gases producers (CX 47, CX 232A-Z, *in camera*). The report on this investigation was completed in February 1970, and it was recommended that BOC not enter the U.S. industrial gases market at that time, but that this conclusion should not be considered final and that BOC should continue to look for future opportunities in that market (BOC RX 62B, *in camera*). After February 1970, BOC continued to have acquisition negotiations with producers in the market (Findings of Fact 96-102).

(iii) BOC's Efforts to Acquire Chemetron

96. In November 1969, Mr. Johnson of Loeb, Rhoades and Company, an investment banking firm, was told by BOC that BOC was interested in acquiring a U.S. industrial gases producer, and in particular, Chemetron (Johnson 832-33). In January 1970, BOC discussed with Chemetron the possibility of BOC acquiring a majority of Chemetron's stock (CX 223A; Johnson 833-35). Subsequently, BOC discussed with Chemetron the acquisition of a minority position in Chemetron with the later possibility of obtaining control (CX 223, 224, 225A).

(iv) BOC's Efforts to Acquire Burdett of Norristown

97. On Aug. 11, 1971, BOC discussed with Burdett Oxygen Company of Norristown (Burdett-Norristown) the acquisition of that firm and its affiliates by BOC. Also discussed at that time was the possible acquisition by BOC of National Welders, Selox, Alabama Oxygen and Gulf Oxygen (CX 250A; Perkins 792-93). Subsequently, a BOC official visited Burdett-Norristown to consider acquiring it (CX 254A, *in camera*). The visit by the BOC official lasted four days, during which he met all key personnel, inspected the plants and headquarters facilities and examined the books and records (CX 254A, *in camera*; Perkins 794-96). BOC continued to analyze Burdett-Norristown by checking out all the references Burdett-Norristown supplied to BOC (CX 254L-N, *in camera*; CX 255A-B, *in camera*). BOC subsequently informed Burdett-Norristown that although it was not then interested in acquiring the company, it had a continuing interest in the U.S. industrial gases market (CX 258).

(v) BOC's Efforts to Acquire Burdett of Cleveland

98. BOC considered Burdett Oxygen Company of Cleveland (Burdett-Cleveland) a likely acquisition candidate in 1969 (CX 40A). In 1969, BOC told Burdett-Cleveland that it would be interested if the company ever wished to dispose of its operations (CX 216). Mr. Perham and Mr. Greenfield of BOC visited Burdett-Cleveland during BOC's 1970 study of the U.S. industrial gases market and recommended that BOC watch to see if this firm would become available (CX 232D-E, *in camera*).

99. Early in 1970, an investment banker told BOC that 50 percent of the stock of Burdett-Cleveland could be purchased for \$4-5 million. In April 1970, BOC informed the banker that it would be interested in a majority position in Burdett-Cleveland (CX 233A, CX 234). After BOC was told it was then impossible to obtain control, BOC told the banker

that if the situation changed it would still be interested (CX 243). In September-October 1970, BOC told Burdett-Cleveland and its bankers that it was interested in buying Burdett's Niagara Falls, N.Y., industrial gases plant (CX 244A, CX 245).

100. On Oct. 15, 1973, BOC informed Burdett-Cleveland of its continued interest in acquiring Burdett-Cleveland (Loveman 592; see also Smith 1826). Burdett-Cleveland would not then sell out but stated it might do so within the next five years (Loveman 592). The interest expressed by BOC in Burdett-Cleveland convinced Mr. Loveman of Burdett-Cleveland that BOC would enter the U.S. industrial gases market at sometime in the future (Loveman 594).

(vi) Other Means of Entry Explored by BOC

101. Prior to the sale of Gulf Oxygen Company to Liquid Air, Inc. in 1972, a BOC representative asked John Hines of Gulf Oxygen Company if Gulf were for sale. Mr. Hines responded that it was not but that it would be available some day (Hines 759-60).

102. In 1972, BOC considered a joint venture with Chemetron to produce and market certain industrial gases, including oxygen and nitrous oxide (Keuhn 1155). BOC informed Chemetron during these discussions that it intended to enter the U.S. market for oxygen and nitrous oxide either on a "grass roots basis" or through acquisition (Keuhn 1152-53).

(d) *Testimony of BOC Executives*

103. The testimony of two of BOC's top executives was to the effect that BOC did not intend to enter the industrial gases market in the United States and that BOC would not have done so in the foreseeable future, but for the Airco transaction. Mr. Smith, chairman of the board of directors of BOC (Smith 1642), testified (1741-42, 1744):

Q * * * Had you not acquired a stock interest in Airco, would BOC have entered the American, United States, gases business in any way in the foreseeable future?

[Colloquy Omitted]

JUDGE BARNES: You may answer, Mr. Smith. Do you recall the question?

THE WITNESS: Yes. I cannot conceive any circumstances whatsoever that would bring BOC into the American market in the foreseeable future, barring Airco.

Similarly, Peter Laister, a director of BOC since 1969 (Laister 2528, 2533), testified (2552-53):

Q After the Perham-Greenfield report was received and considered [February 1970] (and before the meeting) which you had with merchant bankers which you have mentioned here today [regarding Airco in June 1973], did BOC have any intention

whatever to enter the U.S. gases business either on a Greenfield [greenfield] basis or by acquisition?

A There was no intention. Quite the reverse. We were quite determine[d], we decided when we had read the Perham-Greenfield report, that we would not enter on such a basis.

104. Mr. Smith testified that *de novo* entry would be extraordinarily costly. He estimated that it would be likely to cost \$240 million and to take ten years to produce a viable national competitor, by which he meant a market share in excess of 5 percent (Smith 1835-36). He added that he could not "conceive the circumstances in which [he] would have persuaded [his] board to expend that amount of money and take that amount of time, and to have that deteriorating effect on [BOC's] return that they would have said yes." (Smith 1836-37). Entry by acquisition of a firm smaller than Airco was viewed by Mr. Smith as subject to most of the same difficulties as *de novo* entry.

105. These denials by BOC officials must be considered in the light of their other testimony given at the hearings. Mr. Smith testified that BOC had a stated objective of becoming a more international company (Smith 1723). In describing BOC's reasons for acquiring Airco, Mr. Smith testified that the first reason was BOC could work with Airco and:

The second reason was that despite having had to turn our backs on the American market in the belief that there was no way in, the fact is that the American market is much the most powerful and largest in the world, and it must be of continuing interest to any company which has ambitions to act internationally.

The third reason is that the American market, partly as a result of its size, is the source of much technology, much new development, and we have to be in tune with that.

We have to keep pace with that.

And there was no better way of doing it than by getting an interest in Airco.

The international—the industrial gas business has moved in the last five, seven years to really being a well competitive situation.

In fact, the single national economy is very rarely these days sufficient to maintain the pace of development and to get the best out of capital resources and technological resources.

And this is why or partly why the world scene is dominated by a handful of international companies.

Now, two of the international competitors with whom we meet at different parts in the world are American companies.

And certainly we saw an advantage in being present in the same market in which our own international competitors are present.

Q What two do you have in mind, sir?

A Air Products and Union Carbide [Linde].

Q All right.

A And lastly, but I don't doubt just as important, is our belief that at the price we were paying for Airco we would get a reasonable return, and in circumstances much better than anything else we could have devised so far as American markets are concerned (Smith 1728-29).

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* * * * *

Q There was reference in one of the documents which you identified and which was received in evidence, and indeed there was reference in your earlier testimony to BOC's ambition to be ever more international, ever more multi-national.

Did that play a role in this decision?

A Yes.

I don't believe that one can really claim to be a multi-national company without operating in the North American market. (Smith 1731).

* * * * *

Q What was the purpose in acquiring the stock in Airco?

A I think as a matter of fact, I have given this in my testimony yesterday, I am very happy to go through it again.

The first reason is that we have always been interested in the industrial gas market in America. While there is no virtue attached to the claim of being an international company, there are nevertheless benefits which can be obtained by being an international company, and quite clearly, those benefits are diminished if we don't have a position in North America. (Smith 1843-44).

Airco offered BOC the national [U.S.] market in "one jump" (Smith 1736).

106. Peter Laister, a BOC managing director, testified:

The next point is that we are an international company but in an international sense we were incomplete. We were not operating in America where three of our international competitors, Air Liquide, Union Carbide and Air Products, for example, operate. (Laister 2557).

* * * * *

A * * * There were a number of reasons why I personally thought that the tender offer was the right thing to do for BOC and for its shareholders.

First of all, it shows a return upon the investment.

Secondly, it adds to the international strength of BOC.

Thirdly, it gives us a place in the American market which we could see no other way of obtaining.

Q In the American industrial gas market?

A In the American industrial gas market.

Fourthly, it gives us the opportunity of benefiting in the longer term and with providing benefit to Airco in terms of some product or technological interchange, but that is for the future.

Lastly, it places us in the same marketplace as our major international competitors.

Q Let's discuss that. Why is that important to you, sir?

A Basically I think because if they operate in America and there is technological or other development or marketing development, then there are opportunities open to them which are not open to us. That is the first point.

Q Such as?

A Well, I don't know. You know, it is a very large marketplace. Certainly the use of liquid nitrogen for freezing has developed in America ahead of the way it has developed in Europe. Those who take part in America will obviously have that technology available to them, so it is all matter like that.

I don't feel that we could pretend to be a fully international company in the long term if we had given no consideration to the possibilities of the American marketplace. (Laister 2658-59).

107. Although testifying that BOC could not enter the U.S. industrial gases market *de novo* or by toehold acquisition, Mr. Smith acknowledged that BOC has entered many industrial gases markets throughout the world on a *de novo* basis; in other countries, very small acquisitions served as a basis for market entry (Smith 1804-07). In Brazil, BOC is starting in the market with a tonnage plant where it does not have any merchant business (Smith 1807).

(e) *BOC Documents*

108. In 1969 and early 1970, Allan Perham, chairman of the board of Canox, and I. Greenfield, a member of BOC's London marketing research staff, were detailed by BOC to conduct an extensive study of the U.S. industrial gases business. The purpose of the study was two-fold:

- (i) To analyse the present and likely future situation in the American market, and to draw therefrom any lessons and experience which might have application in BOC Group. Subsequently,
- (ii) To consider whether there are any identifiable opportunities in USA which BOC might wish to exploit at some future date. (BOC RX 181-C; *accord*, CX 47A)

Perham and Greenfield conducted such a study of the U.S. industrial gases market, which included interviews and visits with participants in the industrial gases business in this country, collection of much data, and visits to American distributors (CX 44, CX 232). The Perham-Greenfield report was negative on entry at that time by BOC into the industrial gases business in the United States; however, the report noted that this conclusion was not final and that the situation should be subject to periodic review (BOC RX 62B).

Mr. Smith, BOC's chairman, testified (1710):

Q Now, I would like to ask you, please, sir, following the receipt of the Perham-Greenfield report, what did you do about the US gases field afterward?

A What we did was to continue to be very interested in what was going on in the American industrial gas market but what the Perham-Greenfield report told us was that it confirmed an existing belief which existed among all of the top management of the BOC Group was that there was no practical way of coming into the American market.

109. In July 1970, the BOC board of directors adopted priorities of investment and a budget for the development of its business through 1973. Contemporaneous BOC board minutes record these priorities and funds allocated for BOC development:

Following outline approved:

		<i>Millions</i>
1st:	For the UK	28.0
2nd:	For restoring BOC holdings in existing overseas subsidiaries to minimum 60%	3.1
3rd:	For expansion of existing overseas subsidiaries	5.0
4th:	For Europe	10.0
5th:	For Japan, USA and South America	3.9
		50.0 millions

(BOC RX 67A)

The funds allocated to the United States, Japan and South America included no sums for entering the industrial gases market (Smith 1714). Mr. Laister testified, however, that acquisitions are left out of planning documents when it is uncertain what acquisitions will occur in the future (Laister 2569-70). He also testified that:

Quite obviously in any large business you can't read the future a few years out. (Laister 2621A).

(f) *Feasibility of BOC's Entry*

110. It was clearly feasible for BOC to enter the industrial gases market in the United States either *de novo* or by toehold acquisition (See Smith 1760). Further, there is no evidence which indicates the presence of any unique features in the U.S. market which would preclude entry by BOC in the same manner BOC entered many industrial gases markets around the world which has been accomplished by a *de novo* or "grass roots" entry, or by the acquisition of a small producer (Smith 1803-07). BOC entered the Canadian industrial gases market *de novo* after World War II and is now the third largest firm in that market with sales of \$8 million (Smith 1759; Dow 2042; Laister 2560). BOC recently entered the Brazilian industrial gases market with a small plant (Smith 1006). The Brazilian market has a growth rate comparable to the U.S. market (Baker 2731). Other major producers have entered foreign markets successfully on a small basis. Air Products successfully entered Great Britain in 1957 as a *de novo* entrant. By 1973, Air Products held 25 percent of the industrial gases

market in Great Britain (Baker 413-17). Air Products recently entered the Canadian market on a very small basis, having less than 1 percent of the market (Baker 2711-15).

111. Liquid Air, Inc. successfully entered the U.S. industrial gases market through the purchases of toehold firms in 1968, 1969, 1972 and 1973 (CX 335V-W; Dempster 528-30). At the time Liquid Air entered the U.S. market, it purchased American Cryogenics from Standard Oil of New Jersey. At that time, American Cryogenics was losing money at the rate of \$4 million per year. Liquid Air was able to turn the company around, and with the acquisition of other small industrial gas producers, developed a substantial and profitable U.S. operation (Dempster 518-21, 526-27).

112. BOC could have entered the U.S. industrial gases market in any of several ways. It could have entered by acquiring one or several small producers of industrial gases; it could have entered by bidding on a tonnage plant; it could have added incremental capacity to the tonnage plant for sale in the merchant market; it could have entered into a joint venture as was discussed with Chemetron (*see* Finding of Fact 102); or it could have utilized any combination of the above. At the time BOC acquired the stock of Airco, there were and still are a number of attractive small U.S. industrial gases producers available for acquisition, including Burdett of Norristown, Northern Gases and Supply, and Alabama Oxygen (Heckel 736; Perkins 788; Kimerling 876; Baker 393, 2734-35, 2750, 2781; Flamm 260).

113. BOC argues that *de novo* entry would involve a very high cost (BOC PF 247-49). BOC's chairman estimated that *de novo* entry producing a viable operation—over 5 percent of national sales—would be likely to cost \$240 million. This high cost would be coupled with uncertainty as to whether there would be a return on such an investment, and, if so, when such a return would be realized. Another obstacle to entry into the industrial gases business in the United States, according to BOC, is the need for “backup”—the supply of gas to major customers from alternative sources when the producer's supplying plant is out of service, either for scheduled maintenance or as a result of plant failure (Giordano 1931-32; CX 335Z). BOC also argues that major tonnage supply contracts in the industrial gas industry typically are for terms of 15 years (Baker 2739-40), and that it is not feasible to enter the tonnage end of the industry by soliciting existing customers of the firms in the business already.

114. None of these arguments are persuasive. BOC has entered markets around the world *de novo* and on a small basis. The record does not establish that it is necessary to immediately secure 5 percent of the national market. As to uncertainty as to whether there would be an

adequate return, this is always a concern to any enterprise in a free competitive society. The health of the U.S. industrial gases market as of December 1973, is a strong indication that BOC could have entered the market, with an excellent chance of realizing a normal profit. There is no evidence that backup supplies are not readily available to all industry members (Loveman 585). There is no evidence that backup has caused any company to avoid any market in the world, or to avoid any contract of any kind. Backup may be a competitive obstacle, but it is not a barrier to market entry. As for long term tonnage contracts, BOC's opportunity for market entry is not limited to seeking existing customers under contract; BOC can compete for the new market demands which the record indicates existing firms were unable to satisfy.

115. BOC argues that the small companies which are in the U.S. industrial gases market are either unattractive investments or there is no showing they are available for acquisition (BOC PF 257-314). The record does establish that there are small companies in the industrial gases market and that they are available for acquisition now or would be in the future (Loveman 592; Perkins 788; Heckel 736, 746-48). The record does not establish whether they would be good investments or bad investments. Such a burden would be unrealistic. The record does establish, however, that Liquid Air entered the U.S. market by acquiring a company in 1968, that was losing \$4 million per year. Liquid Air now has a profitable U.S. operation. The industrial gases market was much more attractive in 1973 than in 1968 when Liquid Air entered the market.

116. December 1973 would have been an opportune time for BOC to enter the U.S. industrial gases market either on a "grass roots" basis or through the acquisition and expansion of a small company (Baker 2734-35). BOC's apparent reason for acquiring Airco stock as its method of entry into the U.S. industrial gases market was that it undoubtedly offered BOC a substantial share of the U.S. industrial gases market at "one jump" with less risk to its investment. As a matter of fact, BOC had been considering purchasing Airco, or Airco's gases division, for several years (CX 37A, CX 40A; Laister 2540-41). It is thus concluded that BOC was an actual potential entrant into the U.S. industrial gases market as of December 1973.

IV. *Inhalation Anesthetic Equipment*

A. Relevant Product Market

117. The complaint alleges that one of the effects of the acquisition of Airco stock by BOC may be substantially to lessen competition or to

tend to create a monopoly in the manufacture, distribution or sale of inhalation anesthetic equipment, or any submarket thereof, throughout the United States or sections thereof (complaint, Par. 27). "Inhalation anesthetic equipment" (hereinafter IAE) is defined in the complaint as equipment and accessories used in the administration of gas for anesthetic purposes (complaint, Par. 1(b)). Dr. John Hedley-Whyte, an anesthesiologist, testified as complaint counsel's expert on IAE (Hedley-Whyte 1189-1294). He defined IAE as that equipment necessary and useful for the giving of inhalation anesthesia to patients (Hedley-Whyte 1196).

118. Complaint counsel issued a subpoena to the leading firms in the industry calling for sales of all IAE products (CX 316B, *in camera*; Kuehn 1140; Scott 1355-56; Schreiber 1060-63; Hedley-Whyte 1156-57, 1170). This subpoena listed the following products as comprising the IAE market:

(a) *Anesthesia machines*. The essential elements of an anesthesia machine are a cart and a cabinet which provide a framework for the other equipment, and yokes, regulators, needle valves and flow meters, vaporizers, breathing circuits (conducting tubes), masks, CO₂ absorption cannisters and rebreathing reservoir bags (Cosgrove 2286-89, 2295, 2320-21).

(b) *Anesthesia vaporizers*. These are small metal or glass containers which convert a liquid anesthetic agent into vapor, combine it with a stream of carrier gas, which is delivered to the patient (Schreiber 1054, Cosgrove 2288).

(c) *Rebreathing reservoir bags*. There are two general systems used for the administration of inhalation anesthetics: rebreathing and non-rebreathing. In the former, some of the gas administered to the patient is recirculated to the patient again and again after carbon dioxide is first removed from the expired gas. In non-rebreathing systems, all the gas administered to the patient is fresh, and the patient's exhalations are not recirculated to him (Schreiber 1055; Cosgrove 2320; Hedley-Whyte 1200). The rebreathing reservoir bag collects the expired gas from a patient in a rebreathing system. These units retain the moisture in a patient's lungs and mouth (Cosgrove 2320; Schreiber 1055; Hedley-Whyte 1200).

(d) *Anesthesia conducting tubes* carry the gas from the anesthesia machine to the patient and may be either disposable or reusable. Typically, the reusable tubes are rubber and the disposable tubes are plastic (Cosgrove 2321; Schreiber 1055-56).

(e) *Anesthesia airways* are small curved tubes that are inserted into the patient's mouth in order to prevent him from biting endotracheal tubes that are inserted into the trachea (Hedley-Whyte 1202).

(f) *Anesthesia face masks* are used to conduct gas from the anesthesia conducting tube directly to the patient's nose and mouth (Cosgrove 2323-24; Schreiber 1056-57; Hedley-Whyte 1202-03).

(g) *Connecting Y-pieces*. In rebreathing systems, two conducting tubes lead from the anesthesia machine to the patient. One conducts fresh gas from the machine to the patient and the other carries the exhaled gas back to the machine. The Y-piece is a small rubber fitting that connects these two conducting tubes to the face mask (Cosgrove 2325; Schreiber 1056-57; Hedley-Whyte 1203).

(h) *Adapters and fittings*. Y-pieces typically have an inside diameter connection of 15 millimeters while older face masks often have 22 millimeter diameter connections. Adapters are used to connect these older type masks to the 15-millimeter Y-pieces (Schreiber 1057-58).

(i) *Carbon dioxide absorption cannisters*. In rebreathing systems, it is necessary to remove carbon dioxide from gas exhaled by the patient before recirculating the gas. Hence, anesthesia machines are normally equipped with a plastic and metal cannister which contains a chemical compound, called an absorbant, that absorbs carbon dioxide from the exhaled gas before it is recirculated (Schreiber 1058; Hedley-Whyte 1203-04). The absorption cannister is made from polypropylene plastic and steel castings obtained from ordinary foundries (Cosgrove 2297-98). The absorbants are manufactured by chemical companies (Kuehn 1172-74).

(j) *Flow meters* are used to control the flow of gas to the patient during anesthesia (Cosgrove 2293-94, 2287).

(k) *Carts*. Anesthesia carts are used to support drugs and equipment that may be needed in the operating room during an anesthesia procedure (Hedley-Whyte 1204).

(l) *Yokes, handscrews and valves* are used to maintain the anesthesia machine and attach gas cylinder to the machine (Cosgrove 2292; Schreiber 1059).

(m) *Anesthesia ventilators* are devices which mechanically assist and control a patient's breathing during anesthesia (Schreiber 1059; Hedley-Whyte 1205-06).

(n) *Anesthesia respirometers* measure the respiratory minute volume, *i.e.*, the total volume of air breathed in one minute by a breathing patient (Schreiber 1059; Cosgrove 2328-29), and is an indication of the level of anesthesia, *i.e.*, the level of unconsciousness of the patient (Schreiber 1059).

(o) *Endotracheal tubes* are long tubes inserted into the patient's trachea to keep the patient's airway free. They are connected to the anesthesia machine via the conducting tubes and conduct air or the

anesthetic mixture into the patient's respiratory system (Cosgrove 2328; Hedley-Whyte 1206-07; Schreiber 1060).

Complaint counsel's subpoena specifications also included a category entitled "other." Some of the companies responding to complaint counsel's subpoena listed products not specifically mentioned in the specifications under this category. Dr. Hedley-Whyte testified that the items on complaint counsel's subpoena represented a listing of IAE products and to this listing he would add one other item—direct laryngoscopes. Direct laryngoscopes are small metal devices containing a light which permits the anesthesiologist to view the area behind the patient's tongue in order to facilitate insertion of endotracheal tubes through the voice box (Hedley-Whyte 1207-08). Any other products, according to Dr. Hedley-Whyte, would constitute an exceedingly small part of the overall IAE market (Hedley-Whyte 1197).

119. An anesthesia machine, the most significant product in the IAE market, consists essentially of a cart, cabinet, yokes, needle valves, flow meters, vaporizers, breathing circuits (conducting tubes), masks, CO₂ absorbers and rebreathing reservoir bags (Cosgrove 2286-89, 2295, 2320-21). Ventilators are used in conjunction with an anesthesia machine and may be mounted directly on most anesthesia machines in use today (Cosgrove 2326; complaint counsel physical exhibit "A"-C8). Flow meters are used in both anesthesia and therapy procedures; however, anesthesia flow meters are designed specifically for the inhalation anesthesia apparatus (Porter 1309; Cosgrove 2287), and are not normally sold apart from the anesthesia machine (Cosgrove 2326). IAE products each have a very specific function, although there are a few exceptions to this generalization. Reusable and disposable endotracheal tubes are substitutable for one another, as are reusable and disposable face masks and conducting tubes, respectively. Although each product has a specific use, the anesthesia machine and attachments together provide the vehicle for administering anesthesia during surgical procedures.

120. IAE products have distinct physical characteristics which distinguish them from other types of inhalation equipment and accessories. Inhalation anesthetic equipment and accessories must be semiconductive to prevent electrocution or explosions (Schreiber 1097-98; Hedley-Whyte 1201, 1205, 1229-30). Due to its necessary semiconductive property, the price of IAE is substantially higher than the price of inhalation therapy equipment and accessories. Although a few items of IAE can be substituted for items of inhalation therapy equipment and accessories in an emergency situation, the price difference between the two lines make any such substitution economically prohibitive (Hedley-Whyte 1201, 1229).

121. IAE is recognized by the medical profession and by firms in the industry as a separate and distinct product market. IAE is defined by the medical profession and by firms in the industry as those items utilized in the dispensing of anesthetic gases or the vapors of anesthetic liquids to the lungs of patients to be anesthetized, including surgical, dental, and veterinary anesthetic equipment and accessories (Schreiber 1041; Kuehn 1125; Hedley-Whyte 1196-98; Porter 1297-98). Such products have peculiar characteristics and end uses as they are the only products which are used together to directly administer anesthetic vapors.

122. The Z-79 Committee of the American National Standards Institute recognizes the IAE market as a separate and distinct market. This committee consists of the leading manufacturers of IAE, representatives of the medical professional societies in the United States and representatives of the Federal Government (Hedley-Whyte 1212-13). The Z-79 Committee is primarily concerned with the standards of design, performance and terminology of IAE (Schreiber 1081; Hedley-Whyte 1213). Standards set by the Z-79 Committee apply to surgical and dental inhalation anesthetic equipment and accessories (Hedley-Whyte 1213-14).

123. Dental anesthetic equipment and accessories include nitrous oxide sedation units used in the inhalation of nitrous oxide for purposes of anesthesia. Dental anesthesia refers to the administration by inhalation of anesthesia gases whereby the patient is usually rendered unconscious. In contrast, dental analgesia refers to the administration of a local anesthetic by use of a syringe and needle and merely provides relief from pain rather than rendering the patient unconscious. Only in rare circumstances does nitrous oxide act as an analgesia rather than as an anesthesia (Hedley-Whyte 1197-98, 1246-48; Porter³ 1298, 1306, 1331). Nitrous oxide sedation units are used for surgical procedures (Porter 1330-31). There is a cross-fertilization between the dental and medical anesthesia professional societies and a dentist may serve on the anesthesia staff of a hospital (Hedley-Whyte 1210). The level of sophistication and technology used in manufacturing dental anesthetic equipment and accessories is the same as that of surgical anesthetic equipment and accessories (Porter 1301, 1331-32).

124. Veterinary inhalation anesthetic equipment and accessories are part of the overall IAE market (Schreiber 1041; Hedley-Whyte 1198). The principles involved in the manufacture and use of veterinary

³ Porter's testimony consistently refers to "dental analgesia equipment." Porter's definition of dental analgesia equipment as apparatus used to measure and regulate the flow of oxygen and nitrous oxide to the patient through inhalation rather than intravenous means corresponds with the definition of dental anesthetic equipment and accessories used by Dr. Hedley-Whyte (1197-98, 1246-47). Therefore, Porter's reference to "dental analgesia equipment" in his testimony apparently refers to dental anesthetic equipment.

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inhalation anesthetic equipment and accessories are the same as those for human inhalation anesthetic equipment (Schreiber 1094-95, 1121-22; Hedley-Whyte 1198). Veterinary anesthesia machines and human anesthesia machines are interchangeable to a degree. Components are sometimes identical (Schreiber 1044-45). Human anesthesia machines are commonly used on animals (Schreiber 1094-95; Hedley-Whyte 1198-99). Ohio Medical Products Division of Airco (Ohio) manufactures both human and veterinary anesthesia machines (Cosgrove 2311).

125. BOC contends that there are other products which should be included in the IAE market. These are products, the sales of which were reported by companies in response to complaint counsel's subpoena under the category "other," and products that were "mentioned" during the hearings (BOC PF 378-379). Complaint counsel have included some of these "other products in their IAE market while not including others (CCRB, Table I). The most significant differences between the parties as to what is in the IAE market is monitoring equipment, which complaint counsel have excluded (CCPF 142).

126. The medical profession does not recognize monitoring equipment as a part of IAE. Monitoring equipment gives feedback on the patient's general condition; i.e., temperature, pulse, blood pressure, heart action, but it is not used as a direct measure of the level of anesthesia (Hedley-Whyte 1250, 162; Cosgrove 2478-79). Monitoring devices are used in a limited number of surgical cases (Hedley-Whyte 1286-87). Some such devices are dangerous to use (Hedley-Whyte 1254-58). Ohio regards monitoring equipment as separate and distinct from IAE. Ohio does not manufacture monitoring equipment as it requires a different technology from that necessary for IAE. Mr. Cosgrove, executive vice president of Ohio, testified in regard to monitoring equipment:

Judge Barnes: Why don't you make them?

The Witness: Your honor, our technology lies in another direction. It has for years. It is a case of having to work very hard and spend large sums of money just to bring yourself up to the state of the art and that is being practiced by the other manufacturers. (Cosgrove 2364)

Different companies manufacture monitoring equipment than manufacture IAE; companies such as Hewlett-Packard and General Electric make monitoring equipment but not IAE (Hedley-Whyte 1262; Cosgrove 2363-64). The same type of monitoring equipment used inside an operating room is also used outside the operating room (Hedley-Whyte 1286; Cosgrove 2480-81); in fact, such equipment's primary usage is outside the operating room (Hedley-Whyte 1251, 1256, 1286-87). Most blood pressure monitoring in surgical procedures is by the same piece of equipment that is used in a doctor's office for routine

blood pressure checks (Hedley-Whyte 1259, 1289). Because different departments will be using the same monitoring equipment, hospitals attempt to standardize on the monitoring equipment purchased (Hedley-Whyte 1263). Further, the hospital committee that purchases anesthetic equipment is separate from the committee purchasing monitoring equipment (Cosgrove 2481).

127. IAE is usually sold to the head of the anesthesia department in hospitals (Schreiber 1060), and it is only anesthesiologists and nurse anesthesiologists who work with IAE (Hedley-Whyte 1209-10). IAE products are also purchased by veterinarians and dental anesthetists.

B. Geographic Market

128. The relevant geographic market within which to assess the competitive effects of the BOC stock acquisition in Airco with respect to the IAE market is the United States as a whole. The leading manufacturers of IAE, including Airco and BOC subsidiaries Fraser Sweatman, Inc. and Harris Lake, Inc. sell such products throughout the United States (Schreiber 1061; Kuehn 1141; Scott 1355; Cosgrove 2310, 2436-37). There is no dispute as to the geographic market (BOC PF 399).

C. BOC's Operations in IAE

(1) International Operations

129. The Advanced Engineering Division of BOC, formerly the Equipment Division, manufactures and markets IAE (CX 3H, CX 10Z-8, CX 11Z-8). BOC had sold these products in the United States for at least ten years (Cosgrove 2439). During 1973, Medishield Corporation, Ltd., a subsidiary of BOC, consisted of 15 subsidiary companies selling inhalation anesthetic equipment and other medical products throughout the world (CX 292K). During 1973, Medishield Corporation, Ltd., had distributors in over 130 countries (CX 292K). BOC formed Medishield, Inc. to coordinate the activities of its North American medical interests (Smith 1784-85).

(2) Fraser Sweatman, Inc.

130. During 1972, BOC acquired Cyprane, Ltd., a United Kingdom company which manufactured anesthetic equipment, and their wholly-owned subsidiaries, Fraser Sweatman, Inc. (hereinafter FS) and Fraser Sweatman, Ltd. of Canada (CX 11L, CX 11Z-8; Smith 1781-82). As a manufacturer and as a distributor for Cyprane, Ltd., FS sold anesthetic equipment in the United States for general medical, dental and

veterinary applications (CX 11Z-8). During the period fiscal year 1965 through fiscal year 1973, FS increased its U.S. sales of anesthetic equipment from \$604,721 to \$2,498,146 (CX 109K). In 1972, FS marketed a wide range of surgical, dental and veterinary inhalation anesthetic equipment and accessories (CX 130-33, CX 135-48). FS has sold vaporizers to Ohio for the last three years (Cosgrove 2307-08).

(3) Harris Lake, Inc.

131. Harris Lake, Inc., a U.S. company (hereinafter HL), was incorporated in 1970 (CX 70A, CX 101A). During 1972, BOC owned 24 percent of the Harris Calorific Company, the parent of HL (Topkis 1153). During November 1972, HL became a manufacturer of anesthesia machines and distributor of respirometers for BOC (CX 51B, CX 94). During November 1973, BOC acquired full control of HL (CX 102D, CX 107). At the time of its acquisition, HL had approximately 3 percent of the U.S. anesthetic equipment market, although its position in Cleveland, Ohio [HL's location], was much greater (CX 101B).

D. Airco's Operations in IAE

132. Ohio is the dominant firm in the U.S. IAE market (CX 169B, *in camera*; CX 101B). Ohio has been recognized by the industry as the largest manufacturer, in terms of dollars, of IAE in the United States, since at least 1956 (Schreiber 1073, 1088; Kuehn 1156-57; Porter 1316; Cosgrove 2420-21). Ohio's major competitors in the U.S. IAE market in 1973 were Foregger Division of Air Products, Dupaco, and the two BOC subsidiaries, FS and HL (CX 169C, *in camera*; CX 101B; Schreiber 1073; Kuehn 1156-57; Porter 1316-17).

E. Concentration in the IAE Market

133. The data in the record concerning market shares of the companies in the IAE industry comes from subpoenas served by complaint counsel on 37 companies (CX 314-15, CX 316B, CX 317-31, CX 326, CX 329). The data concerning respondent companies was stipulated (CX 327, CX 330). There is no evidence as to how complaint counsel arrived at the names of the companies to be served with subpoenas. Complaint counsel's subpoena served on the companies called for net sales data by product category for all inhalation anesthetic equipment and accessories including but not limited to the listing of products set forth in the subpoena specifications (CX 316B, *in camera*; Finding of Fact 118). A category of "other" was also provided in the subpoena. The subpoena also called for data showing all such

products manufactured by each company to eliminate the possibility of double reporting of resale products (CX 316B, *in camera*). The listing of products on the subpoena was stated to be a substantially complete listing of IAE products (Finding of Fact 118).

134. Table I in the confidential section of this initial decision contains market share data compiled from subpoena returns and stipulations. This table is basically the same as that proposed by complaint counsel (CCRB, Table I, *in camera*). Table I data for BOC includes FS and HL sales as well as sales by BOC in the United States through other methods. Table I also includes one-half of BOC respirometers sold in the United States. Respirometers may be used in either inhalation anesthesia or inhalation therapy depending on the attached adaptor (Cosgrove 2493-94). BOC refused to allocate the sales of respirometers between these two markets although North American Draeger was able to do so (Schreiber 1050-52). On Table I, Narco Scientific Industries, Inc. includes Isolette, McKesson and Air Shields; Becton, Dickinson and Company includes Bard Parker; American Hospital Supply Corporation includes Pharmaseal Division; C. R. Bard, Inc. includes Med-Econ Plastics Division; and Sherwood Medical Industries, Inc. includes Aloe Medical.

135. The market share of the four largest manufacturers in the U.S. IAE market in 1972 was 64.5 percent and of the eight largest 87.9 percent (Table I, *in camera*).

136. The universe figure utilized in Table I is the total of all sales of IAE reported by the 37 companies which were served with subpoenas and respondents' stipulated sales. Complaint counsel did not include insignificant sales reported by the companies of items not in the IAE market. Complaint counsel also solicited testimony from industry executives as to their estimate of the total U.S. IAE market. Mr. Scott, general manager of Foregger, testified that the total IAE market was \$30 million within an error range of 15 percent (Scott 1359). He listed 13 companies (Foregger, Ohio, BOC, Dupaco, North American Draeger, National Catheter, Rusch, Porter, Welch Allyn, Anesthesia Associates, Bard Parker, Narco Scientific, Bird), which he identified as accounting for 90 percent of the net U.S. sales, at the manufacturing level plus imports, of IAE (Scott 1356-59). These companies, whose sales figures are reflected on Table I, had aggregated sales of \$22.4 million in 1972, which results in an estimated universe figure of \$24.9 million. The aggregated sales of all the companies shown on Table I were \$24.5 million, or more than 98 percent of the estimated universe. Mr. Schreiber, president of North America Draeger, estimated the total market as \$25 million (Schreiber 1072). Mr. Porter, president of Porter

Instrument Company, estimated the total market as \$20 million (Porter 1315).

137. BOC contends that the record does not furnish any reliable data from which market shares or industry concentration can be measured (BOC PF 416-447). BOC contends that complaint counsel's subpoena was not directed to all firms manufacturing IAE, that the list of products on the subpoena was not an exhaustive list, and the subpoena specifications were ambiguous. Complaint counsel's expert witness, Dr. Hedley-Whyte, testified that the listing of IAE products on complaint counsel's subpoena was substantially complete. Also, complaint counsel's subpoena called for sales data on *all* IAE equipment to be broken down by product category. A category of "other" was provided to cover IAE products not specifically covered by complaint counsel's listing of products. If all the IAE items reported by companies responding to the subpoenas had been included in Table I, it would represent only an insignificant change in the data actually utilized therein. In fact, such data would only serve to increase the sales of Ohio and Foregger, two of the largest companies in the IAE market, and thus to increase industry concentration.

138. Industry witnesses identified the leading firms in the IAE market. Dr. Hedley-Whyte testified that sales of the principal items of IAE—anesthesia machines—were made by Ohio, Foregger and BOC (Hedley-Whyte 1218). Mr. Schreiber, Mr. Scott, Mr. Porter and Mr. Kuehn, executives of IAE manufacturers, all identified as IAE manufacturers, those companies which were served with subpoenas and whose sales data is shown on Table I (Schreiber 1061-63, 1073; Kuehn 1156-57, 1170; Porter 1311; Scott 1356, 1369-73). BOC estimated that Ohio had 33 percent of the IAE market and Foregger 10-15 percent (CX 101B). By contrast, respondents did not call as witnesses any IAE manufacturers other than Mr. Cosgrove of Ohio. No subpoenas were served on IAE manufacturers by respondents to secure sales data, and only the most general testimony was elicited as to other companies that might have been manufacturers or importers of IAE, what products they manufacture, and their total sales of IAE. Examples of some of this testimony is as follows:

DIRECT EXAMINATION

Kaplan (*BOC counsel*): Have you heard of a vaporizer called Takiocha?

Cosgrove (*Ohio executive*): Takiocha is manufactured in Brazil by a Japanese doctor and there are a few of them in the United States which I have seen in use. (Cosgrove 2309).

CROSS EXAMINATION

Nickel (*Complaint Counsel*): You also mentioned a Brazilian firm that you believe

imported vaporizers. Do you have any idea of the amount of their sales of vaporizers in the U.S.?

Cosgrove: No.

Nickel: Do you know whether they have sold any in the U.S.?

Cosgrove: I don't know.

Nickel: Have you seen them in hospitals?

Cosgrove: We are talking about a vaporizer now as opposed to a machine. I have never seen a tachio machine in this country and I have never seen a vaporizer either. (Cosgrove 2426)

In another instance, Mr. Cosgrove testified as follows regarding a manufacturer of oxygen analyzers:

Kaplan: How about Beckman Instruments?

Cosgrove: Very possible.

Kaplan: How about Electrodyne?

Cosgrove: I believe they do.

Kaplan: Now—

Judge Barnes: Mr. Cosgrove, I think you ought to be certain in these answers. If you are not certain—you just said “very possibly,” and “I believe they do.” That won't be helpful to me. If you know, say yes.

Kaplan: Specifically, with respect to Electrodyne, do you know?

Cosgrove: I don't know. (Cosgrove 2343).

139. The record does reflect that there are some products which possibly should be included in the IAE market and are not reflected on Table I. For example, Air Products (Foregger) reported sales of “alarms, monitors” (CX 317E, *in camera*). Mr. Scott testified that these products are “oxygen alarms, low pressure alarms that are included on anesthesia machines” (Scott 1375). Thus, these products apparently should have been included in the IAE market. Another product that arguably could be included in the IAE market is CO₂ absorbent material used in surgical anesthesia, although this product is a chemical and differs in this regard from other IAE products. Complaint counsel have included the CO₂ cannisters in the IAE market, but not the absorbent material (Kuehn 1129-30, 113; CX 316A, *in camera*). The testimony reveals, however, that there are only two manufacturers of this product—Chemetron and Dewey and Almy [W. R. Grace]. Dewey and Almy is considerably larger in this product category than Chemetron. Dewey and Almy, a chemical company, manufactures the product; it is marketed through Ohio and Puritan-Bennett (Kuehn 1172-74). If oxygen alarms were included in the IAE market, it would increase industry concentration. As for CO₂ absorbent material, inclusion of this product in the IAE market would not make a significant change in concentration figures (CX 329X). Further, a realistic appraisal of this product is that Ohio is a significant factor in

its sales and its inclusion in the market would increase market concentration and Ohio's dominance.

140. It is concluded that market data set forth on Table I is sufficiently precise to constitute a basis for measuring concentration in the IAE market.

F. Barriers to Entry

141. Barriers to entry in the manufacture and distribution of IAE in the United States include technological expertise in manufacturing and marketing; sales and service organization; capital; brand loyalty; and, entrenchment of leading companies in this market.

142. Technological expertise, such as engineering capabilities; extensive knowledge and experience in the medical field of anesthesia; administrative expertise; and production knowledge including research and development are necessary for a new company to enter into the manufacturing of IAE (Schreiber 1077-78; Kuehn 1161; Porter 1317).

143. Capital requirements are high for a company to enter the production and distribution of IAE (Schreiber 1076; Kuehn 1161-62; Porter 1318). North American Draeger, a recent entrant into the IAE market, had technical assistance and financial backing from Draeger Werke, A.G., a German firm (Schreiber 1039).

144. A national distribution network is necessary to enter successfully the IAE market. The leading companies all distribute their inhalation anesthetic products either through dealers or by direct sales to hospitals (Schreiber 1060; Kuehn 1141; Scott 1355; Cosgrove 2369). Ohio has over 800 dealers, a number of whom do not carry products which compete with Ohio's IAE products (Cosgrove 2427-29). HL has 108 dealers (CX 101B).

145. A sales force is essential for a new company to enter successfully into this market (Schreiber 1078; Porter 1319). A sales force introduces and demonstrates products through direct sales or by working with a dealer when introducing a new product (Schreiber 1078). Ohio has approximately 73 salesmen selling IAE; HL and FS have a combined total of 10-11 such salesmen (Cosgrove 2427; Laister 2561-62). Companies with a more complete line of products have several advantages over companies with a narrower line of products. Companies with a full line have a lower cost of selling (Schreiber 1080). Only Ohio, Foregger and BOC have a broad line of IAE products (Kuehn 1170; Hedley-Whyte 1218; Table I, *in camera*).

146. A service force is necessary for the successful marketing of IAE (Schreiber 1078; Porter 1319-20). Service is one of the major concerns of hospitals when deciding what equipment to buy (Schreiber 1078-79; Hedley-Whyte 1219). Hospitals prefer to sign contracts for

service on a regular basis (Schreiber 1079). Ohio has 75 servicemen in their medical service organization (Cosgrove 2428).

147. When a hospital purchases IAE it considers: the reliability of the selling company and its equipment; the selling company's ability to provide good service; and, how the medical profession views the design characteristics of the machine or line of equipment offered by the selling company (Hedley-Whyte 1219). Hospitals tend to train residents on the anesthesia machines they are most likely to encounter in their practice (Hedley-Whyte 1282-83). Medical practitioners tend to continue using the same type of equipment they used during their training (Smith 1792; Cosgrove 2439). The three most common anesthesia machines are manufactured by Ohio, Foregger and BOC (Hedley-Whyte 1268-70; 1282-83).

148. For a new firm to successfully enter the IAE market it is essential to develop a reputation which reflects the image of the company, the quality of the product and service (Schreiber 1079; Cosgrove 2431). At least one smaller manufacturer of IAE, Porter Instrument Company, contemplated marketing directly its own equipment and concluded that it did not have the resources, capital, and sales and service personnel to do so (Porter 1319).

149. The entrenchment of the major companies offering a broad line of equipment in the IAE market constitutes the major barrier facing a new entrant into this market. Mr. Kuehn, a former executive of Chemetron, testified:

The main barrier would be the establishment, the firm establishment of the major companies involved in this particular product area today. (Kuehn 1162)

Dr. Hedley-Whyte testified that anesthesiologists are inherently conservative; they get used to a certain design, a history of reliability of a given machine and service provided by a given company (Hedley-Whyte 1219). This knowledge led Dr. Hedley-Whyte to advise at least two companies against entering the IAE market (Hedley-Whyte 1224-25). Ohio has been the dominant firm in IAE since at least 1956 (Schreiber 1088; Kuehn 1156-57; Porter 1316; Cosgrove 2420-21).

G. Anticompetitive Effects of Airco Acquisition in IAE Market

150. Prior to the acquisition of Airco, BOC competed with Airco for sales in the IAE market (CX 135-48; Complaint Counsel Physical Exhibit "A"; Table I, *in camera*). Ohio's medical products are "identical or closely parallel to those of BOC" (CX 76B, *in camera*). BOC's stock acquisition in Airco eliminated that competition.

151. Prior to the acquisition, Airco anticipated that FS, with the

backing of BOC, would challenge Airco's position in the IAE market (CX 169C, *in camera*; Cosgrove 2510-11). If BOC had not acquired Airco, BOC would have expanded its IAE operations in the United States (Smith 1788; Cosgrove 2510-11). This combination of BOC and Airco eliminates any possibility of BOC challenging Airco's dominance of the IAE market.

152. The acquisition of Airco by BOC has enhanced the dominant position of Airco in the manufacture of IAE by raising Ohio's market share significantly (Table I, *in camera*).

153. The acquisition of Airco by BOC raised the already high barriers to entry for any firm wishing to enter the U.S. IAE market (Kuehn 1162, 1166).

V. *Inhalation Therapy Equipment*

A. Relevant Product Market

154. The complaint alleges that one of the effects of the acquisition of Airco stock by BOC may be substantially to lessen competition and to tend to create a monopoly in the manufacture, distribution or sale of inhalation therapy equipment, or any submarket thereof, throughout the United States or sections thereof (complaint, Par. 27). "Inhalation therapy equipment" (hereinafter ITE) is defined in the complaint as equipment and accessories used in the administration of gas for therapeutic purposes (complaint, Par. 1(c)). Dr. Ronald John Karpick, a physician specializing in pulmonary medicine, testified as an expert witness for complaint counsel (Karpick 1381-1432), and he defined ITE as:

Inhalation therapy equipment would have to involve all of the machinery which is involved with administering the respiratory therapy, as I like to call it rather than inhalation therapy services. This involves everything from the simple nasal catheter for administration of oxygen straight through to the large complicated machinery needed for constant volume ventilation of patients who are otherwise unable to ventilate themselves. (Karpick 1387.)

155. Complaint counsel's subpoena (CX 316B-C), previously discussed in connection with the IAE market, also requested sales data on ITE from the same 37 companies. This subpoena called for data on all ITE, including but not limited to the following products which were separately listed on the subpoena:

(a) *Ventilators and respirators*. For practical purposes, the terms "ventilators" and "respirators" are synonymous (Karpick 1389). Both assist a patient in breathing by administering a gas, usually oxygen or air, to the patient under positive pressure; in effect, they force the gas into the patient's lungs (Matsch 1523-25, 1521; Karpick 1386-88).

(b) *Humidifiers and nebulizers* are devices which vaporize water or convert it into fine particles in order to humidify air or oxygen administered to the patient and prevent the airways from becoming dried out.

(c) *Resuscitators*. A resuscitator is an emergency device used for the immediate establishment of a breathing pattern in a person who has stopped breathing (Karpick 1930).

(d) *Inhalation therapy delivery tubing* is used for the administration of gases for therapeutic purposes (Karpick 1390; CX A, form 1764, pp. 5-6).

(e) *Inhalation therapy face masks* conduct gases to a patient's nose and mouth and exclude room air (Karpick 1390-91; CX A, form 1764, pp. 2-3).

(f) *Inhalation therapy flow meters* are used to control the rate of flow of gases to the patients (Karpick 1391; CX A, form 1766).

(g) *Nasopharyngeal catheters and cannulae* are used to convey gases into the patient's nose or nasal passages (Karpick 1391).

(h) *Oropharyngeal airways* are tubes inserted through the mouth and into the pharynx in order to conduct oxygen or compressed air into the airways and to prevent the patient's tongue from obstructing the airways (Karpick 1391).

(i) *Inhalation therapy drain and condensation bottles* are bottles attached to ventilators to collect excess humidity from the gas administered to the patient (Karpick 1391).

(j) *Adaptors and fittings*. These are self-explanatory.

(k) *Yokes, hardscrews and valves* were described by complaint counsel's expert as "the nuts and bolts * * * that help get all of this together." (Karpick 1392).

(l) *Respirometers* are used to measure the air breathed by patients (Schreiber 1059). Respirometers can be used either for inhalation anesthesia or inhalation therapy with appropriate adaptors (Cosgrove 2493-94).

(m) *Bacteria filters* are employed in ventilators and respirators to remove bacteria from the air or oxygen administered to the patient (Karpick 1392).

(n) *Tracheotomy tubes* are placed in a surgical incision into the trachea in the lower part of the neck to permit easy access to the airways for the administration of ventilation and for intratracheal suctioning. They are used primarily by patients requiring long-term assistance (Karpick 1392).

(o) *Incubators* are used in controlling and in assisting pediatric patients in breathing (Karpick 1392). Complaint counsel's subpoena also included a category entitled "other." Some of the companies listed

products not specifically mentioned in the subpoena specifications under this category. Dr. Karpick testified that he would add oxygen tents and mist tents to the above products (Karpick 1392-93), but that otherwise the product listing was adequate (Karpick 1393). Complaint counsel have also added IPPB (intermittent positive pressure breathing devices) to the ITE market (CCPF 184). IPPB devices are machines that administer pressure to the upper airways in order to assist patients in breathing (Karpick 1423).

156. Over the years, the medical profession has begun to recognize respiratory therapy or respiratory care as a separate speciality (Karpick 1385-86, 1393-95, 1429-31; Cosgrove 2478-88). Most hospitals which provide major patient care have respiratory therapy departments (Karpick 1386). There are now respiratory therapy specialists who have specialized training and who assist physicians in administering respiratory therapy (Karpick 1393-97).

157. Professional recognition of respiratory therapy, however, is not equivalent to recognition of inhalation therapy as a separate entity. For example, complaint counsel's expert, Dr. Karpick, in explaining why these paraprofessionals had changed their titles from inhalation therapists to respiratory therapists, testified:

[I]t became obvious to everyone that inhalation therapy was not the proper term for this group of individuals in that they were dealing more than just with inhalation of various gases and humidity, but they are really responsible for the entire respiratory function of the patient. This does involve intra-tracheal suctioning of the patient, physical therapy, physical rehabilitation; and they are getting involved in the pulmonary function laboratories now. (Karpick 1396). *See also* Cosgrove 2373-74; Schreiber 1089-90).

Dr. Karpick testified that respiratory therapy is related to the entire respiratory function of the patient, and that inhalation therapy is one method of administering respiratory therapy, with no medical personnel specializing in it (Karpick 1396, 1404, 1407, 1416, 1430-31). Inhalation therapy is a subsection of respiratory therapy and it deals with the inhalation of various gases and the humidification of those gases for therapeutic purposes (Karpick 1396). Inhalation therapy is a distinct method of treating respiratory deficiencies (Karpick 1407).

158. Inhalation therapy includes the modalities of oxygen, carbon dioxide and helium, as well as the use of aerosols and nebulizers to provide humidity to the airways (Karpick 1387, 1404). Complaint counsel contend that inhalation therapy does not include the administration of medications by the use of a nebulizer; the use of suctioning apparatus; the administration of physical therapy and physical rehabilitation; and the use of pulmonary function laboratories. Suction equipment is not part of the ITE market as such equipment is not used for the therapeutic administration of gas. Further, it is widely used in

other areas of the hospitals and for purposes other than respiratory therapy (Karpick 1398, 1407, 1426-27). Pulmonary function equipment is a series of products which analyze the lung function to determine the impairment of the lungs or the patient's ability to properly exchange gases in the lungs (Cosgrove 2384). This type of equipment is marketed towards a specific group of physicians interested in diagnostic respiratory products and is not necessarily shown at the same meetings or advertised in the same media as ITE. Such equipment is not used for the therapeutic administration of gases and therefore is not a part of ITE (Cosgrove 2383-85). Complaint counsel's contentions that the administration of medication by use of nebulizers is not inhalation therapy is not logical. Where drugs are administered in connection with a gas, other than the ordinary atmosphere, it is considered part of inhalation therapy (Karpick 1409, 1415). Furthermore, the administration of medications by the use of nebulizers is part of respiratory therapy (Karpick 1404). Therefore, nebulizers are part of the ITE market since they are used to administer drugs by the same process as with the administration of gases. The Riker Medihaler, and similar products, are hand bulb nebulizers which deliver nebulized medication to the patient without employing an accompanying gas other than the atmosphere (Karpick 1410-13; Cosgrove 2378-79). The hand bulb nebulizers are primarily over-the-counter items (Karpick 1387), are rarely used by physicians, although occasionally prescribed for home use by patients (Karpick 1410-13). These products can be distinguished from the ITE market on this latter basis rather than for the reasons advanced by complaint counsel (CCPF 186).

159. The gases administered for inhalation therapy purposes, oxygen, carbon dioxide, helium and compressed air, differ from those used for anesthetic purposes, such as nitrous oxide (Karpick 1387, 1421). Respiratory therapy and anesthesiology are distinct and separate areas in medicine (Karpick 1430). Presently, anesthesiologists generally do not receive specialized training in respiratory therapy (Karpick 1430). There is a growing trend for pulmonary physicians to head up respiratory therapy departments separate from the anesthesiology departments (Karpick 1385, 1428-30). There is a similar trend for ITE to be purchased by the respiratory therapy department under the direction of a pulmonary physician rather than anesthesiologist (Hedley-Whyte 1271; Karpick 1429-30). The respiratory therapist is the person who actually administers inhalation therapy to a patient. Therapists work with and are under the supervision of physicians (Hedley-Whyte 1210-11; Karpick 1393-94, 1417). Respiratory therapists have minimal access to anesthetic equipment in most anesthesiology departments, even in hospitals where they are under the anesthesiolo-

gy department (Hedley-Whyte 1211). Advertising of ITE is aimed at different medical personnel and toward an area of medicine separate from anesthesiology (Schreiber 1090). Respiratory therapists have their own professional journals (Karpick 1395). Accordingly, ITE is a separate product market from IAE for purposes of this proceeding.

B. Geographic Market

160. The relevant geographic market within which to assess the competitive effects of the BOC stock acquisition of Airco with respect to ITE is the United States as a whole. The leading ITE manufacturers, including Airco and BOC, sell such products throughout the United States (Fegan 1439; Matsch 1493; McWhinnie 1538; Cosgrove 2497). There is no dispute as to the geographic market (BOC PF 399).

C. BOC's Operations in ITE

(1) International Operations

161. The Advanced Engineering Division of BOC manufactures and markets ITE throughout the world including the United States (CX 3H, CX 6F, CX 10Z-8, CX 11L, CX 11Z-8). Since at least 1968, BOC has sold directly a small volume of ITE in the United States, including oxygen therapy apparatus, resuscitation equipment and Wright respirometers (CX 6F, CX 328, *in camera*).

162. HL, subsequently acquired in toto by BOC, was a small factor in the U.S. ITE market selling essentially the BOC Wright respirometer (Table II, *in camera*).

163. Since 1968, BOC has sought to expand its position in the U.S. ITE market and has considered acquiring several U.S. firms (CX 274, 276, 278). During May 1969, David Morgan, planning manager for BOC Medical Products, concluded after visiting the United States that the ITE market was the most obvious and immediately profitable area for exploitation in the United States by BOC (CX 26D). Further, Mr. Morgan concluded that HL could easily be expanded into the ITE market (CX 26D). During 1972 and subsequently, BOC actively explored expanding its operations in the ITE market in the United States and had contacts with several medical companies engaged in the manufacture and sale of inhalation therapy equipment and accessories (Kuehn 1152-53).

164. From 1972 to 1973, BOC through its representative, Mr. Fraser Sweatman, had a series of contacts with Oxequip Health Industries for the purpose of possible acquisition of Oxequip (McWhinnie 1545-55). Oxequip is a manufacturer of ITE (Table II, *in camera*). During this period, Oxequip was visited by several represent-

atives of BOC, including Mr. Sweatman, A. I. Ray, and a chartered accountant (McWhinnie 1547-49, 1552). The accountant spent an entire day studying confidential financial records of Oxequip (McWhinnie 1552-53).

165. In October 1973, William C. Moeller, president of FS, communicated with Frank Fegan, president of OEM Medical, concerning possible acquisition of OEM by BOC (Fegan 1439-40). OEM is a manufacturer of ITE (Table II, *in camera*). As a result of this meeting, financial information concerning OEM was sent to Moeller (Fegan 1441).

Further discussions were postponed until early 1974, when Fegan was told that BOC was no longer interested in acquiring OEM (Fegan, CX 294; 144). By this time BOC had already acquired a 35 percent interest in Airco including the Ohio Medical Products Division (Finding of Fact 31).

D. Airco's Operations in ITE

166. Ohio manufactures and markets a line of ITE products, including mist tents, nebulizers and humidifiers, masks, catheters, tubes and airways, resuscitators and IPPB devices, and flow meters (CX Physical Exhibit A; Table II, *in camera*). Ohio was mentioned by industry witnesses as being a principal competitor in respiratory care equipment (Matsch 1494, 1530; McWhinnie 1539). Ohio has been attempting to expand its share of the ITE market (Cosgrove 2511-12; CX 169Q, *in camera*).

E. Concentration in the ITE Market

167. The data in the record concerning market shares of the companies in the ITE industry comes from subpoenas served by complaint counsel on 37 companies (*see* CX 316C, *in camera*). Data concerning respondent companies was stipulated (CX 326, CX 329). There is no evidence as to how complaint counsel arrived at the names of the companies to be served with subpoenas. Complaint counsel's subpoena served on the companies called for net sales data by product category for all inhalation therapy equipment and accessories including but not limited to the listing of products set forth in the subpoena specifications (CX 316C, *in camera*). A category of "other" was also provided in the subpoena specifications (Finding of Fact 155). The subpoena also called for data showing all products manufactured by each company to eliminate the possibility of reporting resale products (CX 316C, *in camera*). The list of products on the subpoena were stated

to be a substantially complete listing of ITE products (Karpick 1392-93).

168. Table II in the confidential section of this Initial Decision contains market share data compiled from subpoena returns and stipulations. This table is substantially identical to that proposed by complaint counsel (CCRB, Table II, *in camera*). Table II data includes sales by BOC directly and through its subsidiaries FS and HL [it appears FS had no sales of ITE in 1972]. On Table II, Narco Scientific Industries, Inc. includes Isolette, McKesson and Air Shields; Becton, Dickinson and Company includes Bard Parker; Air Products and Chemicals, Inc. includes Foregger; American Hospital Supply Corporation includes Pharmaseal; Sherwood Medical Industries, Inc. includes Aloe Medical; and C. R. Bard, Inc. includes Med-Econ Plastics Division. Smith & Wesson Electronics was formerly the Stephenson Company. Table II also includes one-half of BOC respirometers sold in the United States. Respirometers may be used in either inhalation therapy or inhalation anesthesia depending on the attached adaptor (Cosgrove 2493-94).

169. The market share of the four largest manufacturers in the U.S. ITE market in 1972 was 61.4 percent and of the eight largest, 77.7 percent (Table II, *in camera*). The universe figure utilized in Table II is the total of all sales reported by the 37 companies which were served with subpoenas and respondents' stipulated sales. Table II does not include certain items reported by the companies, which items complaint counsel contend are not in the ITE market.

170. Complaint counsel also solicited testimony from industry witnesses as to the names of their principal competitors and their estimates of the total U.S. ITE market (Schreiber 1061-62; Scott 1356, 1369-73; Matsch 1494, 1530; McWhinnie 1539). Mr. Matsch, an official of Monahan Company, testified that his four largest competitors were Puritan-Bennett, Ohio, Bird and Air Shields (Narco); he estimated the total ITE market at \$75 million (Matsch 1494, 1497). Mr. Cosgrove, Ohio's chief executive officer, also estimated the total U.S. ITE market at \$75 million (2498-99). Both officials did not include certain insignificant items of ITE in their estimates.

171. BOC contends that the record does not furnish any reliable data from which market shares or industry concentration can be measured (BOC PF 451-476). BOC contends that complaint counsel's subpoena was not directed to all firms manufacturing ITE, that the list of products on the subpoena was not an exhaustive list, and the subpoena specifications were ambiguous. In this regard, complaint counsel's expert witness, Dr. Karpick, testified that the list of ITE products on complaint counsel's subpoena was substantially complete

(Karpick 1393). Also complaint counsel's subpoena called for sales data on all ITE equipment to be broken down by product category. A category of "other" was provided to cover ITE products not specifically covered by complaint counsel's listing. For example, IPPB devices were not listed as a separate category on the subpoena (*see* BOC PF 464). However, several companies reported sales of IPPB devices, and these sales have been included in Table II.

172. Complaint counsel did not include sales data for several products which were reported pursuant to the subpoenas. These products, such as diagnostic products, compressors, emergency oxygen, monitors, are not in the ITE market. However, if all sales of such products had been included in Table II, it would not change the overall data to any significant degree. In fact, the most substantial omitted data was for such companies as Ohio, Narco, Puritan-Bennett, and Hudson Oxygen. Inclusion of this data in Table II would only serve to increase market concentration.

173. The principal products in the ITE market are ventilators, respirators, resuscitators, humidifiers and nebulizers. The leading manufacturers of these products are identified in the record (Finding of Fact 170), and their sales data appears on Table II. By contrast, respondents did not call as witnesses any manufacturers of ITE other than Mr. Cosgrove of Ohio. No subpoenas were served on ITE manufacturers by respondents to obtain sales data. Respondents have offered only the most general testimony regarding other companies that might have been manufacturers or importers of ITE, what products they manufacture, and their volume of sales of ITE.

174. Market data on the ITE market is not as clear or convincing as with the IAE market; primarily lacking is data relating to the ITE universe. However, even assuming that the total ITE market is \$75 million, which is undoubtedly an exaggerated universe based on this record, four-firm concentration would be 45 percent and eight-firm concentration 57 percent. Further, Table II clearly establishes that under either criteria the market is concentrated and Ohio is one of the leading firms in the market. Accordingly, it is concluded that the market data set forth on Table II is sufficiently precise to constitute a basis for measuring concentration in the ITE market.

F. Barriers to Entry

175. A high degree of technology is necessary for a company to enter into the manufacture and distribution of ITE in the United States (Matsch 1501; McWhinnie 1540). A company would need people skilled in many disciplines including mechanics, rubber, plastics, mechanical and bio-engineering (Matsch 1501). Substantial capital

requirements are necessary for a company to enter into the manufacture and distribution of ITE or to expand a product line (Matsch 1499-1500; McWhinnie 1540-41).

176. Before an ITE product can be successfully marketed, it is necessary to have a good clinical evaluation of the item demonstrating its quality and acceptance by the medical profession (Matsch 1501-02). Ohio has a good working relationship with the medical profession including people who will provide clinical evaluation of new ITE products for Ohio (Cosgrove 2410-13).

177. A distribution network is also necessary to enter the ITE market (Matsch 1501-02). The leading companies all distribute their ITE products nationwide through dealers or by direct sales (Cosgrove 2497; Scott 1355; Fegan 1439; Matsch 1493). Ohio has over 800 dealers for ITE, a number of whom do not carry products which compete with Ohio's ITE products (Cosgrove 2427-29). Highly trained, technical sales personnel are important to a company in the U.S. ITE market since they make the initial contact with the hospital's purchasing department representative (Karpick 1384; Cosgrove 2409, 2427-28). Ohio has approximately 73 salesmen handling its ITE products (Cosgrove 2427-28). A highly trained service force is necessary for the successful marketing of ITE (Matsch 1501-02). Ohio has 75 men to service their ITE (Cosgrove 2428).

178. The ability to deliver the apparatus requested, the ability to service the product and the ability to maintain the product, including replacement parts, are all major factors taken into account by the purchasing department of hospitals in buying ITE (Karpick 1385). For a new firm to successfully enter the ITE market, it is essential to develop a reputation which reflects the quality of the product and the image of the company (Matsch 1501-02; Cosgrove 2431). The same requirements for a company to enter the ITE market would also be required for a company in the market to expand its product line (McWhinnie 1541). BOC possessed the resources and expertise necessary to expand in the U.S. ITE market (Matsch 1502-03).

G. Anticompetitive Effects of Airco Acquisition in ITE Market

(1) Elimination of Competition

179. Prior to BOC's stock acquisition in Airco, BOC competed to a small extent with Airco for sales in the U.S. ITE market (CX 328, *in camera*; CX 150C, Z-20-21; Commission Physical Exhibit "A"-F-B, H-6; Table II, *in camera*). This acquisition eliminated actual competition between the two companies.

180. BOC, in 1973, had the technical and marketing expertise necessary to expand its small U.S. operations in the ITE market (Matsch 1502). BOC had the capital resources required for expansion (Topkis 1503). BOC is extensively engaged in marketing medical products in 60 countries throughout the world (Smith 1790), including ITE (Smith 1791). But for the acquisition, BOC would have expanded its manufacturing and marketing operations in the United States in its attempts to become one of the leading companies in the U.S. ITE market (Smith 1788). BOC had considered acquiring small U.S. firms engaged in the ITE market (Finding of Fact 163), and the ITE market appeared to BOC to be the most obvious and profitable area in the U.S. medical market for exploitation by BOC (Findings of Fact 163-165). The combination of BOC and Airco eliminated any possibility of increased competition between BOC and Airco.

181. The acquisition of Airco by BOC strengthened the market position of Airco in the ITE market by increasing Ohio's market share (Table II, *in camera*).

(2) Heightened Barriers to Entry

182. The acquisition of Airco by BOC raised the already high barriers to entry for any firm wishing to enter the U.S. ITE market or to expand its product line (Kuehn 1166; Findings of Fact 175-178).

CONCLUSIONS

I. Industrial Gases

A. The Industrial Gases Industry Comprises a Line of Commerce

It is well settled that an entire industry may constitute a line of commerce within the meaning of Section 7 of the Clayton Act. *United States v. Phillipsburg National Bank & Trust Co.*, 399 U.S. 350 (1970); *United States v. Philadelphia National Bank*, 374 U.S. 321 (1963); *A.G. Spalding & Bros., Inc.*, 56 F.T.C. 1125 (1960), *aff'd*, 301 F.2d 585 (3rd Cir. 1962); *United States v. Bethlehem Steel Corp.*, 168 F. Supp. 576 (S.D.N.Y. 1958).

The United States Supreme Court held that the relevant line of commerce in which to appraise the probable competitive effects of a proposed merger in *Philadelphia National Bank*, *supra*, was

* * * the cluster of products (various kinds of credit) and services (such as checking accounts and trust administration) denoted by the term "commercial banking." * * * composes a distinct line of commerce. (374 U.S. at 356).

Commercial banking was found by the Supreme Court to be a distinct line of commerce even though the various services and products offered by commercial banks are distinguishable from each other and in some instances are also provided by financial institutions other than commercial banks. The Court emphasized that it was the cluster of products and services that commercial banks offered that as a matter of trade reality made commercial banking a distinct line of commerce. The Supreme Court later reaffirmed its holding that the commercial banking industry as a whole was a relevant line of commerce for Section 7 purposes. *Phillipsburg National Bank, supra*, 399 U.S. at 359-62.

The Commission has similarly held an entire industry to constitute a relevant line of commerce. *A.G. Spalding & Bros., Inc., supra*, 56 F.T.C. at 1160. In determining the relevant line of commerce within which to measure the impact of a merger between Spalding and Rawlings Manufacturing Company, the Commission ruled:

Counsel supporting the complaint also contends that the athletic goods industry as a whole constitutes a line of commerce within the meaning of Section 7 of the Clayton Act. We believe the record fully supports this contention. The testimony of AGMA [Athletic Goods Manufacturing Association] officials establishes that the principal products of this industry are those listed in the AGMA Census Reports. These products are manufactured and sold by Spalding and formerly had been manufactured and sold by Rawlings. They are products which are required to be used in established and well-organized athletic games. They have peculiar characteristics and end-uses for which there are no substitutes; they are distinct from the products of other industries; and are sold in a recognized market with its own competitive standards. See *United States v. Bethlehem Steel Corporation*, 168 F. Supp. 576 (1958). Moreover, the athletic goods industry is recognized by its members and by its trade association as a separate and distinct industry. It is our opinion, therefore, that the industry itself is a relevant market within which to measure the impact of the merger (56 F.T.C. at 1160).

On appeal, Spalding argued that a line of commerce may consist of only competitive indistinguishable products and therefore various athletic products such as baseballs, baseball gloves and mitts, footballs, and basketballs could not constitute a market. The Third Circuit Court of Appeals rejected Spalding's argument and held that the Commission, for the reasons set forth in its opinion, had "properly determined that the athletic goods industry as a whole is a relevant market within which to measure the impact of the merger." *A.G. Spalding & Bros., Inc.*, 301 F.2d at 606.

In *United States v. Bethlehem Steel Corp., supra*, the District Court for the Southern District of New York held that the sum of all products of the iron and steel industry constituted a line of commerce within the meaning of Section 7. The basis for the District Court's conclusion was as follows:

The products of the iron and steel industry as a group are generally standardized, are not subject to the vagaries of style appeal, and have peculiar characteristics and uses for which there are no effective substitutes. The manufacture of such products requires special know-how and experience, huge capital investment and a trained labor force. The products of the iron and steel industry are generally distinct one from the other and as a group distinct from the products of other industries. They are sold in a recognized market with its own competitive standards. The iron and steel industry is commonly recognized by its members as well as the community at large as a separate industry. It has its own trade association, treating the industry as separate and distinct. In the light of these facts the conclusion is warranted that the sum of all the products of the iron and steel industry constitute a line of commerce. Since Bethlehem and Youngstown both produce and sell the principal products of the iron and steel industry, it is an appropriate line of commerce for analyzing the effect of this merger. (168 F. Supp. at 593-94).

The evidence of record in this present proceeding clearly establishes that the industrial gases industry as a whole constitutes a relevant line of commerce within which to measure the impact of BOC's stock acquisition in Airco. The industrial gases industry is recognized by its members and two trade associations as a separate and distinct industry. Industrial gases companies only recognize other industrial gases companies as their competitors. The Bureau of the Census has classified the production and marketing of industrial gases as a separate economic entity since at least 1945. Further, the Bureau of the Census and members of the industry generally define the same group of gases as industrial gases. Industrial gases companies generally market the same group of gases, although some companies market insignificant volumes of gases not marketed by others. Both Airco and BOC market a wide range of industrial gases. Further, customers for industrial gases can look only to industrial gases companies for their needs.

There is also a commonality of technical expertise and capabilities involved in the production, transportation and marketing of the various industrial gases. Unique production and marketing facilities are utilized. Further, industrial gases have unique characteristics and end-uses, and, accordingly, are distinct from and do not compete with the products of other industries.

Respondents argue that only products which are completely interchangeable may constitute a relevant line of commerce, and that industrial gases are generally not substitutable for each other (BOC PF* 214-228). Respondents' position is based upon the Supreme Court's statement in *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962), that

The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it. (Footnote omitted.)

The Supreme Court clearly did not intend to preclude an economically significant group of noninterchangeable products from being defined as a relevant line of commerce. In *Philadelphia National Bank, supra*, and *Phillipsburg National Bank, supra*, both decided after *Brown Shoe*, the Supreme Court held that the cluster of products and services offered by commercial banks constituted a relevant line of commerce. The products and services of commercial banks such as personal loans, checking accounts, estate and trust planning, and safety deposit boxes are clearly not interchangeable.

Moreover, the Supreme Court has made it abundantly clear that “* * * submarkets are not a basis for the disregard of a broader line of commerce that has economic significance.” *Phillipsburg National Bank, supra*, 399 U.S. at 360. In the present case, it would be inappropriate to divide industrial gases into submarkets for the purpose of assessing the competitive impact of BOC's stock acquisition in Airco. Both BOC and Airco market a wide range of industrial gases and there is no evidence in the record which suggests that BOC intended to enter the U.S. industrial gases market with less than a broad line of industrial gases. There is no evidence of record that any industrial gases company markets only a single industrial gas; all companies market a broad line of industrial gases. Industrial gases customers normally use a wide range of industrial gases. Further, the evidence of record firmly establishes that the industrial gases market is “sufficiently inclusive to be meaningful in terms of trade realities.” *Crown Zellerbach Corp. v. FTC*, 296 F.2d 800, 811 (9th Cir. 1961).

B. Industrial Gases Geographic Market

Section 7 of the Clayton Act, as amended, prohibits an acquisition if its effect may be substantially to lessen competition in any line of commerce in “any section of the country.” The United States Supreme Court has recently reiterated the proper test for determining the relevant “section of the country” within which to measure the competitive impact of an acquisition:

Without exception the Court has treated “section of the country” and “relevant geographic market” as identical, and it has defined the latter concept as the area in which the goods or services at issue are marketed to a significant degree by the acquired firm. (*United States v. Marine Bancorporation, Inc.*, 42 U.S.L.W. 5210, 5215 (June 26, 1974)).

Airco, the acquired firm in the present case, produces and markets industrial gases throughout the United States. Further, Airco bids for both tonnage and merchant accounts nationwide. BOC, the acquiring firm, was interested in participating in the United States market on a national basis. The nationwide scope of Airco's industrial gases

operation was one of the primary reasons for BOC acquiring stock in Airco.

Therefore, considering the area where Airco operates as well as the area where BOC intended to enter, the nation as a whole is the geographic market within which the effect of BOC's acquisition should be measured. Further, the other large U.S. industrial gases companies produce and market industrial gases throughout the United States and, like Airco, bid for new accounts nationwide. Accordingly, BOC's acquisition of stock interest in Airco will affect competition in the industrial gases industry throughout the entire United States.

Respondents contend the competitive impact of BOC's acquisition must be considered on a regional basis because some industrial gases cannot be shipped economically more than 100 to 300 miles. Such a contention, however, ignores the fact that the large industrial gases companies, in fact, compete throughout the entire United States. This is accomplished by having plants strategically located throughout the United States.

Respondents' argument is also contrary to the Commission's holding in *Kennecott Copper Corp.*, 78 F.T.C. 744 (1971), *aff'd*, 467 F.2d 67 (10th Cir. 1972), *cert. denied*, 94 S. Ct. 1617 (1974). *Kennecott Copper*, which is squarely on point with this issue, was a potential competition case involving the coal industry. Coal, like some industrial gases, can only be economically shipped limited distances, and coal marketing is therefore generally confined to the geographic area of its production.

The Commission held in *Kennecott Copper* that although the distance over which coal is shipped is limited, the nation as a whole constituted the relevant geographic market within which to assess the impact of the challenged acquisition. The Commission based its conclusion on the fact that the large coal companies, including the acquired company, compete with each other throughout the United States and the fact that the acquiring company intended to become a nationwide competitor. The geographic market issue was raised on appeal to the United States Court of Appeals for the Tenth Circuit. The Tenth Circuit upheld the Commission's determination that the nation as a whole was a relevant geographic market. 467 F.2d at 71. That same conclusion must be reached in this proceeding.⁴

C. Market Concentration

The industrial gases market in the United States is highly

⁴ The Commission's holding in *Kennecott* is not inconsistent with the Supreme Court's decision in *United States v. General Dynamics Corp.*, 42 U.S.L.W. 4368 (see BOC RB 51). In *General Dynamics*, the Court expressly did not reach geographic or product market; further *Kennecott* was affirmed by the Court subsequent to the *General Dynamics* decision.

concentrated. BOC respondents do not dispute that the top seven or eight firms account for the bulk of the market. The evidence of record establishes that in 1972, the top eight industrial gases firms in the United States accounted for 86.5 percent of the market and the top four firms held 69.6 percent of the market.⁵ Top eight firm concentration in the industrial gases market has increased from 84 percent to 86.5 percent during the past five years and the top four firm concentration has increased from 67 percent to 70 percent. Further, the record discloses a significant increase in industry concentration from 1967 to 1972 through mergers (Findings of Fact 65-66).⁶

The degree of concentration in the U.S. industrial gases industry is well above the level considered by the Commission and the federal courts to constitute a concentrated market.⁷ In *The Stanley Works*, 78 F.T.C. 1023 (1971), *aff'd*, 469 F.2d 498 (2d Cir. 1972), *cert. denied*, 412 U.S. 928 (1973), the Commission and the Court of Appeals for the Second Circuit found that the cabinet hardware industry in which four firms accounted for 49-51 percent of the market was “* * * sufficiently concentrated to invoke the proscriptive sanction of the Clayton Act * * *” 469 F.2d at 504.

The Supreme Court, in *United States v. Aluminum Co. of America*, 377 U.S. 271, 278 (1964), found that the relevant line of commerce was “highly concentrated” as the top five firms controlled 65.4 percent of the market and the top nine companies held 88.2 percent. Recently, the California gasoline market, in which the top four and seven firms accounted for 61 and 83 percent respectively of refining capacity and 58 and 81 percent respectively of sales, was held to be highly concentrated. *United States v. Phillips Petroleum Co.*, 367 F. Supp. 1226, 1252 (C.D. Cal. 1973), *aff'd mem.*, 42 U.S.L.W. 3710 (July 8, 1974).

BOC respondents have asserted that the value of shipments for industrial gases reported by the Bureau of the Census should not be considered as a reliable basis for establishing concentration in the industrial gases market. This assertion is based on the testimony of one witness who stated that value of shipment information required by the

⁵ These concentration figures are based upon the total value of shipments by primary producers of industrial gases. These concentration ratios are an accurate reflection of industry concentration since it is to the industrial gases companies which customers must look to supply their needs. Concentration ratios based upon value of shipments of industrial gases of all manufacturers including those not in the industrial gases industry are also extremely high, with the top eight and four firms accounting for 79.3 and 63.8 percent respectively of total value of shipments in 1972 (Findings of Fact 62-64).

⁶ Other evidence of industry concentration in industrial gases exists. There are only three “national bulk producers” in the industrial gases market—Linde, Air Products and Airco. It is basically these three companies that purchasers of industrial gases have to look to fill the shortages of industrial gases which existed as of 1973 (Dempster 559; Smith 1732-33; CX 95D).

⁷ An authority frequently used by the Commission and the federal courts as a guideline for measuring concentration is C. Kaysen & D. Turner, *Antitrust Policy: An Economic and Legal Analysis* 72 (1959), which defines a “tight oligopoly” as an industry in which eight firms share at least 50 percent of the market and the largest firm has at least 20 percent.

Census could be subject to different interpretation by different companies. He criticized the Census information as providing only the value of gases at the producing plant and not at the point of actual distribution. Further, his company did not normally measure company achievements on f.o.b. plant data.

Bureau of the Census reports are traditionally used in antitrust cases and their reliability is well established. *See, e.g., Avnet, Inc.*, 78 F.T.C. 1562, 1563 n. 1 (1971). Reporting companies are required by law to accurately report their value of shipments to Census. Industrial gases shipment reports have been made to Census for many years. Census reports are clearly as reliable, if not more so, than any overall industry data which could be compiled for the purpose of litigation.

Respondents also contend captive production of industrial gases should be included in the universe. This argument is without merit. Captive production is not part of the industrial gases industry; captive production is not available to serve the industrial gases market. There is no competition between such producers with respect to the industrial gases each produces and consumes. To the extent surplus production is available, the record establishes that such surplus is sold to industrial gases companies who resell in the marketplace (Finding of Fact 55). Thus, to include captive production in the market would not be meaningful in terms of trade realities; it would recognize competition where competition, in fact, does not exist.

BOC respondents misread *Ford Motor Co. v. United States*, 405 U.S. 562 (1972), *aff'd*, 315 F. Supp. 372 (E.D. Mich. 1970), and 286 F. Supp. 407 (E.D. Mich. 1968). There, the Supreme Court regarded AC Spark Plugs as a competitor in the spark plug market, although AC was owned by General Motors and AC plugs were installed as original equipment in GM cars. Of critical importance in that case, however, was the fact that GM actively marketed AC plugs in the spark plug market including the lucrative replacement market. GM did not simply manufacture its spark plugs as a necessary component or input to its car production.

Respondents also attempt to dilute market statistics by including in the industrial gases market, production and sales of other products such as propane, butane, propylene, chlorine and sulphur dioxide. These gases are not considered as part of the industrial gases industry. The bulk of such gases are sold by other industries for different purposes. To the extent such gases are sold by industrial gases companies, the volume is insignificant (Finding of Fact 39).

Moreover, it is well settled that precise market data in antitrust cases is simply not necessary. For example, in *Brown Shoe Co. v. United States*, *supra*, the defendant argued that the government's

statistics concerning its own sales were improperly derived since they included both wholesale and retail sales in the same category. The Supreme Court rejected the argument, stating:

Again, while recognizing a possible margin of error in statistics combining sales at two levels of distribution, we believe they provide an adequate basis upon which to gauge Brown sales through outlets it controlled * * * In summary, although appellant may point to technical flaws in the compilation of these statistics, we recognize that in cases of this type precision in detail is less important than the accuracy of the broad picture presented. We believe the picture as presented by the government in this case is adequate for making the determination required by §7: whether this merger *may* tend to lessen competition substantially in the relevant markets. (370 U.S. at 342 n. 69).

The Commission has also recognized that the government is not required to establish the *exact* size of a market in Section 7 cases. In *Papercraft Corp.*, 78 F.T.C. 1352, 1405-06, (1971), *aff'd*, 472 F.2d 927 (7th Cir. 1973), the Commission held that estimates by experienced members of the industry were an adequate basis for determining the size of the relevant market. It is thus concluded that market data in this proceeding is sufficiently precise to present an accurate assessment of market concentration in the industrial gases industry.

D. Potential Competition

The Supreme Court, in *Brown Shoe Co. v. United States*, 370 U.S. 294, 315 (1962) stated:

The dominant theme pervading congressional consideration of the 1950 Amendments was a fear of what was considered to be a rising tide of economic concentration in the American economy * * *.

The greater the concentration "the greater is the likelihood that parallel policies of mutual advantage, not competition, will emerge." *United States v. Aluminum Co. of America*, 377 U.S. 271, 280 (1964). The Court also observed that "* * * competition will be most vital when there are many sellers, none of which has any significant market share." *Ibid.*

Decisions by the Supreme Court have made it abundantly clear that Section 7 of the Clayton Act is to be construed at the possibility of not only preventing the rising tide of economic concentration, but preserving the possibility of eventual deconcentration. Further, Section 7 deals with probabilities, not with certainties. *FTC v. Procter & Gamble Co.*, 386 U.S. 568, 577 (1967). Section 7 "look[s] not merely to the actual present effect of a merger but instead to its effect upon future competition." *United States v. Von's Grocery Co.*, 384 U.S. 270, 277 (1966).

With these basic premises in mind, the elimination of potential

competition as well as actual competition is prohibited by Section 7. *United States v. Falstaff Brewing Corp.*, 410 U.S. 526 (1973); *Ford Motor Co. v. United States*, 405 U.S. 562 (1972); *United States v. Procter & Gamble Co.*, *supra*; *United States v. Penn-Olin Chemical Co.*, 378 U.S. 158 (1964); *United States v. El Paso Natural Gas Co.*, 376 U.S. 651 (1964). The potential competition doctrine has meaning only as applied to concentrated or oligopolistic markets. "The present procompetitive effects that a perceived potential entrant may produce in an oligopolistic market will already have been accomplished if the target market is performing competitively. Likewise, there would be no need for concern about the prospects of long-term deconcentration of a market which is in fact genuinely competitive." *United States v. Marine Bancorporation, Inc.*, 42 U.S.L.W. 5210, 5218 (U.S. June 26, 1974).

There are two kinds of potential competition which an acquisition may foreclose. An acquisition may eliminate the procompetitive influence that a firm which is positioned on the edge of a market, threatening to come in, exerts upon the behavior of the companies within the market. Secondly, an acquisition may eliminate the likelihood of a procompetitive entry into a market by an actual potential competitor, *i.e.*, a firm that, were it not for the acquisition, would likely have entered the market either *de novo* or by a toehold acquisition.

A party to an acquisition may be both a perceived potential entrant and an actual potential entrant. In such an instance, the acquisition would foreclose both types of potential competition. The elimination of either type of potential competition by itself renders an acquisition illegal under Section 7. *E.g.*, *United States v. Phillips Petroleum Co.*, 367 F. Supp. 1226, 1235 (C.D. Cal., 1973), *aff'd without opinion*, 42 U.S.L.W. 3710 (July 8, 1974); *United States v. Falstaff Brewing Corp.*, *supra*, at 538 (Douglas, J., concurring). An acquisition which eliminates a company that is both a perceived and an actual potential entrant "renders the anticompetitive consequences of the acquisition even greater." *Phillips Petroleum Co.*, *supra*. (367 F. Supp. at 1234).

The procompetitive influence exerted by a perceived potential entrant has been succinctly stated by the Supreme Court in *United States v. Penn-Olin Chemical Co.*, *supra* at 174:

The existence of an aggressive, well equipped and well financed corporation engaged in the same or related lines of commerce waiting anxiously to enter an oligopolistic market would be substantial incentive to competition which cannot be underestimated.

The potential entry effect of an actual potential entrant arises from the likelihood of actual market entry by the potential competitor at some time in the future and set the stage for noticeable deconcentration. The merger deprives the market of the procompetitive effect of an increase

in the number of competitors. *United States v. Ford Motor Co.*, *supra* at 587 (Burger, C.J., concurring).

BOC argues that the record in this proceeding is filled with references to price wars and severe competition, with evidence of declining prices, product surpluses, and low profitability. Hence, the doctrine of potential competition does not apply to this case (BOC PF 190). The administrative law judge had concluded just the opposite, that the market is highly concentrated, entry barriers are high, prices have firmed substantially, product shortages exist, and that, in fact, there is evidence the major companies stay out of each other's way (Findings 49-76). Thus, the doctrine of potential competition is highly applicable to this proceeding.

E. The Acquisition of Airco Eliminated BOC as a Significant Perceived Potential Entrant

Prior to BOC's stock acquisition in Airco, BOC was perceived by companies within the industrial gases market in the United States as waiting on the edge of the market for the right opportunity to enter. Members of the U.S. industrial gases industry not only recognized BOC as one of the few firms possessing the necessary resources, technical knowledge and expertise and marketing capability to enter the U.S. market, but also believed BOC was very likely to enter. Indeed, the two largest U.S. industrial gases firms not only perceived BOC as the firm most capable and most likely to enter the industrial gases market in the United States, but both Linde and Air Products anticipated BOC would enter the U.S. industrial gases market at some time in the future (Flamm 250-52, 335; Baker 392). Executives of Alabama Oxygen and Burdett of Cleveland anticipated market entry by BOC (Kimerling 876, 878; Loveman 613). Dr. Muller, a consultant in the industrial gases industry in the United States, also anticipated BOC would enter the U.S. market (Muller 682).

Moreover, the belief by firms in the U.S. market that BOC was a likely entrant was well founded. BOC had actively pursued various means of entry into the U.S. industrial gases market since at least 1968, and had participated in the U.S. market with Airco in a joint venture selling industrial gases plants. BOC was known to have the resources, technical knowhow, and marketing expertise to enter the market. BOC was recognized as being an international company with 50 percent of its profits coming "off-shore the United Kingdom" (Flamm 238). BOC had entered the industrial gases market in numerous countries since 1956, most recently Brazil (Finding of Fact 85). The United States industrial gases market is the largest and most technically advanced market in the world, and in 1973, the market was very bouyant (Findings of Fact

86-87, 49-51). The attractions of the United States market to an international company was very much appreciated by U.S. industrial gases companies (Flamm 255). Further, BOC was the most likely potential entrant into the U.S. industrial gases market (Findings of Fact 80-83).

In sum, based on BOC's history of being an international company and having entered numerous industrial gases markets around the world, and possessing the resources, technical ability, marketing knowhow and the motivation and incentives to enter the U.S. market, having made numerous contacts beginning in 1968, with U.S. firms concerning possible acquisition or market entry, having participated in the joint venture with Airco and being located in the adjacent Canadian market, considering the bouyant nature of the U.S. industrial gases market as of 1973, and the testimony of industry executives that they believed BOC to be the most likely entrant into the market, it must be concluded that BOC was a perceived potential entrant into the U.S. industrial gases market.

F. BOC Exerted Beneficial Influence on Competitive
Conditions in the United States Industrial Gases Market

The Supreme Court in *Falstaff Brewing Corp., supra*, made it clear that an acquisition which eliminates a perceived potential entrant violates Section 7 if the potential competitor was so positioned on the edge of the market that it exerted beneficial influence on competitive conditions in that market (410 U.S. at 532-33).

In a lengthy footnote to the majority opinion in *Falstaff*, the Supreme Court spelled out the nature of evidence to be considered in weighing the effects of the elimination of a perceived potential entrant:

The Government did not produce direct evidence of how members of the New England market reacted to potential competition from Falstaff, but circumstantial evidence is the lifeblood of antitrust law, * * * (citations omitted) especially for §7 which is concerned "with probabilities, not certainties," *Brown Shoe Co. v. United States*, 370 U.S. at 323. As was stated in *United States v. Penn-Olin Chemical Co.*, 378 U.S. 158, 174 (1964), "[p]otential competition cannot be put to a subjective test. It is not susceptible of a ready and precise answer."

Nor was there any lack of circumstantial evidence of Falstaff's on-the-fringe competitive impact. As the record shows, Falstaff was in the relevant line of commerce, was admittedly interested in entering the Northeast, and had among other ways * * * made its interest known by prior-acquisition discussions. Moreover, there were * * * objective economic facts as to Falstaff's capability to enter the New England market; and the same facts * * * would be probative of violation of §7 through loss of a procompetitive on-the-fringe influence. (410 U.S. at 534-35 n. 13).

The approach suggested by the Supreme Court in *Falstaff* was followed by the District Court in assessing the competitive impact of

the acquisition by Phillips Petroleum Company of the Western Manufacturing and Marketing Division of Tidewater Oil Company in *United States v. Phillips Petroleum Co.*, *supra*. On the basis of objective evidence, the District Court held that the acquisition was illegal under Section 7. Just recently, the District Court's decision was unanimously affirmed without opinion by the Supreme Court. 42 U.S.L.W. 3710 (U.S. July 8, 1974).

The District Court concluded that Phillips' elimination as both a perceived and actual potential entrant had substantial anticompetitive effects within the meaning of Section 7, on the basis of the following standard of proof:

[W]here credible objective evidence shows the basic economic facts of the acquiring company's overall size, resources, capability, and motivation with respect to entry into an adjacent attractive market involving a line of commerce in which the firm is already heavily engaged, that firm must be considered to be a significant potential entrant unless it is objectively demonstrated that some unique feature of the market precludes such entry. Moreover, where the market is concentrated and there are few such likely entrants, whether due to the existence of high barriers to entry or for other reasons, no further inquiry is required as to the anticompetitive effect of the acquisition, and that effect must be considered to be substantial within the meaning of §7. (367 F. Supp. at 1239).

BOC argues that the Supreme Court's recent decision in *United States v. Marine Bancorporation*, 42 U.S.L.W. 5210, 5216 (June 26, 1974), requires proof that firms in the industry *in fact* guided their conduct in light of the perceived entrant's presence on the market fringes (BOC PF 168). Industry officials in the present proceeding testified that they had not made any business decisions based on the perceived potential entry of BOC into the U.S. industrial gases market (Finding of Fact 81). Mr. Flamm of Linde testified that such factors were "a degree of sophistication that did not enter our considerations." (Flamm 336).

Voluminous economic evidence in this record demonstrates that BOC's position on the fringe of the U.S. industrial gases market exerted a procompetitive influence on the market. This economic evidence satisfies any burden which may have been set forth in *Marine Bancorporation* since Section 7 deals with probabilities, not certainties. *FTC v. Procter & Gamble Co.*, 386 U.S. 568, 577 (1967). The industrial gases market is highly concentrated with only three national "bulk" producers.⁸ Barriers to entry are extremely high. BOC was the most likely potential entrant into the market with few, if any, other potential entrants. BOC's financial strength and experience in entering industrial

⁸ Industry members do consider existing competitors in their marketing discussions, particularly the big three bulk producers (Flamm 305, 350).

gases markets throughout the world indicated BOC's capability of entering the U.S. industrial gases market on a unilateral basis. BOC had the economic incentives to enter the U.S. market, and in 1973, the market was ripe for entry. BOC had been actively exploring methods of market entry since 1968. Further, there are no unique features of the U.S. industrial gases market which would preclude entry by BOC. Thus, it must be inferred that BOC's position as a perceived potential entrant had a procompetitive effect on the U.S. industrial gases market.

G. The Acquisition of Airco Eliminated BOC as an Actual Potential Entrant

The elimination through merger of an actual potential entrant can be unlawful "[A]lthough its competitive conduct in the market may be the mirror image of that of the acquired company" since the entry eliminates a potential competitor exercising present influence on the market, *United States v. Falstaff Brewing Corp.*, 410 U.S. 526, 532 (1973); it also eliminates the possibility of eventual market deconcentration. *United States v. Ford Motor Company*, 286 F. Supp. 407 (E.D. Mich. 1968), *aff'd*, 405 U.S. 562, 587 (1972) (Burger, C. J., concurring in part).

Strong objective evidence of record indicates that BOC would have eventually entered the U.S. industrial gases market either *de novo* or through toehold acquisition. BOC had a "long-term objective" of expanding its international operations and BOC's chairman admitted the Airco acquisition was in furtherance of this objective. The U.S. market is the world's largest industrial gases market and the most technically advanced. BOC needed to be "in tune" with this technology (Smith 1788). BOC could not be truly "multi-international" without operating in the North American market (Smith 1731). BOC needed to be in competition with its American-based competitors "on their home grounds" to survive internationally (CX 38C; see Findings of Fact 84-87).

BOC continuously investigated methods of entry into the U.S. market from 1968 through 1973, including hiring a consultant who was a specialist in industrial gases, making an extensive investigation of the industrial gases market in 1969-1970, and holding acquisition discussions with several small industrial gases companies, including commencing a study of possible acquisition of Airco in June 1973 (Findings of Fact 90-101). BOC had the financial resources, technical knowhow and marketing ability, and the economic incentives and motivation to enter the market. Further, there were no barriers to such entry by BOC.

BOC argues that testimony by BOC officials and BOC contemporaneous documents prove conclusively BOC would not have entered the U.S. industrial gases market except for the Airco acquisition. The testimony by BOC officials, however, must be viewed in the light of other testimony given in this proceeding, and in light of other evidence of record. The BOC officials admitted there were strong economic incentives for BOC to enter the U.S. industrial gases market (Findings of Fact 103-107), and they authorized extensive acquisition discussions with several U.S. industrial gases firms. Thus, self-serving testimony that BOC would never enter the U.S. market *de novo* or by toehold acquisition can be given little weight.

BOC stresses two contemporaneous documents, (1) the Perham-Greenfield report of the BOC 1969-1970 investigation of the industrial gases industry, and (2) an internal budget and forecast for the development of business through 1973 (Finding of Fact 108).

The Perham-Greenfield report does not represent a BOC decision not to enter the U.S. industrial gases market. It was a report to the BOC managers on the U.S. market as of early 1970, and it was negative on entry by BOC at that time. However, the report recommended that BOC continue to look for future opportunities in the U.S. market (Finding of Fact 95).

The July 1970 BOC budget and forecast did not authorize any funds for entering the U.S. industrial gases market through 1973. However, Peter Laister, a director of BOC, testified that funds for acquisitions are left out of planning documents when it is uncertain what acquisitions will occur in the future (Finding of Fact 109). Mr. Laister also stated that in any large business you obviously cannot read the future a few years out.

There is no other documentation in the record to establish that BOC made a business decision not to enter the U.S. industrial gases market. If such a decision had been reached, it is inconceivable that BOC would have authorized several extensive merger discussions with U.S. firms after receipt of the Perham-Greenfield report. Further, the \$80 million needed for the Airco transaction did not appear in any planning documents. Thus, this subjective evidence of BOC's state of mind is not persuasive.

The subjective evidence discussed above does not overcome the strong objective evidence of BOC's likely entry into the U.S. industrial gases market. It is well settled that subjective evidence of management's intent is entitled to little weight in determining whether a company is an actual potential entrant. The Supreme Court expressly rejected reliance on such subjective evidence in *United States v. Penn-Olin Chemical Co.*, 378 U.S. 158 (1964). After a full review of objective

evidence in that case showing the capability and incentives of joint venturers to enter a market independently, the Court held (at p. 174):

Unless we are going to require subjective evidence, this array of probability certainly reaches the prima facie stage. As we have indicated, to require more would be to read the statutory requirement of reasonable probability into a requirement of certainty. This we will not do.

In his concurring opinion in *United States v. Falstaff Brewing Corp.*, 410 U.S. 526, 545 (1973), Justice Marshall elaborated reasons for giving subjective evidence limited consideration in actual potential entry cases (at pp. 567-569):

The reasons for so limiting the role of subjective evidence are not difficult to discern. Such evidence should obviously be given no weight if it is not credible. But it is in the very nature of such evidence that in the usual case it is not worthy of credit. First, any statement of future intent will be inherently self-serving. A defendant in a §7 case such as this wishes to enter the market by acquisition and its managers know that its ability to do so depends upon whether it can convince a court that it would not have entered *de novo* if entry by acquisition were prevented. It is thus strongly in management's interest to represent that it has no intention of entering *de novo*—a representation which is not subject to external verification and which is so speculative in nature that it could virtually never serve as the predicate for a perjury charge.

* * * * *

Thus, in most cases, subjective statements contrary to the objective evidence simply should not be believed. But even if the threshold credibility gap is breached, it still does not follow that subjective statements of future intent should outweigh strong objective evidence to the contrary. Even if it is true that management has no present intent of entering the market *de novo*, the possibility remains that it may change its mind as the objective factors favoring such entry are more clearly perceived.

BOC also argues that it is incumbent upon complaint counsel to show that *de novo* or toehold entry was economically feasible and attractive. BOC stresses that there was no evidence at all to the effect that such a course of action would have been reasonably likely to yield even a modest profit (BOC PF*177).

Moreover, it is argued that after BOC offered testimony that *de novo* entry designed to produce a viable national competitor would have cost almost \$250 million, taken at least 10 years to show a profit, and would not have been a prudent business decision, complaint counsel offered no rebuttal (BOC PF*178). BOC also points out that there was no evidence offered as to the asking prices or the profitability of small industrial gases companies which were available for acquisition.

BOC would impose an impossible burden on a trial record. It would be nearly impossible to determine reasonableness of asking prices of firms in the industry, and literally impossible to establish at what point in time *de novo* entry would produce a viable national competitor and

return a "modest profit." It may have been easier and more immediately profitable for BOC to enter the U.S. industrial gases market purchasing a large existing market share than it would be for BOC to have to engage in the competitive struggle necessary to win a significant market share by *de novo* or toehold entry. "But the test in Section 7 cases is not whether anticompetitive conduct is profit maximizing. The very purpose of Section 7 is to direct the profit incentive into channels which are procompetitive." *Falstaff Brewing Corp., supra* (Marshall, J., concurring), at p. 572.

There is, moreover, substantial evidence of record showing that *de novo* entry or toehold acquisition would have been both feasible and attractive to BOC. The record is manifestly clear that BOC had the resources, technical knowhow and marketing experience to enter the U.S. industrial gases market *de novo* or by toehold acquisition. BOC found it economically feasible and attractive to enter *de novo* and by toehold acquisitions industrial gases markets in 19 different countries throughout the world. BOC found it economically feasible and attractive to recently enter the industrial gases market in Brazil *de novo* by building a small plant. The Brazilian and the U.S. industrial gases markets have comparable growth rates (Baker 2732).

Air Products' successful *de novo* entry into the industrial gases market in Great Britain in 1957 also demonstrates by analogy the feasibility and attractiveness of entry by BOC on a small scale into the U.S. industrial gases market. In 1957, Air Products was a small company and its entry into Great Britain was its first overseas penetration. It did not have the resources and world wide marketing experience that BOC had at the time of BOC's stock acquisition in Airco. Air Products began its operations in Great Britain by building very small plants and it had to compete with BOC, whose market share was in excess of 95 percent. Despite its meager beginning, Air Products was able subsequently to obtain a 25 percent share of the Great Britain industrial gases market (Baker 2738). Further, Air Products found it attractive to recently enter the Canadian market where it markets products from its U.S. gases plants, pays a 10 percent tariff, and has at the present less than 1 percent of the market (Baker 396-99, 2713-15).

Further convincing evidence of the feasibility and attractiveness of entering the U.S. industrial gases market by toehold acquisition is the successful entry by Liquid Air in 1968 through acquisition of American Cryogenics, a small company that was losing \$4 million a year at the time of its acquisition. Liquid Air was able to turn American Cryogenics into a profitable operation. Furthermore, market conditions in 1968 were not as advantageous for entry into the market as conditions in recent years. Liquid Air has also been able to extend its

initial penetration into the U.S. market through acquisition of other toehold firms and by internal expansion (CX 345H, *in camera*; Dempster 511, 518-19, 528-530, 552).

The record also establishes that had BOC not acquired a stock interest in Airco, it would have been an opportune time for BOC to enter the U.S. industrial gases market *de novo* by competing for tonnage supply schemes for industrial gases. BOC had already established itself in the United States market as a supplier of air separation plants through its joint venture with Airco which designed and sold air separation plants in the United States from 1967 through 1971. In recent years the demand for industrial gases in tonnage quantities has been increasing faster than the capacity of the U.S. industry to construct plants, and BOC could successfully compete in the United States for tonnage accounts (Baker 2734-35). Tonnage accounts are profitable (Baker 2741).

The prevailing market conditions of increased demand and shortage of production capacity also would make it an opportune time for BOC had it not acquired stock in Airco to enter the U.S. industrial gases market by acquisition and expansion of a toehold firm. The evidence of record clearly shows that entry into the U.S. industrial gases market by toehold acquisition was available to BOC. At the time BOC acquired the stock of Airco, there were a number of attractive small U.S. industrial gases producers available for acquisition, including Burdett of Norristown, Northern Gases, and Alabama Oxygen (Heckel 736; Perkins 788; Kimerling 876; Baker 2750, 2781). Further, Burdett of Cleveland, which BOC denigrates, was the subject of several BOC acquisition discussions, and in the fall of 1973, before the Airco acquisition, BOC was *still* interested in acquiring Burdett (Loveman 591-92). Thus, entry by toehold acquisition was available to BOC. (See the Commission's decision in *Kennecott Copper Corp.*, 78 F.T.C. 744, 927 (1971), *aff'd*, 467 F.2d 67 (10th Cir. 1972), *cert. denied*, 94 S.Ct. 1617 (1974), where the existence of toehold firms in the market was stated to be sufficient to show the availability of entry by toehold acquisition.)

Executives of two of the largest industrial gases firms in the United States testified that BOC could enter the U.S. industrial gases market by a toehold acquisition, by building a tonnage plant, by building a tonnage plant with incremental capacity to serve the merchant market, or by any combination thereof (Flamm 260; Baker 393-94, 2734-2735). Early 1974 would have been an opportune time to enter the U.S. industrial gases market (Baker 2735).

Thus, it is concluded that *de novo* or grass roots entry into the U.S. industrial gases market was feasible and economically attractive to BOC. It is further concluded that there were toehold firms that could

have been acquired by BOC on a practical basis. It is also concluded that, as of December 1973, BOC was an actual potential entrant into the U.S. industrial gases market either *de novo* or by toehold acquisition; its entry would have increased the number of effective competitors in the market. BOC was committed to becoming a viable national firm with at least 5 percent of the market. Thus, BOC would have been compelled to seek its place in the market at the expense of the established firms, and this effort by BOC would have resulted in a procompetitive effect in the marketplace.

Further, the substantiality of the anticompetitive effect resulting from the elimination of an actual potential entrant may be inferred from the objective facts as are present in this case. Objective evidence establishes that BOC was an actual potential entrant, that the market is highly concentrated, and that there are high barriers to entry and few, if any, other likely entrants. Thus, no further inquiry is required into the anticompetitive effects of the acquisition and the effect must be considered substantial within the meaning of Section 7. *United States v. Phillips Petroleum Company*, 367 F. Supp. 1226, 1239 (C.D. Cal. 1973); see *United States v. Falstaff Brewing Corp.*, 410 U.S. 526, 532 (1973).⁹

H. Acquisition of Airco by BOC Increased Entry Barriers in the U.S. Industrial Gases Market

Airco, one of the dominant firms in the U.S. industrial gases market was acquired by BOC, a company with substantial resources and technical and marketing skills and apparently the second largest industrial gases company in the world. It must be concluded that such an acquisition increased concentration in the market and substantially increased what were already exceeding high entry barriers.

I. Airco Is Not A Toehold

Airco clearly does not meet the criteria for a toehold firm as its assets and market position enabled BOC instantly to achieve a dominant, national position in the U.S. industrial gases market without any expansion effort. BOC's chairman testified that BOC would need over five percent of the national market to be a viable competitor

⁹ Even if BOC's conduct in the marketplace is the "mirror image" of that of Airco (see *United States v. Falstaff Brewing Corp.*, 410 U.S. at 532 (1973)), it appears that Section 7 is nevertheless violated. The Court, in *Falstaff*, stated that it would "leave for another day" the question of the applicability of Section 7 to a merger that will leave competition in the marketplace exactly as it was, neither hurt nor helped. (*Id.* at 537.) However, as observed by Justice Marshall, Section 7 prohibits an entry by acquisition [other than toehold] since such an acquisition eliminates the possibility of future actual competition. (*Id.*, Marshall, J., concurring, at 561.) Thus, even if *de novo* or toehold entry by BOC did not have immediate procompetitive effects, there is the possibility that such entry would have such effects at some time in the future. This is sufficient to establish a violation of Section 7, which looks to possibilities—not certainties, and looks to the future as well as the present.

(Smith 1837). Airco's share of the U.S. industrial gases market substantially exceeds that percentage.

The District Court in *United States v. Phillips Petroleum Co.*, 367 F. Supp. 1226, 1258 (C.D. Cal. 1973), defines a toehold acquisition as:

* * * one which is sufficient to assist the potential entrant over the entry barriers and into the market, but not so large that the entrant merely replaces the acquired company; the acquiring company must have a substantial need to build upon the acquisition. Such a foothold acquisition is fully consistent with the concept of unilateral entry, since both envision a significant market penetration effort by the entering company quite apart from whatever assets or market position have been acquired.

Under the above definition, with which the administrative law judge is in accord, Airco clearly is not a toehold acquisition.

II. Inhalation Anesthetic Equipment

A. Inhalation Anesthetic Equipment Comprises a Line of Commerce

Inhalation anesthetic equipment and accessories fall within the criteria for defining product markets set forth by the Supreme Court in *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962):

The outer boundaries of a product market are determined by the reasonable interchangeability of use or the cross-elasticity of demand between the product itself and substitutes for it. However, within this broad market, well-defined submarkets may exist which, in themselves, constitute product markets for antitrust purposes. * * * The boundaries of such a submarket may be determined by examining such practical indicia as industry or public recognition of the submarket as a separate economic entity, the product's peculiar characteristics and uses, unique production facilities, distinct customers, distinct prices, sensitivity to price changes and specialized vendors.

The Court further emphasized that:

* * * it is necessary to examine the effects of a merger in each such economically significant submarket to determine if there is a reasonable probability that the merger will substantially lessen competition. (*Ibid.*)

It is now well established that it is not necessary for each of the seven criteria set forth in *Brown Shoe* to be present in every merger case in order to establish a market; a relevant market has been found to exist where less than all of the *Brown Shoe* criteria were present. *United States v. E. I. duPont de Nemours & Co.*, 353 U.S. 586, 593-95 (1957); *General Foods Corp. v. F.T.C.*, 386 F.2d 936, 941 (3rd Cir. 1967); *Reynolds Metals Co. v. F.T.C.* 309 F.2d 223, 227 (D.C. Cir. 1962).

Applying the *Brown Shoe* criteria, it is clearly established that inhalation anesthetic equipment and accessories are a separate and distinct market. The medical profession, as well as firms in the

industry, recognize inhalation anesthetic equipment and accessories as constituting a separate market. Inhalation anesthetic equipment and accessories have peculiar characteristics and uses, i.e., supplying anesthetic vapors to patients during surgical procedures. Production facilities for inhalation anesthetic equipment and accessories are unique, owing to the unique nature of the technology of supplying gases for anesthesia. Customers buying or using inhalation anesthetic equipment and accessories are distinct from those buying or using medical products generally. Inhalation anesthetic equipment and accessories are priced markedly higher than comparable equipment used in other medical applications.¹⁰

BOC respondents point out that there is a profusion of products in the IAE market and that individual IAE products are not interchangeable (BOC PF 311). On that basis, BOC argues that IAE products are not a relevant product market. However, the principal product in IAE, the anesthesia machine, consists of nearly every product in the IAE market. The remaining items in the IAE market are necessary in order for the patient to effectively receive the anesthetic vapors. Additionally, there is a degree of interchangeability among surgical, veterinary and dental anesthesia machines. These products have the common denominator of all being used by the anesthesiologist to administer anesthesia. The surgical, veterinary and dental anesthesia machines utilize common technology to perform the identical purpose of inducing anesthesia in surgical procedures.

B. IAE Geographic Market

Manufacturers of inhalation anesthetic equipment and accessories generally market their products throughout the United States. Airco markets inhalation anesthetic equipment and accessories throughout the United States, as does BOC's subsidiaries, Fraser Sweatman and Harris Lake. The acquisition will thus have a direct and immediate effect upon competition in the IAE market throughout the United States.

Accordingly, the United States as a whole is the relevant geographic market in which to appraise the effects of BOC's acquisition of Airco stock upon competition in inhalation anesthetic equipment and accessories. *United States v. Marine Bancorporation, Inc.*, 42 U.S.L.W. 5210, 5215 (U.S. June 26, 1974); *United States v. Pabst Brewing Co.*, 384

¹⁰ Inhalation anesthetic equipment and accessories must be semi-conductive to avoid danger of explosion. This pushes the cost of such items substantially above that of otherwise comparable or even identical items used in the practice of inhalation therapy. This price differential is further enhanced by the greater precision needed in equipment for the administration of potentially lethal anesthetic agents than that for the administration of gases for therapeutic purposes (Hedley-Whyte 1278).

U.S. 546, 549 (1966). Respondents do not dispute the geographic market.

C. Market Concentration

The record establishes that the IAE market is highly concentrated. Airco is the dominant firm in the IAE market; the consortium of BOC and its subsidiaries, Fraser Sweatman and Harris Lake, constitute a substantial part of the market. The record reveals that in the manufacture and sale of the anesthesia machine, three companies completely dominate the market—Airco, Foregger and BOC.

The record also reveals that barriers to entry are high, *i.e.*, technological expertise in manufacturing and marketing; the need for sales and service organization; high capital costs; brand loyalty; and the entrenchment of the leading companies in the marketplace. An already highly concentrated market with high entry barriers obviates any need to show a trend in concentration. *Stanley Works*, 78 F.T.C. 1023, 1065 (1971), *aff'd*, 469 F.2d 498, 503-504 (2nd Cir. 1972), *cert. denied*, 412 U.S. 928 (1973).

D. Competitive Effects

No difficult or novel issue is involved in appraising the effect of BOC's acquisition of Airco stock in the IAE market in the United States. The facts disclose a clear violation of Section 7. The Supreme Court has repeatedly struck down mergers between actual competitors with considerably smaller market shares than those of Airco and BOC. In *Brown Shoe, supra*, the Court determined that a merger resulting in a combined market share of 5% would be illegal. 370 U.S. at 343-44. Similarly, acquisition of the ninth-ranked firm, with 1.3 percent of the aluminum conductor market by the market leader, with 27.8 percent of the market, was struck down by the Court in *United States v. Aluminum Co. of America (Alcoa-Rome)*, 377 U.S. 271 (1964), as was a merger between the sixth- and seventh-ranked firms with 5.84 and 5.48 percent, respectively, of the three-state beer market in *Pabst, supra*. The Court in *Pabst* also found the merger unlawfully anticompetitive in the national beer market where the two firms ranked tenth and eighteenth and had a combined market share of 4.49 percent of total U.S. beer sales. With a combined market share of 8.9 percent, a merger between the third-ranking firm with 4.7 percent and the sixth-ranking firm with 4.2 percent of the market was likewise invalidated by the Court in *United States v. Von's Grocery Co.*, 384 U.S. 270 (1966).

In *United States v. Philadelphia National Bank*, 374 U.S. 321, 363

(1963), the Supreme Court set forth the test for judging horizontal acquisitions between significant competitors:

Specifically, we think that a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market, is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects.

Concentration in the inhalation anesthetic equipment market is very high. The market shares of the top four firms in 1972 totaled 64.5 percent, and the top eight firms had 87.9 percent of the total market. Where "concentration is already great," the Supreme Court has observed, "the importance of preventing even slight increases in concentration and so preserving the possibility of eventual deconcentration is correspondingly great." *Philadelphia National Bank, supra*, 374 U.S. at 365, n.42; *Alcoa, supra*, 377 U.S. at 279; *United States v. Continental Can*, 378 U.S. 441, 461-62 (1964).

Although it is not necessary to show the further likelihood of anticompetitive effects of the acquisition, such effects clearly present themselves in this market. While no firm in the IAE market has been able to approach Airco's market dominance, BOC has shown itself to be a formidable factor in the market. Instead of expanding its market share, with the possibility of market deconcentration, BOC joined forces with Airco to increase substantially Airco's market dominance. Thus, the merger of Airco and BOC increased concentration, heightened entry barriers, and more firmly entrenched Airco in the IAE market.

III. Inhalation Therapy Equipment

A. Inhalation Therapy Equipment Comprises a Line of Commerce

The product market criteria set forth in *Brown Shoe Co. v. United States*, 370 U.S. 294, 325 (1962), discussed hereinbefore in connection with the IAE market, establishes ITE as a relevant product market within which the effects of BOC's acquisition of Airco stock under Section 7 may be considered. ITE is recognized by the medical profession and by the firms in the industry as constituting a separate entity. ITE has peculiar characteristics and uses. Customer users and purchasers of ITE are distinct and the price of ITE is distinct from the prices of IAE (*see infra*, p. 105).

ITE is comprised of the equipment and accessories used in the administration of gases for therapeutic purposes. There is also a distinct group of medical paraprofessionals referred to as "inhalation

therapists" and recently as "respiratory therapists" who specialize in inhalation therapy (Hedley-Whyte 1210-11; Karpick 1396). Although the duties of these professionals has in recent years expanded to include other aspects of respiratory care, they primarily are responsible for the administration of gases for therapeutic purposes, *i.e.*, inhalation therapy (Karpick 1393, 1396). Inhalation therapists are further differentiated from other medical personnel by virtue of their specialized training. They are certified and registered as respiratory therapists. Further, respiratory therapists have their own professional organization and medical journal (Hedley-Whyte 1210-1211; Karpick 1395). Inhalation therapy is recognized by the medical profession as a subsection of the broad field now referred to as respiratory therapy.

ITE equipment has a specialized production technology and requires specialized vendors to successfully market the products. ITE is distinct from IAE, and is separate from other respiratory therapy equipment such as suction equipment and monitoring equipment. ITE meets the criteria set forth in *Brown Shoe, supra*, 370 U.S. at 325, sufficiently to constitute a submarket for Section 7 purposes.

B. Geographic Market

The acquired firm, Airco, markets inhalation therapy equipment and accessories nationwide, as do its competitors, including BOC's subsidiary. The acquisition's effect will be felt directly and immediately in the ITE market throughout the United States. The United States as a whole is, therefore, the relevant geographic market in which to appraise the effects of BOC's acquisition of Airco stock upon competition in inhalation therapy equipment and accessories. *United States v. Marine Bancorporation, Inc.*, 42 U.S.L.W. 5210, 5215 (U.S. June 26, 1974); *United States v. Pabst Brewing Co.*, 384 U.S. 546, 549 (1966). Respondents do not dispute the geographic market.

C. Market Concentration

The ITE market is concentrated, although not as concentrated as the IAE market. Further, in the ITE market Airco is not the dominant firm that it is in the IAE market. The sales of ITE by BOC and its subsidiaries are not very substantial (Table II, *in camera*). It is doubtful that the complaint in this matter would have been brought based on the market shares in the ITE market alone. However, other more substantial markets are involved in this proceeding [industrial gases and IAE]; and other significant factors are involved in the sale of ITE, such as the formidable position of BOC in the medical markets

throughout the world, and BOC's intention to and capability of unilaterally expanding ITE sales in the United States.

D. Competitive Effects

Although the inhalation therapy equipment and accessories market is composed of many companies, the bulk of the sales in the market are concentrated in the hands of a few firms. Airco is a substantial factor in the ITE market and BOC's subsidiary, Harris Lake, backed by BOC, had established itself as a significant competitor.

Substantial barriers to entry and expansion limit the potential for growth of small firms in the rapidly growing inhalation therapy equipment and accessories market. Backed by BOC's vast capital, technological and marketing skills, BOC's operations not only had the ability to expand in this market, but were already doing so. Thus BOC's subsidiary, Harris Lake, though small, was a significant and closely watched competitor. BOC had carefully devised its strategy for growth when it entered the U.S. market. Through internal expansion, acquisition of other small competitors, or a combination of both approaches, BOC intended to become a significant firm in the U.S. inhalation therapy equipment and accessories market.

The fact that BOC had taken steps to accomplish its expansion goals made BOC a highly significant factor in the market. There can be little doubt that within a short span of time, BOC would have significantly increased its share of the ITE market. As a firm with immense resources and capabilities, already in the market, BOC exerted a significant restraining influence on the market leaders beyond its small market share, and was a strong force for competition.

Section 7 dictates that a small, significant competitor such as BOC, with its capability, interest, and incentives to expand, must be compelled to pursue internal development in lieu of an acquisition inimical to competition. *United States v. Philadelphia National Bank*, 374 U.S. 321, 370 (1963); *United States v. Standard Oil Company* (New Jersey), 253 F. Supp. 196, 227 (D.N.J. 1966).

As recognized by the Second Circuit in *Stanley Works, supra*, at 508:

[t]he continued independence of companies with relatively small market shares is * * * crucial to the health and vitality of a market threatening to become oligopolistic.

The legal principle set forth in *Stanley Works* is well established. The Supreme Court earlier noted that "the basic premise of * * * [Section 7 is] that competition will be most vital 'when there are many sellers, none of which has any significant market share.' *United States v. Philadelphia National Bank*, 274 U.S., at 363." *United States v. Aluminum Co. of America*, 377 U.S. 271, 280 (1964).

In *Alcoa*, only a dozen companies could claim market shares as large as one percent. This fact was specifically noted by the Supreme Court in finding the acquired firm, ranked ninth, with a 1.3 percent market share, a significant competitor. *Alcoa, supra*, at 281. In *Stanley*, ten firms had market shares as great as one percent and Stanley was ranked tenth. Similarly, outside the central core of dominant firms, of which Airco is a member, the inhalation therapy equipment and accessories market is composed of small competitors.

Section 7 "look[s] not merely to the actual present effect of a merger but instead to its effect upon future competition." *United States v. Von's Grocery Co.*, 384 U.S. 270, 277 (1966). Elimination of competition between Airco and BOC in the ITE market has eliminated the probability of substantial future competition between the two firms, and has significantly increased entry barriers by combining BOC's tremendous resources and experience with Airco's existing market strength.

IV. *The Acquisition of Airco Stock by BOC Is a Violation of Section Five of the Federal Trade Commission Act*

An acquisition that violates Section 7 of the Clayton Act, as amended, also violates Section 5 of the Federal Trade Commission Act. *E.g., Stanley Works v. F.T.C.*, 469 F.2d 498, 499 n.2 (2d Cir. 1972), *cert. denied*, 412 U.S. 928 (1973).

In the present case, BOC's acquisition of Airco stock violates Section 7 in several respects. The acquisition eliminated BOC both as a perceived potential entrant and as an actual potential entrant into the industrial gases industry in the United States. It also eliminated actual competition between BOC and Airco in the inhalation anesthetic equipment and accessories market and in the inhalation therapy equipment and accessories market. Therefore, the BOC acquisition also violated Section 5 of the Federal Trade Commission Act. Accordingly, BOC respondents, as charged in the complaint, violated both Section 7 of the Clayton Act and Section 5 of the Federal Trade Commission Act.

Section 5 of the Federal Trade Commission Act also applies in the present case to Airco. The Commission has ruled that "* * * Section 5 is the proper statute under which to charge an acquired corporation where the acquisition substantially lessens competition." *Dean Foods Co.*, 70 F.T.C. 1146, 1291 (1966). In *Dean Foods*, the Commission held that the acquired firm, Bowman Dairy Corporation, violated Section 5 by entering into a purchase contract for the sale of its assets to Dean Foods (70 F.T.C. at 1292).

Although Airco did not enter into an agreement to sell its assets to BOC, the record clearly shows that Airco was instrumental in BOC's

acquisition of Airco's stock. First, Airco actively sought out BOC and provided confidential information with respect to its business operations to BOC. Airco and BOC entered into an agreement on July 25, 1973, which provided for an exchange of confidential information between the two companies and also prohibited either company from making a tender offer for the other company's shares for a period of five years without the approval of the other company's board of directors (Finding of Fact 25).

On Dec. 10, 1973, Airco and BOC entered into another agreement in which Airco consented to BOC's tender offer for Airco shares. This agreement also provided for reciprocal representation by BOC and Airco on each other's board of directors. Further, the agreement gave Airco the right to purchase or designate a purchaser for any of the Airco shares acquired by BOC which BOC may subsequently sell (Finding of Fact 30).

Further, Airco actively assisted BOC in making its tender offer. Airco not only made its list of shareholders available to BOC, it also had Airco's transfer agent mail BOC's offer to Airco shareholders (Finding of Fact 30).

Airco's role in the acquisition of Airco stock by BOC was a significant part of the overall transaction. Airco actively opposed the Curtiss-Wright proposal and supported the BOC proposal. Accordingly, respondent Airco, as charged in the complaint, violated Section 5 of the Federal Trade Commission Act by taking affirmative actions which resulted in an acquisition prohibited by Section 7 of the Clayton Act and Section 5 of the Federal Trade Commission Act.

Moreover, it is proper to join Airco as a party respondent to this case since the relief to be entered may affect the rights and interests of Airco. Accordingly, Airco was a proper party to this action. *See, e.g., United States v. Phillips Petroleum Co.*, 367 F. Supp. 1226, 1261-62 (C.D. Cal. 1973), *aff'd mem.*, 42 U.S.L.W. 3710 (July 8, 1974), and the cases cited therein.

V. Form of Relief

BOC respondents have consented to the jurisdiction of the Commission (Finding of Fact 12), and the Commission has jurisdiction over Airco (Finding of Fact 20). Thus, the Commission has authority to enter whatever remedy may be necessary to restore competition to the status that existed prior to December 1973, and to take steps to assure that the law will not be violated in the future.

It is well settled that the choice of the remedial order is committed to the discretion of the Commission. *F.T.C. v. Mandel Bros.*, 359 U.S. 385, 392-93 (1959); *L. G. Balfour Co. v. F.T.C.*, 442 F.2d 1 (7th Cir. 1971).

Generally, the most appropriate remedy to redress a Section 7 violation is divestiture. *Ford Motor Co. v. United States*, 405 U.S. 562, 573 (1972); *F.T.C. v. Procter & Gamble Co.*, 386 U.S. 568 (1967).

In the present case, effective relief can only be achieved by complete divestiture of Airco's stock by BOC, removal of BOC representatives from Airco's board and removal of Airco representatives from BOC's board. Complete divestiture and removal of BOC and Airco representatives from each other's board of directors will restore BOC as a procompetitive force on the edge of the market and as a likely potential entrant into the United States industrial gases market. The same sanction will also restore BOC as an independent, actual competitor in the inhalation anesthetic equipment and accessories market and in the inhalation therapy equipment and accessories market.

BOC has shown some proclivity toward mergers in the lines of commerce relevant to this proceeding. To insure that the Commission's objective in bringing this proceeding is not circumvented, the Commission should retain jurisdiction over BOC respondents and the authority to approve future acquisitions in the three lines of commerce relevant to this proceeding for a period of ten (10) years. *Abex Corp. v. F.T.C.*, 420 F.2d 928, 933 (6th Cir. 1970); *cert. denied*, 400 U.S. 865 (1970); *Seeburg Corp. v. F.T.C.*, 425 F.2d 124, 129 (6th Cir. 1970), *cert. denied*, 400 U.S. 866 (1970).

The acquisition involved in this proceeding is 4 million shares of Airco stock. Because of a court injunction issued at the behest of the Commission, intermingling of assets of the two corporations has been prevented. *F.T.C. v. British Oxygen Co.*, 1974 CCH Trade Cas. ¶75,003 (D. Del. 1974) [*supra*]. Thus, divestiture will not cause undue difficulty to either BOC or Airco. Further, it is possible to get almost immediate relief since the divestiture involves stock only. The order entered herewith will require BOC to set up an independent Voting Trustee which shall have full independent authority to vote said stock until such time as the trustee stock shall have been divested pursuant to the provisions of this order. Under this arrangement, the vagaries of the financial markets will not prevent some immediate relief.

CONCLUSIONS OF LAW

1. The Commission has jurisdiction of and over the subject matter of this proceeding and of respondents The British Oxygen Company Limited; BOC Financial Corporation; BOC Holdings Limited; and British Oxygen Investments Limited ("BOC respondents"); and respondent Airco, Inc. ("Airco").

2. BOC respondents and Airco were, at all times relevant herein,

corporations engaged in commerce, as "commerce" is defined in the Clayton Act, as amended, and in the Federal Trade Commission Act.

3. The appropriate lines of commerce within which to evaluate the competitive effects of the acquisition of Airco stock by BOC are: (a) industrial gases; (b) inhalation anesthetic equipment and accessories; and (c) inhalation therapy equipment and accessories.

4. The proper geographic market within which to determine the competitive effects of BOC's acquisition in the three relevant lines of commerce is the United States, as a whole.

5. The effect of the acquisition of Airco stock by BOC has been, or may be, substantially to lessen competition or to tend to create a monopoly in violation of Section 7 of the Clayton Act, as amended, and in violation of Section 5 of the Federal Trade Commission Act, in the following ways:

(a) Substantial potential competition between BOC and Airco in the production and sale of industrial gases has been eliminated.

(b) BOC has been eliminated as a significant perceived potential entrant into the production and sale of industrial gases in the United States.

(c) BOC has been eliminated as a significant actual potential entrant into the production and sale of industrial gases in the United States.

(d) The already high concentration in the industrial gases market in the United States may be increased.

(e) Already high barriers to entry of new manufacturers into the production and sale of industrial gases may be raised significantly.

(f) Substantial actual competition between BOC and Airco in the manufacture and sale of inhalation anesthetic equipment and accessories has been eliminated.

(g) Concentration in the manufacture and sale of inhalation anesthetic equipment and accessories has been increased.

(h) Airco, through its Ohio Medical Products Division, has been further entrenched in the manufacture and sale of inhalation anesthetic equipment and accessories.

(i) Barriers to entry of new manufacturers into the manufacture and sale of inhalation anesthetic equipment and accessories may be raised significantly.

(j) Actual competition in the manufacture and sale of inhalation therapy equipment and accessories between BOC and Airco has been eliminated.

(k) Concentration in the manufacture and sale of inhalation therapy equipment and accessories has been increased.

(l) Airco, through its Ohio Medical Products Division, has been

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further entrenched in the manufacture and sale of inhalation therapy equipment and accessories.

(m) Barriers to entry of new manufacturers into the manufacture and sale of inhalation therapy equipment and accessories may be raised significantly.

6. The acquisition of Airco stock by BOC may be substantially to lessen competition, or to tend to create a monopoly, in violation of Section 7 of the Clayton Act, as amended (15 U.S.C. §18), and in violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. §45).

ORDER

For the purpose of this order, BOC shall include all subsidiary or related corporations and all successor corporations of The British Oxygen Company Limited; BOC Financial Corporation; BOC Holdings Limited; and British Oxygen Investments Limited; and Airco shall include all subsidiary or related corporations and all successor corporations of Airco, Inc.

I

It is ordered, That BOC, its officers, directors, agents, representatives and employees, shall within one (1) year from the date this order becomes final, divest itself absolutely and in good faith, subject to the prior approval of the Federal Trade Commission, of all rights, title and interest including without limitation all shares of stock and all assets, properties, rights and privileges, tangible or intangible, including without limitation all plant, equipment, machinery, raw material reserves, inventory, customer lists, trade names, trademarks, good will, and other property of whatever description acquired by BOC as a result of its acquisition of the stock of Airco.

II

It is further ordered, That none of the stock, assets, properties, rights and privileges, tangible or intangible, required to be divested by BOC pursuant to Paragraph I above, shall be divested directly or indirectly to anyone who is, at the time of the divestiture, an officer, director, employee, or agent of, or under the control, direction or influence of BOC, or who owns or controls more than one percent of the capital stock of BOC.

III

It is further ordered, That BOC shall, within sixty (60) days from the

date this order becomes final, transfer to an independent voting trustee, subject to the prior approval of the Federal Trade Commission, which shall not be under the direct or indirect control, domination, or influence of BOC, its officers, directors, agents or representatives, all of the stock of Airco presently held by BOC, and BOC shall maintain in existence the voting trust so created, or a successor thereof, until BOC has divested itself of all the stock of Airco in compliance with Paragraphs I and II above.

Said Voting Trustee shall have full independent discretion to vote the trustee stock and BOC and its officers, directors, agents and representatives may not consult, advise or otherwise participate in any manner except in connection with the sale of the trustee stock in accordance with the provisions of Paragraphs I and II above, or the appointment of a successor voting trustee.

IV

It is further ordered, That respondent BOC shall cease and desist for a period of ten (10) years from the date this order becomes final from acquiring, directly or indirectly, through subsidiaries or otherwise, the whole or any part of the stock, share capital or assets (other than products sold in the normal course of business) of any concern, corporate or noncorporate, engaged at the time of acquisition in any State of the United States in any or all of the business of industrial gases, inhalation anesthetic equipment and accessories, and inhalation therapy equipment and accessories, without the prior approval of the Federal Trade Commission.

The prohibited acquisitions in this paragraph shall include but not be limited to the entering into any arrangement between BOC, and any concern engaged in any or all of the business of industrial gases, inhalation anesthetic equipment and accessories, and inhalation therapy equipment and accessories, or any segment thereof, pursuant to which BOC obtains the market share of any such concern (a) through such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, under its own trade name or labels and thereafter manufacturing or distributing any of said products under the BOC trade name, or (b) by reasons of such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, and thereafter transferring to BOC its customer lists, or in any other way making available to BOC access to its customers or its customer accounts.

V

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

VI

It is further ordered, That BOC cease any and all representation on the board of directors of Airco, and cease and desist from taking any steps to nominate, seat, or admit any representatives of Airco to the board of directors of BOC.

VII

It is further ordered, That BOC shall within sixty (60) days from the date this order becomes final, and every sixty (60) days thereafter until BOC has fully complied with the provisions of this order, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which BOC intends to comply or has complied with this order. All compliance reports shall include, among other things that are from time to time required, a summary of contacts or negotiations with anyone for the specified stock, assets, properties, rights, and privileges, tangible or intangible, the identity of all such persons, and copies of all written communications to and from such persons.

VIII

It is further ordered, That Airco cease and desist from taking any steps toward achieving union of interest between Airco and BOC, including but not limited to merger, acquisition, consolidation or joint venture in any market referenced herein.

IX

It is further ordered, That Airco cease and desist from taking any steps to implement any provision of the agreements between Airco and BOC of July 25, 1973, and of Dec. 10, 1973.

X

It is further ordered, That Airco cease any and all representation on the board of directors of BOC, and cease and desist from taking any

steps to nominate, seat, or admit any representative of BOC to the board of directors of Airco.

XI

It is further ordered, That Airco shall within sixty (60) days from the date this order becomes final, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which Airco has complied with this order.

OPINION OF THE COMMISSION

BY ENGMAN, *Commissioner*:

This is an appeal by all respondents from an initial decision by Administrative Law Judge Ernest G. Barnes.

The British Oxygen respondents appeal his ruling that they violated Section 7 of the Clayton Act in acquiring approximately 35 percent of the outstanding shares of common stock in respondent Airco.¹ There appears to be no dispute that 35 percent gives BOC effective control of Airco.

The administrative law judge also found that certain agreements between BOC and Airco relating to the acquisition violated Section 5 of the Federal Trade Commission Act and both BOC and Airco appeal that ruling.

Prior Proceedings

In December 1973, BOC acquired 4 million shares, or 35 percent, of the outstanding common stock of Airco by means of a public tender offer. On Feb. 26, 1974, two months after the acquisition, the Commission issued a complaint charging that BOC's acquisition violated the antitrust laws. On the same day the Commission applied to a United States District Court for a temporary restraining order and a preliminary injunction requiring BOC to maintain Airco as a separate entity and restraining it from, among other things, voting its Airco stock, having BOC personnel serve on the Airco board, increasing or decreasing its holding of Airco stock, and exchanging trade secrets with Airco pending disposition of the Commission's complaint.

On Mar. 8, 1974, the District Court issued a preliminary injunction requiring BOC, among other things, to maintain Airco as a separate company. The court declined to enjoin BOC from voting its Airco

¹ Airco also appeals that ruling, joining in the British Oxygen companies' briefs. The British Oxygen respondents are represented by common counsel and will be collectively referred to as BOC. The corporate relationships between the BOC respondents are described in Findings 6-8. Airco is sometimes referred to in the record by its previous name, Air Reduction Company.

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shares or having BOC personnel serve on the Airco board. The injunction was conditioned on the Commission expediting its administrative proceeding: *FTC v. British Oxygen Co.*, 1974-1 Trade Cases ¶75,003 (D. Del. 1974), appeal by *Airco* docketed, No. 74-1492, 3rd Cir. May 20, 1974 [9 S&D 887].

During hearings on the complaint which were commenced on May 6, 1974, some 28 witnesses were called and several thousand pages of documentary exhibits were received into the record. On Oct. 18, 1974, the administrative law judge issued his initial decision sustaining the major allegations of the complaint. Motions by all the parties for extensions of time to file appeal briefs were granted by the Commission. Oral argument on the appeals was heard by the Commission on Apr. 30, 1975.

The Respondents

British Oxygen Company is a publicly-held United Kingdom company with its main office in London. A principal part of its business is the production and sale of industrial gases, not only in the British Isles but in some 18 other countries. At the time of the acquisition it was the second largest industrial gases firm in the world. BOC also produces and sells equipment for the manufacture and storage of certain gases at extremely low temperatures (cryogenic equipment), welding and cutting equipment, medical equipment, chemicals, metals, vacuum engineering and some consumer products. In its fiscal year ending Sept. 30, 1973, BOC had total sales of about \$766 million, approximately half of which were derived from operations in the United Kingdom and the balance chiefly from countries that were formerly parts of the British empire.

Airco, Incorporated is a publicly-owned New York corporation with its principal office in Montvale, N.J. It manufactures industrial gases and medical products, which account for about 35 percent of total sales. Airco also makes and sells welding and cutting equipment, cryogenic equipment, metals and specialized metal products, medical gases, and high vacuum equipment. It operates gases plants in 22 locations scattered throughout the United States. It is the third largest producer of industrial gases in the United States. Through its Ohio Medical Products Division it also engages in the sale of inhalation anesthetic equipment and inhalation therapy equipment. Its sales of inhalation anesthetic equipment exceed those of any other company in the United States. In 1973 Airco had net sales of \$584 million and net income of approximately \$19 million.

BOC's Acquisition of an Interest in Airco

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BOC acquired its interest in Airco in late December 1973 in the context of a competing tender offer for Airco stock. During 1973 Airco's stock had been selling at its lowest prices in over five years. In June 1973 BOC learned of rumors of an impending tender offer for Airco stock and the managing director of BOC discussed Airco's vulnerability to such a tender offer with a vice president of Airco. BOC also implemented a study of the possibility of BOC's acquiring Airco by a tender offer.

Later that month, the president of Airco met with the board chairman of BOC and proposed an amalgamation between BOC and Airco. Subsequently, on July 25, 1973, BOC and Airco entered into a written agreement that provided for the exchange of confidential financial information and contained a provision that neither company would make any offer for a period of 5 years to acquire any securities of the other without the prior approval of the other company's board of directors. Meetings exploring an amalgamation between the two companies were held during September and October.

In November 1973, the Curtiss-Wright Corporation suddenly informed Airco that it was prepared to make a tender offer for 2 million Airco shares at \$16-17 per share. After consideration of the proposal and a study of the Curtiss-Wright tender offer for 2 million Airco shares at \$18 per share. Airco's board recommended to Airco's shareholders that they not accept it and asked them to wait to consider possible alternatives to that offer.

Shortly thereafter, BOC and Airco entered into an agreement in which Airco consented to BOC making a tender offer for Airco shares. The agreement provided for reciprocal representation by BOC and Airco on each other's board of directors. Additionally, the agreement provided that Airco would have first right to purchase or to designate a purchaser for any Airco shares purchased by BOC should BOC subsequently decide to sell.

On Dec. 10, 1973, BOC made a tender offer to buy up to 4 million shares of Airco stock at \$20 per share. Airco's board informed Airco's shareholders that it did not oppose the offer and advised them that a closer association of Airco and BOC would be beneficial. The BOC tender offer was oversubscribed and the shareholders who tendered to BOC had their tenders pro rated. The cost to BOC of purchasing the 35 percent interest in Airco was \$80 million plus \$2.8 million in expenses. Subsequently Airco's board of directors was enlarged from 12 to 16 directors to provide for four representatives of BOC.

The Complaint

The Commission's complaint charges that the acquisition may substantially lessen competition in industrial gases, inhalation therapy equipment, and inhalation anesthetic equipment, and submarkets thereof.² The case was tried on the theory that BOC's acquisition of controlling interest in Airco substantially lessened potential competition in the U.S. industrial gases industry by eliminating BOC as the most likely potential entrant into that market, and that actual competition between Airco and U.S. subsidiaries of BOC in the inhalation anesthetic equipment and inhalation therapy equipment was eliminated. The ALJ sustained these charges and an additional charge that the July and December agreements between BOC and Airco, paving the way for the BOC tender offer, violated Section 5 of the Federal Trade Commission Act. He issued an order requiring BOC to divest its holdings of Airco stock and Airco to cease and desist from taking any steps to implement any provision of the agreements with BOC.

I. INDUSTRIAL GASES

"Industrial gases" are recognized as consisting of those gases, except for common fuel gases, sold in compressed or liquid (and sometimes solid) form including acetylene, carbon dioxide, carbon monoxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other medical gases, rare gases, and mixtures and combinations thereof. The term "industrial gases industry" is commonly used to refer to a distinct group of manufacturers who produce the principal atmospheric gases (oxygen, nitrogen, argon) and acetylene and who may produce or purchase for resale the other mentioned gases. Sales by industrial gases firms are direct or through distributors to other manufacturers, welders, contractors and other users.

The industrial gases industry has two major marketing segments; tonnage and merchant. "Tonnage" refers to supplying a single customer where demand at a particular plant location justifies the construction of a "tonnage" or "on-site" plant near that location. The gas is delivered through a pipeline, with many tons of gas delivered a day. Steel companies are typical tonnage users of oxygen. Tonnage plants are commonly owned and operated by industrial gases companies with output sold under long-term contracts. However, some customers own and operate a plant which has been built for them ("turnkey" plants).

² The complaint also charged that the acquisition lessened competition in medical pipeline systems, electrical welding equipment, and gas welding and cutting equipment. These allegations were abandoned by complaint counsel early in the proceeding.

The only gases which are produced and sold on a tonnage basis are oxygen, nitrogen and hydrogen.

"Merchant" refers to sales of gases in smaller quantities. The gas is transported to the customer either in gaseous form in cylinders or as bulk liquid. The larger quantities are shipped as bulk liquid under reduced temperatures. Plants used to supply gases to customers in either liquid form or in cylinders are referred to as merchant plants. It is common, however, for on-site tonnage plants to have merchant capacity. A gases company building a tonnage plant for itself will often construct excess capacity, sell the excess in the merchant market, and benefit from the economies of scale which would otherwise not be available. Gases distributed into the merchant market, including gases coming from incremental production in tonnage plants, are sold at prices that are as high as eight or nine times the price of tonnage gas.

It is important to note that the production and handling of bulk liquid gases requires highly technical skills and special equipment designed to withstand extremely low temperatures. The equipment is specialized and used almost exclusively in the industrial gases industry.

A. *Relevant Market*

The ALJ found that the relevant product market is the production and distribution of industrial gases by industrial gases companies. Included are all gases sold by industrial gases firms including resale of gases purchased from companies who produce them as by-products. Because individual gases are utilized for different purposes, have different prices, and there is no cross-elasticity of production facilities except among the atmospheric gases, respondents contend that the ALJ erred in treating them all as part of one line of commerce. However, we agree with his reasoning and conclusions.

There is no doubt that each of the individual gases listed in the complaint could constitute a separate product market since most gases have specialized end uses. However, lack of interchangeability in use does not automatically bar recognition of a broader line of commerce encompassing such products where, for technological or other reasons, there is commonality in production and distribution resulting in a distinct and recognized "industry" of firms who sell a broad line of such products. *U.S. v. Grinnell Corp.*, 384 U.S. 563 (1966). *U.S. v. Bethlehem Steel Corp.*, 168 F. Supp. 576, 594 (S.D.N.Y. 1958); *U.S. v. Ford Motor Co.*, 286 F. Supp. 407, 411-416 (E.D. Mich. 1968), *aff'd*, 405 U.S. 562 (1972); *cf. Sterling Drug, Inc.*, 80 F.T.C. 477 (1972).

Industrial gases companies typically either produce or distribute a broad range of gases. They do this in order to provide their customers and dealers in the merchant market with a full or nearly full line of

gases because many buyers prefer to order and get delivery from one gases supplier. Also the technical skills used in production, are very similar for many gases. For example, oxygen, nitrogen and argon are all produced in identical air separation plants, generally by a highly technical cryogenic process. Gases produced in such plants accounted for over 63 percent of the total value of all industrial gas shipments by primary manufacturers in the United States in 1972. The skills and technical capability for storing and transporting are also similar for many of the industrial gases. Oxygen, nitrogen, argon, helium, carbon dioxide, and hydrogen are commonly transported and sold to distributors in bulk liquid form in special tank cars or trailers.

This type of synergetic marketing relationship is not unlike the "cluster of products and services" offered in response to "settled consumer preferences" which the courts have held set "commercial banking" apart as a separate line of commerce. *U.S. v. Philadelphia National Bank*, 374 U.S. 321 (1963); *U.S. v. Connecticut National Bank*, 418 U.S. 656 (1974). See also *U.S. v. Grinnell Corp.*, *supra* 384 U.S. at 573-74 (1966). The industrial gases companies are recognized in the trade as a distinct industry and are represented by two trade associations. It was entry into the "U.S. industrial gases market" that BOC had studied and considered prior to its acquisition of Airco, not simply the production of one industrial gas or a limited group of gases.

BOC also challenges the ALJ's finding that the United States as a whole is the appropriate "section of the country" or geographic market in which to measure any adverse effects of the loss of BOC as a potential entrant. Although most industrial gases are sold and distributed in regional markets of a few hundred miles distance from the point of manufacture, it is appropriate to use the nation as a whole as the section of the country affected by the merger. To begin with, BOC was interested in becoming a nationwide competitor in this country's industrial gases industry and did not limit its studies or merger discussions to one particular area or region. As is apparent from the evidence discussed later in this opinion, the interest evinced by BOC in some regional firms was whether they would constitute feasible footholds for subsequent building of a national company. Airco, the company it eventually acquired, was engaged in the industrial gases business throughout the nation. This clearly was a factor in BOC's decision to acquire it (Tr. 1732-37).

In *FTC v. Procter & Gamble Co.*, where Procter & Gamble, a potential entrant into household liquid bleaches, acquired Clorox, an established nationwide seller of that product, the Commission and the courts found it appropriate to use national sales and concentration data even though liquid bleach was distributed within a range of only 300

miles from the point of manufacture, 63 F.T.C. 1467, 1537, 1561 (1963), *vacated*, 358 F.2d 74 (6th Cir. 1966), *rev'd*, 386 U.S. 568, 571 (1967). In *U.S. v. Marine Bancorporation*, 418 U.S. 602, 622 (1974) the Court held that "in a potential-competition case * * * the relevant geographic market or appropriate section of the country is the area in which the acquired firm is an actual, direct competitor." See also *U.S. v. Pabst Brewing Co.*, 384 U.S. 546 (1966); *U.S. v. Bethlehem Steel Corp.*, *supra*; and *Kennecott Copper Corp. v. FTC*, 467 F.2d 67, 71 (10th Cir.) *cert. denied*, 416 U.S. 909 (1974), where national "markets" were considered as appropriate alternatives to regional markets.

Furthermore, the record shows that in an important segment of the industrial gases business, namely tonnage gases, the leading gases companies (including Airco) compete on a national basis in submitting bids for the construction of onsite plants. Such nationwide competition among leading firms in the industry in an important segment of the business is in itself a sufficient basis for finding that the country as a whole is a relevant market area. *U.S. v. Grinnell Corp.*, *supra*, 384 U.S. at 575 (1966).

We conclude that the sale of industrial gases by U.S. industrial gases firms constitutes the appropriate market for the purpose of examining the effects of this acquisition.

B. Concentration

The U.S. industrial gases industry is highly concentrated. As indicated in the following table which shows 1972 market shares of leading firms based on f.o.b. plant selling value of shipments by all U.S. manufacturers classified in the industrial gases industry by the Bureau of Census, the top four firms accounted for approximately 70 percent of production and the top eight firms for over 80 percent:³

³ Some of the individual firm data in the following tabulation were given *in camera* treatment at the hearing. In view of the fact that the information is now nearly three years old, no competitive harm should result from its disclosure and we have decided to take it out of *in camera* status. See also Section 3.45 of the Commission's Rules of Practice.

INDUSTRIAL GASES MARKET SHARES, 1972

<i>Company</i>	<i>Value of Shipments (\$1,000)</i>	<i>Market Share⁴</i>	<i>Source</i>
Union Carbide (Linde)	153,000	25.71	Tr. 221
Air Products and Chemicals	106,976	17.98	CX 325-A
Airco	93,577	15.73	CX 325-A
Chemetron	60,496	10.17	CX 325-A
Liquid Air	33,500 ⁵	5.63	CX 325-A
Liquid Carbonic	29,651	4.98	CX 325-A
Big Three	24,699	4.15	CX 325-A
Burdett (Cleveland)	12,680	2.13	CX 325-A
Total	514,579		
Census ⁴	595,000		CX 296-A
Top Four Concentration	414,049	69.59	
Top Eight Concentration	514,579	86.47	

Furthermore the ALJ found that from 1967 to 1972 there was an increase in concentration in the U.S. industrial gases market. Four-firm concentration increased from 67 percent to 70 percent and eight-firm concentration increased from 84 percent and 86.5 percent between those years.⁶

BOC disagrees with the size of the market used in measuring the foregoing market shares and trends. Its arguments can be subdivided into three areas:

- (1) the exclusion of the production of helium by the Federal Government,
- (2) the exclusion of the production of atmospheric gases in air separation plants owned by backward-integrated firms,
- (3) finally, BOC objects to the *inclusion* of tonnage gases sold pursuant to long-term contracts.

We find no merit in any of these objections.

The ALJ excluded all helium produced in government-owned plants. BOC challenges this exclusion, pointing out that one-half of all helium

⁴ Based upon value of shipments of industrial gases produced by plants classified as in the industrial gases industry.

⁵ Pro forma; includes value of shipments of two industrial gases companies acquired effective December 31, 1972 (CX 335-P, Tr. 516).

⁶ It is true as BOC points out, and as is conceded in the initial decision, that concentration ratios reported for 1967 by Census in BOC RX 72F are not strictly comparable with 1972 data. Shipments included in 1967 ratios (both in the numerator and the denominator) but not included in 1972 data are products other than industrial gases ("secondary" products) shipped by plants classified in the industrial gases industry, and resales, and various miscellaneous receipts. But if one assumes that the percentage of total resales, secondary product shipments and miscellaneous receipts accounted for by the four largest firms remained fairly constant between 1967 and 1972—a reasonable assumption we think—then the figures are comparable.

BOC has proffered other calculations in an attempt to show a decline in concentration. (Reply brief pp. 14-15 and references cited therein.) However these tabulations are based in whole or in part on market definitions (universe figures) which include inter-plant production and consumption of industrial gases by establishments that are not classified as industrial gases establishments. Since we have determined that such production and consumption are not within the relevant market (*infra*), these calculations do not have any probative force.

produced and sold is derived from government plants. However, the ALJ was clearly correct in not counting this production since the government does not sell its helium in the open market but sells it to industrial gases companies who purify it and resell it as part of their total marketing package. Such resales by industrial gases firms *were* included within the ALJ's market.

There are instances of backward integration into industrial gases, primarily by steel companies supplying their own oxygen from air separation plants. It is true that to the extent that such vertical integration occurs, the demand for oxygen from industrial gases firms is reduced pro tanto. But that is not equivalent to producing gases for sale in the marketplace. The vertically integrated firms utilize the gas they produce only for their internal manufacturing processes. Any excess gases which they do market are sold to the industrial gases firms, and not in competition with them or their distributors.

It is true that in *U.S. v. Aluminum Co. of America*, 148 F.2d 416, 424 (2d. Cir. 1945) the Court agreed with the government that the extent of Alcoa's "control of the aluminum market" could be measured by examining not only Alcoa's sale of ingot aluminum, but also the consumption of ingot in its fabricating plants. But the Court did not hold that such a broader market was the *only* appropriate market, as BOC contends. Alcoa was virtually the sole supplier of ingot to nonintegrated fabricators of products (sheet, foil, rod, bar), that Alcoa also produced. The fact that Alcoa was in competition with its customers and could impose, as it did at times, a cost-price squeeze was an important element of the monopolization case against it. The vertical integration of Alcoa played a qualitatively different role in aluminum industry compared with the backward integration of industrial gases users. The exclusion of "in-house" production and consumption from the relevant market was proper here and is in accordance with several prior Section 7 cases. See, e.g., *U.S. v. Greater Buffalo Press, Inc.*, 327 F. Supp. 305, 309 (W.D.N.Y. 1970), *dismissal reversed and remanded* 402 U.S. 549, 555 (1971); *Avnet, Inc.* 82 F.T.C. 391, 451-54 (1973), *aff'd*. 511 F.2d 70 (7th Cir.), *cert. denied* (Oct. 6, 1975). Even if such production were included within the relevant market, four-firm concentration would exceed sixty percent and Airco's share would approximate 14 percent (Finding 62). The change is not so substantial as to cause a different result in this case.

BOC argues that if production by backward-integrated steel firms is not to be included, then the initial decision should not have included any of the gases produced in tonnage plants owned by industrial gases companies since they are committed under long-term supply contracts and are not available for sale in the open market. It contends that as in

U.S. v. General Dynamics Corp., 415 U.S. 486 (1974) market shares computed on such a basis "do not represent the exercise of [present] competitive power but rather the obligation to fulfill previously negotiated contracts at a previously fixed price." *Id.* at 501.

However we see no error in including gases produced in tonnage contracts pursuant to long-term contracts. Nor do we agree that it leads to a logical dilemma. Gases produced for both tonnage users and merchant users are often produced at the same plant using the same facilities. In *General Dynamics*, the acquired company had diminished ability to compete for new business because most of its coal deposits—a limited resource found only on certain lands—were previously committed. Past production figures were not indicative of future capability; hence it was error, the Court held, to use market shares based on past production rather than on what coal reserves were available for future contracts. In contrast, the industrial gases companies have virtually unlimited natural resources to produce gases. The principal gases are literally made out of thin air. Since an industrial gases firm is always able to compete for new business from an existing plant or by building a new plant, the past record of these firms in selling tonnage gases is a reasonable indicator of their future ability to compete for new accounts.

C. Barriers to Entry

The administrative law judge found, and BOC does not dispute, that there are substantial barriers for entry into the industrial gases business. To begin with, substantial capital is needed for production plants which cost \$7 or \$8 million to build. Larger plants cost up to \$16 million. With costs of new plant construction being higher today than in previous years, a new entrant would suffer a cost disadvantage insofar as competing in areas (at the same geographical distance to principal customers) that are supplied by established plants.

Experience and a reputation for technical proficiency is undoubtedly a considerable advantage that established firms have over new entrants. Cryogenic facilities which produce atmospheric gases are operated at low temperatures and can be hazardous to employees and surrounding community if misoperated. Lack of familiarity with cryogenic technology has been suggested as a reason why many steel companies prefer to have onsite plants operated by industrial gases firms rather than by themselves. Entry on a multiplant basis is also viewed as desirable if one or more plants are to serve tonnage customers. If one gases plant should have to be closed down for repairs,

the supplier would then have an emergency backup facility to provide bulk liquid gases to the tonnage customers.⁷

D. *Elimination of BOC as a Future Entrant*

As the principal basis for his decision that the acquisition will likely lessen competition in the U.S. industrial gases industry, the ALJ found that BOC was a potential entrant into the U.S. market and that by acquiring Airco—a leading firm already in the market—BOC eliminated the beneficial effects that would result from a competitive form of entry.⁸

We agree. Except for a toehold-acquisition entry by another large international industrial gases firm in 1968, in recent years there has been no significant entry into the U.S. market, which has been dominated by three firms, one of which is Airco. As to possible future entry, industry executives were of one of two views—either there will be no further substantial entry into the U.S. market, or there could be entry by BOC or possibly two or three other large international firms. Only these firms were viewed as having the know-how and experience to surmount the difficulties confronting a would-be entrant. Of those who adhered to the latter view—and this included executives of the two leading industrial gases firms in the United States—all agreed that BOC was the *most likely* of this small group to enter the U.S. market (Tr. 250, 335, 393, 445-46, 564-68, 594, 876-878). Testimony by BOC executives as well as BOC documents confirm these objective assessments as they show that BOC by 1969 believed it should be represented in the United States, particularly in industrial gases, its primary business. As BOC's chairman phrased it, only a strategy of what, how, when, and where was lacking (CX 47). By stepping into

⁷ To some extent independents may solve this problem in the merchant market by canvassing other gases companies for temporary supply, and it is common practice for the major firms to exchange gases among themselves when one lacks merchant supply (CX 44-Z-37; CX 232-T; BOC RX 62-1; Tr. 1934; Tr. 2011-12).

⁸ The ALJ also found that BOC's position in the fringe of the U.S. industrial gases market itself exerted a procompetitive influence (I.D. pp. 95-96 [pp. 1321-1322, herein]). Presumably, the ALJ had in mind that firms in a concentrated market will sometimes limit their prices and profit margins to forestall new entry. See *U.S. v. Falstaff Brewing Corp.*, 410 U.S. 526 (1973); Bain, *Barriers to New Competition* (1956). No showing of such effect was made here. In fact, several executives of leading firms testified that although they viewed BOC as the most likely firm to enter the market, BOC had no effect on their prior pricing decisions. Presumably during the time Federal price ceilings were in effect, BOC's position as a possible entrant would have had no additional restraining influence on prices in any event. The record is not clear, however, that the witnesses' testimony was limited to that period. In any event, the finding of actual influence on prices cannot stand.

The ALJ also found that the acquisition increased entry barriers (I.D. p. 103 [p. 1327, herein]). Although it is difficult to resist the thought that this acquisition—which created the world's largest consortium in industrial gases—may further deter new entry, there was no inquiry into such questions during the hearing. Consequently we will also vacate this finding. *Missouri Portland Cement Co. v. Cargill, Inc.*, 498 F.2d 851, 865-66 and n.32 (2d Cir. 1974); *Beatrice Foods Co.*, 81 F.T.C. 481, 534-35 (1972).

Airco's shoes, BOC virtually removed any prospect that any major future procompetitive entry would ever occur in this industry.⁹

Not only did the acquisition remove whatever prospects existed that BOC would eventually enter the U.S. market by internal expansion or its equivalent, *i.e.*, elimination of "actual entry" effects, but it removed BOC's presence on the fringe of the market which might *in the future* have had some disciplining effect on U.S. market prices. Although there is no evidence of such disciplining effect in the past, if present trends continue and supply becomes tight, leading firms may coordinate pricing decisions and areas of specialization (*infra* pp. 35-36 [p. 1365]). The possibility of entry by BOC may become a factor to be reckoned with. "The existence of an aggressive, well equipped and well financed corporation engaged in the same or related lines of commerce waiting anxiously to enter an oligopolistic market would be a substantial incentive to competition which cannot be underestimated." *U.S. v. Penn-Olin Chemical Co.*, 378 U.S. 158, 174 (1964). See also concurring opinions in *U.S. v. Falstaff*, *supra*, 410 U.S. at 538-39, 560 n.15.

BOC's Incentives for Entry into the U.S. Market. The acquisition of Airco was motivated primarily by a desire to expand BOC's ever-widening international operations and gain exposure to United States technology.¹⁰ BOC's board chairman characterized the United States market as the "most powerful and largest in the world [which] must be of continuing interest to any company which has ambitions to act internationally" in the industrial gases business.¹¹

Although BOC started its gases business in the British Isles, it has expanded into some 17 countries, including such industrialized nations as Australia, South Africa, Canada, India, Pakistan, Italy, and Brazil. All of these were either *de novo* or toehold acquisition entries. At the time of the acquisition, BOC was the second largest producer and

⁹ Cf. Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," 78 Harv. L. Rev. 1313, 1384-85 (1965):

"In this situation [a market in which entry barriers for all but a small group of firms are too high] the only significant hope for making the market in question more competitive, apart from radical technological changes or the development of new substitutes, lies in new entry by one or more of those firms for whom entry barriers are not prohibitive. Loss through merger of one of a limited group of potential entrants thus reduces the prospects of future deconcentration."

¹⁰ There is no claim here that the acquisition was undertaken solely to effect "financial" relationships such as tax savings, earnings-per-share gains via favorable price-earnings differences, or "improved" performance through use of pooling-of-interest accounting methods—motives which have inspired many "conglomerate" mergers. See Bureau of Economics, Federal Trade Commission, *Economic Report on Corporate Mergers* ch. 2 (1969); Steiner, *Mergers: Motives, Effects, Policies* (1975).

¹¹ He stated:

"[T]he American market, partly as a result of its size, is the source of much technology, much new development, and we [BOC] have to be in tune with that" (Tr. 1728).

"The first reason [for acquiring stock in Airco] is that we have always been interested in the industrial gas market of America. While there is no virtue attached to the claim of being an international company, there are nevertheless benefits which can be obtained by being an international company, and quite clearly, those benefits are diminished if we don't have a position in North America" (Tr. 1844).

The managing director of BOC also confirmed the general desire of BOC to enter the United States industrial gases market (Tr. 2658-59).

marketer of industrial gases and related equipment in the world, with sales of those products estimated at nearly \$400 million in 1973 (CX 76K). BOC regarded the United States as being the most important and most advanced industrial gases market in the world and one that still enjoys a respectable growth rate (CX 36 A-B, CX 47-A, Tr. 2000-01).

It is interesting to note that in 1969, when BOC management first commenced long range studies of U.S. market, it was emphasized that making profits from a U.S.-based operation was not the primary goal: "Despite the very large size of markets in the USA, the main purpose of a series of BOC ventures over the next, say, five to ten years would be commercial, managerial and technical 'exposure' rather than for the sake of the business itself" (CX 38-E). After the acquisition of controlling interest in Airco, BOC's chairman informed his company's shareholders that the acquisition enabled BOC to pursue its "long-term objectives." He viewed the Airco transaction as offering BOC the opportunity to enter on a national scale "in one jump" as compared to a series of slower, more expensive (and more procompetitive) steps (Tr. 1736).

Ability of BOC to Expand Into the U.S. Market. BOC does not dispute that it had the financial, technological and business ability to expand into the U.S. market (Tr. 237-38). BOC had an established world-wide reputation and had gained American business experience by participating in the manufacturing and selling of air separation plants in the United States through a joint venture with Airco from 1967 through 1971.

Uniqueness of BOC's Status as a Potential Entrant. Aside from BOC, the only other firms named by any members of the industrial gases industry as possible entrants into the U.S. market were Messer Greishiem and Linde A.G., both German firms, and AGA of Sweden. They were not, however, considered by American firms to be very strong candidates for entry, a view that BOC shared (CX 76L). Linde A.G. is primarily a manufacturer of industrial gases manufacturing equipment for sale to producers and lacks experience in the distribution end of the gases business.¹² Messer Greishiem does not have the reputation in the industry that BOC possesses (e.g. Tr. 721-22). AGA of Sweden was viewed by some as having the technological prerequisites for entry, but BOC and others felt this firm lacked the financial ability to enter the U.S. market (Tr. 1760, CX 76L).

Contrary to BOC's contentions, none of the companies in the United States which operate air separation plants for their own use, or buy

¹² Linde A.G. sells air separation equipment in the United States, but does not manufacture and distribute gases in this country. (Linde A.G. is not affiliated with the Linde division of Union Carbide). We have also examined the *in camera* material which BOC has requested us to consider (BOC RX 235 *in camera*; Tr. 2065-69) and do not find that it detracts from the evidence that BOC was the most likely entrant into the U.S. market.

large quantities, is considered a likely potential entrant into the business of selling industrial gases on the open market. None has successfully entered the market in the past and any excess oxygen or other gases they produce they sell to industrial gases firms. Industry witnesses who testified in this proceeding did not consider them to have the required marketing expertise and capability needed to make them likely prospects for distributing industrial gases in the merchant market (Tr. 346, 443-44, 564-65, 2743-44).¹³

That technical expertise and marketing experience in industrial gases are not easy to come by, but are prerequisites for successful entry, is demonstrated by the unsuccessful attempt of Standard Oil of New Jersey (now Exxon) to enter the market by acquiring American Cryogenics, a West Coast producer of industrial gases. Standard's experience was not in the industrial gases field and it eventually sold American Cryogenics to an affiliate of L'Air Liquide—a world-wide French industrial gases firm. At the time of the sale (1968), American Cryogenics was losing \$4 million a year on sales of \$20 million. L'Air Liquide has subsequently been able to turn the company (Liquid Air in its present name, see p. 10, *supra* [p. 1347]) into a profitable and aggressive operation—a fact of which BOC was aware.

BOC also argues that the initial decision ignores the potential competition represented by the smaller industrial gases firm already doing business in some, but not all, of the regional markets within the United States. The difficulty with this line of argument is that unlike BOC, these firms do not constitute major potential competition to the United States market as a whole and the "Big Three" national firms that dominate the U.S. industry.

Interests Shown by BOC Regarding Entry in the United States Industrial Gases Market Since 1970. Although BOC concedes that it had strong desires and incentives to enter the U.S. market, it contends that a study of the U.S. industrial gases market conducted in 1969 convinced its management that there was no feasible means to enter. It submits that the Commission should therefore find that BOC would not have entered the U.S. market but for the "unique opportunity" provided by Airco.

In 1969 BOC's directors decided to make an onsite study of the American industrial gases market to consider "whether there are any identifiable opportunities in USA which BOC might wish to exploit at

¹³ BOC's own study of the U.S. market in 1970 confirmed this view in a section entitled "Customer Ownership of Plant:"

"At one stage it was thought possible that the giant petrochemical complexes would own their own air separation units and perhaps sell surplus to the majors. We were informed that they were persuaded not to follow this route, largely by Linde Division who emphasized the need for back-up supplies, etc. A.D. Little do not believe that customer ownership will be of any significance in the future." (BOC RX 62-K).

some future date" (BOC RX 181 C). BOC assigned Allan Perham, chairman of Canox (BOC's Canadian industrial gases subsidiary) and I. Greenfield, a London staff man, to make the study. Together they interviewed people familiar with the U.S. industrial gases industry and completed a report in the early part of 1970.

BOC relies on the report's conclusion that "based on the BOC requirement of 15 percent pretax return on capital employed there is today no case for entering the USA industrial gas market as a producer for either onsite supply or merchant requirements" (BOC RX 62B).¹⁴ Since there is testimony that the report was accepted by the BOC top management committees and board of directors, BOC contends that the Perham-Greenfield report virtually closed the door on the United States for BOC.

The contention that this report demonstrates that BOC decided not to seek entry into the U.S. market is not borne out by the record. To begin with, BOC has quoted only a portion of the Perham-Greenfield report. The report, completed in February 1970, based its recommendation on low profit margins existing in the U.S. gases industry but went on to caution that its "generally negative conclusion is in relation to the foreseeable future *and should not be considered final. Opportunities could rise in the future and a periodic review of the situation is recommended*" (BOC RX 62B) (emphasis added). Subsequent to the Perham-Greenfield report, BOC did in fact continue to take an active interest in examining entry possibilities into the U.S. industrial gases industry.

(1) In April 1970, an investment banker approached BOC and advised that a fifty percent interest in Burdett Oxygen Company of Cleveland ("Burdett-Cleveland") was available. Although he noted that profits of the firm were negligible and that it did not appear a very attractive proposition, BOC nevertheless responded there was a possibility that it would be interested, but that an essential precondition to further study would be that BOC could obtain control (CX 233-34). After learning that control was not available, BOC told the banker it was not interested but if the situation changed it could be interested (CX 243).

(2) In August 1971, BOC's managing director discussed with Charles Perkins, president of Burdett Oxygen Company of Norristown, Pa. (which has no present connection with Burdett of Cleveland) a proposal by Perkins that BOC enter the U.S. by acquiring Burdett and a number of other small independent gases companies. A memorandum of the conversation (which took place at BOC's offices in London) was made by the BOC official and copies were sent to other top BOC officials

¹⁴ The reference to a 15 percent pretax "requirement" return on capital was based on an "arbitrarily selected yardstick" of BOC management to set realistic limits to the study (BOC RX 181 C).

including the chairman of the board of BOC. Soon afterwards, BOC sent an executive to the United States to look over the company. The visit lasted three or four days during which the BOC representative made a thorough inspection of the books and records as well as the physical plant. Discussion and consideration was given to BOC's purchasing Burdett-Norristown with a group of other nonmajor industrial gases companies to effectuate a toehold entry into the U.S. market. The BOC official recommended to his superiors in a memorandum dated Oct. 4, 1971 that:

If it is agreed both that BOC should make an entry into the industrial gases market in the USA and that this type of entry be adopted (from the small end upwards in the Canox manner)¹⁵, then Perkins, Burdett, and the group he proposes would in principle be a likely route * * * The companies he runs, if not financially healthy, have a reasonable trading foothold and can probably be made healthy. The other independents may well agree to his plan and his claims are broadly borne out by first checks (CX 254-C).

Despite the visiting official's optimistic view of the company, BOC apparently regarded the company as too small to form the basis for long term expansion in the U.S. market. BOC informed the president of Burdett by letter that BOC had decided it was not then interested in acquiring the company. However the letter concluded that BOC was aware of the "sort of profits which can be made in the U.S. market and [we] are keenly interested to improve this awareness" (CX 117).¹⁶

Feasibility of Entry. BOC claims that it would never enter the U.S. market but on a national scale and that it would cost about \$240 million for it to have entered the U.S. market on such a scale had the Airco opportunity not presented itself. BOC's chairman testified that he could not conceive any circumstances in which BOC would ever expend that amount of money for entry into the United States.

This argument depends, however, upon an acceptance of self-serving testimony that BOC would never enter except on such a large scale. No reasons are presented as to why BOC would have to enter on a national scale. L'Air Liquide—a leading French firm—successfully entered the U.S. market through the purchase of a small regional firm in 1968. Subsequent to that acquisition, it purchased additional small regional

¹⁵ Canox, as previously noted, is the name of BOC's industrial gases firm in Canada. BOC entered the Canadian market by toehold acquisitions after World War II and is now the third largest firm in that market.

¹⁶ Another incident took place after the Perham-Greenfield report. Dr. Albert Muller, a former consultant to BOC called by complaint counsel, testified that in 1970, subsequent to the Perham-Greenfield report, he and Mr. Perham, at the request of BOC, had meetings with the owner of Gardner Cryogenics, an American helium firm, as to the possible acquisition of that company by BOC (Tr. 671-80). This followed a study previously made by BOC of the possibility of acquiring that company (CX 15, CX 17). Although BOC claims its interest was only in acquiring this firm's European business, Dr. Muller testified that BOC was also interested in Gardner's United States operations (Tr. 676, 679, 709). Although the firm was not acquired, this incident corroborates the view that BOC had not closed the door on possible entry into the U.S. market because of the Perham-Greenfield report.

We do agree with BOC, however, that the additional conversations referred to in Findings 101 and 102 of the initial decision are not probative on the issue at hand.

companies and has constructed an air separation plant in the Seattle-Tacoma area and an acetylene plant in Houston and one in Los Angeles (CX 335 V-W, Tr. 528-530). At the time of the hearing it was expanding production capabilities in three additional areas of the country (Tr. 528). We have difficulty in perceiving why this international firm (which was the world's largest industrial gases firm before BOC acquired Airco) was able to enter on such a modest scale, yet BOC could not.¹⁷ The record indicates the existence of many small companies which could presumably be purchased in similar fashion.

We reject BOC's contention that before toehold entry can be considered as a procompetitive means of entry it must be shown that any of these firms was available at a reasonable price as of the time of the acquisition of Airco. Such a burden would be unrealistic. Also the fact that some of these firms may have sizeable shares of a local market in sales of a particular gas or group of gases would not disqualify them as permissible toehold candidates since the target market—the sole “relevant market” in this potential competition case—is the national industrial gases market. Regional producers had sales substantially below 10 percent of industry sales and one or more small firms presumably could have been acquired for purposes of subsequent expansion into a national or semi-national operation. See *The Budd Co.*, F.T.C. Dkt. 8848, Commission opinion, Aug. 29, 1975 [86 F.T.C. 518].¹⁸

Industry experts suggested other ways by which entry could be achieved or an initial entry expanded. The chief executive officer for Air Products and Chemicals' gases operations who has been in the gases business for 22 years testified (Tr. 393-94):

Q What method of entry do you believe the British Oxygen Company could have used to enter the United States market for industrial gases in late 1973?

A * * * [T]hey have already chosen one method which we, of course, know about. Other methods available, of course, are the construction of an air separation plant capable of producing liquid gas products, to serve a particular market area of the United States within economic distribution radius from the facility. They could bid for a base load pipeline gas supply opportunity from one of the merging new markets and then add incremental capacity to that facility in order to serve not only the base load customer, but the surrounding industrial market, or they could acquire one of the smaller regional producers and add new capacity to that regional producer's production capabilities and expand their market penetration that way.

¹⁷ Noting that L'Air Liquide was expanding in the United States, a BOC official suggested (in 1969) that “despite the very large size of markets in the USA” there could be a “series of BOC ventures [entries] over the next, say, five to ten years * * *”. He also suggested “some kind of joint venture, or series of joint ventures * * * if direct entry and acquisition are blocked.” (CX 38 D, E).

¹⁸ Over twenty small regional firms were identified by witnesses. (We do not agree, however, with complaint counsel that Chemetron should be classified as a toehold firm, since its business was nearly nationwide and it had 10 percent of the national market. Nor would we regard Liquid Air as a permissible toehold firm since it was a rapidly expanding firm which had the financial backing to become a national producer. Cf. *The Budd Co.*, *supra.*) Additional independent manufacturers were listed in a 1969 BOC staff report on the U.S. market, which stated “We believe that in actual fact there are approximately between 60-100 across the USA” (CX 44-Z-97).

Similar views were stated by the head of the Gas Products Department of the Linde Division of Union Carbide (Tr. 259-60).

An important ingredient of feasibility of entry is, of course, whether reasonable profits could be anticipated which would justify the expenditures necessary for BOC to make a de novo or toehold entry. If, for instance, the American market had been plagued by chronic overcapacity and extremely low profit margins, little incentive would exist for new entry. Although excess capacity existed in the 1960's, by 1973 conditions had changed substantially and there were shortages in the supply of air gases. By 1974 the market was buoyant; prices had firmed and industry was anticipating a yearly growth rate of up to 10 percent compounded annually over the next 5 years (Tr. 239, 246, 256, 391, 403, 438, 1941, 2716, 2719, 2723).¹⁹

By 1974 new applications for industrial gases in the United States were contributing to increasing demand. This has in part been due to the rise in prices of petroleum products. Industrial gases are now being used in the production of synthetic natural gas that can be used for commercial purposes or in power generation. The elevated price of oil has also led to the production of gas for pipeline transmission by the combustion of coal with oxygen. Additionally, industrial gases are now being used to generate chemical feedstock for the manufacture of fertilizers and methanol. These new applications have created demand for large tonnage plants by public utilities and chemical companies. The scarcity of natural gas has also made economically prohibitive the use of ammonia for generating nitrogen for metallurgical processes. This has increased demand for nitrogen produced by air separation.

Other new applications in the United States have been the development of nitrogen food freezing and the use of industrial gases in sewage treatment. Also the high price of scrap metal has resulted in steel companies using liquid pig metals to produce more steel rather than melting scrap. This has increased the requirement of steel companies for oxygen.

According to the witnesses from Air Products and Chemicals, the demand for principal industrial gases products, particularly tonnage oxygen, has increased to such an extent that the engineering and manufacturing capacity of the industry today is insufficient to meet the demand for construction of new plants (Tr. 2727). At the time of the

¹⁹ This is supported by the Department of Commerce which predicted industrial gases to be in a high demand through 1975 resulting in increased output and price rises. *United States Industrial Outlook 1975*, U.S. Department of Commerce (1974) pp. 98-99. (Official notice is taken of this publication).

hearing his company had recently told customers that it was unable to supply their requirements for new industrial gases plants.²⁰ In addition, the witness from the Linde Division of Union Carbide testified that a number of industrial gases are in short supply and that Linde has had to allocate customers. Union Carbide announced that demand for industrial gases was "exceptionally strong in 1974, and exceeded Union Carbide's ability to supply even at capacity operation." Airco told its stockholders in 1974 that peak production had been maintained "to keep pace with developing tightness in the industrywide supply of bulk-liquid products," that there was "unprecedented demand" and record sales in 1973 were due to new uses of industrial gases. These companies are the three largest firms in the industry accounting for 60 percent of the nation's manufacturing capacity in industrial gases.

Based on the fact that BOC had the clear incentive to enter the U.S. market; that it had the technological, and managerial expertise necessary to effectuate such entry as well as having large capital resources; that it earlier entered the Canadian market; that it in fact considered possible acquisitions of small American firms; and that demand for industrial gases in the U.S. was outstripping capacity in 1973-1974 with indications that this is a long-term trend—we cannot accept the testimony of BOC's executives that under no circumstances would BOC attempt an entry into the market other than Airco acquisition. Where objective considerations so clearly favor probable entry, contrary testimony by company officials as to future intent has little probative force. See *U.S. v. Falstaff Brewing Corp.*, 410 U.S. 526, 563-569 (concurring opinion); President's Task Force Report on Productivity and Competition ("Stigler Report") 5 CCH Trade Reg. Rep. ¶50,250 (1969) at 55,521 ("The identity of potential entrants should not be established by introspection"). Even apart from the fact that such testimony is inherently self-serving, it would represent, at best, only the current views of present management. Circumstances change, as does management. Even a firm that has once firmly rejected *de novo* or toehold entry in a market, preferring (understandably) to enter by acquiring an established leader, may reconsider and enter if the latter route is blocked by antitrust action.²¹ Clearly the ALJ was correct in basing his findings on objective evidence and other facts of record rather than the testimony as to BOC's future intent.

Also we perceive no error in approaching the question of potential

²⁰ BOC contends that this testimony was designedly misleading. However the witness' view of industry conditions is supported by a recent Department of Commerce report (publication cited in the preceding footnote) which states: "Shipments of all industrial gases will be limited because of lack of production capacity. New plants are being built, but completions scheduled for 1975 probably will not satisfy the rising demand for industrial gases."

²¹ Such entry occurred after *U.S. v. Bethlehem Steel Corp.*, 168 F. Supp. 576 (S.D.N.Y. 1958) was decided. See discussion *infra*.

competition in this industry on the basis of assessing future probabilities and market trends. The Act contemplates this. "[C]ourts should look also to the size and growth prospects of the target market * * *" *U.S. v. Marine Bancorporation*, 418 U.S. 602, 642 (1974). "[R]ational rules applying to mergers that involve the possible loss of a new entrant should take the trend of demand into account." Turner, "Conglomerate Mergers and Section 7 of the Clayton Act," 78 Harv. L. Rev. 1313, 1385 (1965).

If, despite the generally negative Perham-Greenfield report in early 1970, BOC still examined possible entry candidates later, there is every reason to believe that at the time of the acquisition, when the market had firmed up and major U.S. firms were not able to construct new plants at a pace to keep up with demand, BOC would be interested in entry. Simply because no entry had been effectuated at the time the Airco opportunity presented itself did not mean that BOC would not have eventually realized its "long-term objectives" of entering the U.S. market—by growth rather than by this major acquisition. The "premise of an antimerger statute such as §7 is that corporate growth by internal expansion is socially preferable to growth by acquisition." *U.S. v. Philadelphia National Bank*, 374 U.S. 321, 370 (1963).

We conclude that as of December 1973, there was a "reasonable probability" that BOC would have eventually entered the U.S. industrial gases market by internal expansion, or its equivalent, but for the acquisition of Airco, *U.S. v. Penn-Olin Co.*, 378 U.S. 158, 175 (1964); *Ekco Products Co. v. FTC*, 347 F.2d 745, 752-753 (7th Cir. 1965). In view of the trends in the market existing at the time of the hearings in 1974, and attested to by witnesses, the probability that BOC would enter the U.S. market in the future, if divestiture is ordered, has even increased.

E. *The Question Reserved in Falstaff and Marine Bancorporation*

Respondents contend that in the absence of BOC exerting any present fringe effect on the U.S. gases market, the possibility that BOC might have entered the market by some more procompetitive means is legally irrelevant.

The Supreme Court has expressly reserved decision on the question of whether an acquisition which has no immediate market effects except for the elimination of a future entrant can violate Section 7 of the Clayton Act. In *U.S. v. Marine Bancorporation*, *supra* at 625 (1974) the Court stated:

The Court has not previously resolved whether the potential-competition doctrine

proscribes a market extension merger solely on the ground that such a merger eliminates the prospect for long-term deconcentration of an oligopolistic market that in theory might result if the acquiring firm were forbidden to enter except through a de novo undertaking or through the acquisition of a small existing entrant (a so-called foothold or toehold acquisition).

See also *id.* at 639; and *U.S. v. Falstaff Brewing Corp.*, 410 U.S. 526, 537 (1973).²²

BOC urges that the Commission answer the question reserved in *Marine Bancorporation* and *Falstaff* by holding this acquisition to be lawful irrespective of whether BOC would have been likely to enter the U.S. market.

The Commission and lower courts have on several occasions expressed the view that foreclosure of likely or probably future competition between two merging firms can be the type of "effect" which "may be substantially to lessen competition" with the meaning of Section 7 of the Clayton Act.²³

We find no persuasive reasons to depart from that line of authority. It is true that unlike a horizontal merger between actual competitors, a merger between potential competitors does not increase concentration, or reduce the number of firms, in a market. There would, however, be a decrease in concentration, and increased pressures for competition, if the potential entrant entered by internal growth or its equivalent.²⁴ Section 7 is as concerned with "preserving the possibility of eventual

²² Previous "potential competition" cases which have reached the Court have involved acquisitions which arguably reduced the premerger level of competition or raised entry barriers. See *U.S. v. El Paso Natural Gas Co.*, 376 U.S. 651, 659 (1964); *U.S. v. Penn-Olin Chemical Co.* 378 U.S. 158, 174 (1964); *U.S. v. Continental Can Co.*, 378 U.S. 441, 462-63 (1964); *FTC v. Procter & Gamble Co.*, 386 U.S. 568 (1967). There is, however, dictum in several of those opinions suggesting that elimination of a future entry by the acquiring corporation into the acquired company's market is a type of foreclosure that is covered by Section 7 of the Clayton Act. See, e.g., *FTC v. Procter & Gamble*, *supra* at 575 ("If Procter had actually entered, Clorox's dominant position would have been eroded and the concentration of the industry reduced").

²³ Commission decisions: *Foremost Dairies, Inc.*, 60 F.T.C. 944, 1084 (1962); *Beatrice Foods Co.*, 67 F.T.C. 473, 717-722 (1965); *The Bendix Corp.*, 77 F.T.C. 731, 817 (1970) reversed and remanded on other grounds, 450 F.2d 534 (6th Cir. 1971); *Beatrice Foods Co.*, 81 F.T.C. 481, 528 (1972); *General Mills, Inc.*, Dkt. 8836 (Oct. 5, 1973 [83 F.T.C. 696]); *Beatrice Foods Co.*, Dkt. 8864 (July 1, 1975 [86 F.T.C. 1]); *The Budd Co.*, Dkt. 8848 (Aug. 29, 1975 [86 F.T.C. 518]).

Court decisions: *U.S. v. Phillips Petroleum Co.*, 367 F. Supp. 1226, 1234 (C.D. Cal. 1973) *aff'd without opinion*, 418 U.S. 906 (1974); *U.S. v. Joseph Schlitz Brewing Co.*, 253 F. Supp. 129, 147 (N.D. Cal. 1966), *aff'd without opinion*, 385 U.S. 37 (1966); *U.S. v. Wilson Sporting Goods*, 288 F. Supp. 543, 562 (N.D. Ill. 1968); *U.S. v. Standard Oil Co.*, 253 F. Supp. 196, 227 (D.N.J. 1966); *Ekco Products v. FTC*, 347 F.2d 745, 752-53 (7th Cir. 1965). See also *U.S. v. Bethlehem Steel Corp.*, 168 F. Supp. 576, 615 (S.D.N.Y. 1958).

²⁴ Respondents contend that the legislative history shows that Section 7 was designed only to prevent increases in concentration, citing from the Senate Report on H.R. 2734 (which upon passage amended Section 7 of the Clayton Act in 1950 to read in its present form) the statement that the purpose of the proposed bill was "to limit future increases in the level of economic concentration resulting from corporate mergers and acquisitions." The reference to "economic concentration" was to national aggregate concentration in the industrial sector which Congress feared was on the rise. It was not a statement that mergers which only raise concentration in a particular line of commerce were to be covered by the legislation. The 1950 amendment in fact removed language in Section 7 that appeared to limit its scope to acquisition of an existing competitor (the so-called "acquiring-acquired" test). *U.S. v. Brown Shoe Co.*, *supra*, 370 U.S. at 317. See Narver, *Conglomerate Mergers and Market Competition* ch. 3 (1967) for evolution of the 1950 amendment with regard to conglomerate mergers.

It is certainly settled by Supreme Court decisions that Section 7 can be violated in ways that do not necessarily increase concentration in the relevant market. In addition to cases recognizing that Section 7 applies to mergers that make it difficult for new competitors to enter (e.g., *Procter & Gamble*, referred to in the above text), the Court's holding

(Continued)

deconcentration" of oligopolistic markets as it is with preventing increases of concentration. *U.S. v. Aluminum Co. of America*, 377 U.S. 271, 279 (1964); *U.S. v. Philadelphia National Bank*, 374 U.S. 321, 365N.42 (1963). It is now settled that enforcement policy under Section 7 should be concerned not only with immediate effects on the market, but also with market conditions over the long term so as to preserve opportunities for future entry and competition. This was clearly the import of the Court's decision in *Procter [Gamble, supra]*, where the Court held the merger to be anticompetitive because it had the effect of deterring future entry. Although we have dismissed for want of evidence the charge that the BOC-Airco merger has further raised existing entry barriers, the removal of BOC as the most likely of a limited group of possible entrants into the market has the same, if not greater, adverse effect on prospects for future competition as the raising of entry barriers. Both effects reduce the likelihood that future entry will occur, thus entrenching the existing firms already in the market.

BOC contends that if the "actual potential entrant" doctrine is to be applied it should be confined to cases where "subjective" proof exists that the acquiring firm would have entered but for the acquisition. It is true that in giving weight to "objective" factors in determining whether a firm is likely to expand into a new geographical market, there is the possibility that the deciding tribunal will err. But "if justice requires the fact to be ascertained, the difficulty of doing so is no ground for refusing to try." O. Holmes, *The Common Law* 48 (1881). "Potential competition cannot be put to a subjective test. It is not 'susceptible of a ready and precise answer.' " *U.S. v. Penn-Olin Co.*, 378 U.S. 158, 174 (1964). To follow BOC's suggestion and simply refuse to make any objective determination of the probabilities would leave the resolution of the legality of many large mergers to the self-serving testimony or documentation of company officials who stand to gain if the merger is permitted. A "wrong" decision, *i.e.* dismissal of the proceeding on the basis of erroneous statements as to the firm's ability and incentives to enter by internal rather than external growth, would mean the permanent loss of the firm as a future major competitive force in the market.

On the other hand, if objective considerations of the firm (its capability, incentives, and nearness to the market) and feasibility of entry sufficiently indicate that it would probably enter at some point

in *U.S. v. Falstaff Brewing Corp.*, 410 U.S. 526 (1973), that elimination by merger of a perceived potential entrant may violate Section 7, in no way depended upon a likely increase in market concentration resulting from such a merger. Nor is a resulting "increase in concentration" the basis upon which vertical mergers have been held to violate Section 7. See, *e.g.*, *Brown Shoe Co., supra*, 370 U.S. at 323-334; *Antitrust Law Developments* 76-78 (1975).

by internal growth or a toehold acquisition—and the decision is made on that basis—an erroneous decision will be far less apt to have any substantial adverse consequences on the marketplace.

That the antitrust laws should be concerned with elimination of “objective probable entrants” was demonstrated in the aftermath of *U.S. v. Bethlehem Steel Corp.*, 168 F. Supp. 576 (S.D.N.Y. 1958), one of the first merger cases brought under Section 7 after it was amended in 1950. Bethlehem Steel, which was located primarily in the East, argued that it needed the ingot facilities of Youngstown’s Chicago plant as a prerequisite to building new plate and structural shape mills in the Chicago area. Contending that the construction of an entirely new integrated plant in Chicago of the desired scale was not economically feasible, it presented figures showing the costs of a new plant greatly exceeded the cost of expanding Youngstown’s existing plant. The District Court recognized that “it is undoubtedly easier and cheaper to acquire and develop existing plant capacity than to build entirely anew,” and acknowledged both Youngstown’s and Bethlehem’s avowals that absent the merger neither would be able to build an integrated plant in the Chicago market. However, the Court found that the contentions, “which, of course, involve matters of business judgment and, in a sense, matters of preference,” were “not persuasive in the light of their prior activities and history, their financial resources, their growth and demonstrated capacity through the years to meet the challenge of a constantly growing economy.” *Id.* at 616. A few years after the decision disallowing the merger, Bethlehem built in that area what has been described as one of the country’s most efficient steel plants.²⁵

F. *Prospects for Future Competition in the Industrial Gases Industry*

In *U.S. v. Marine Bancorporation*, *supra*, the Court held that by introducing evidence of high concentration ratios the Government established a *prima facie* case that the market was a candidate for the potential competition doctrine and that the burden was on the defending company to show that the concentration ratios do not accurately depict the competitive characteristics of the market, *id.* at 631.

Complaint counsel has clearly made such a *prima facie* case here. The

²⁵ Singer, *Antitrust Economics* 133 (1968):

“Bethlehem may have accomplished, even more effectively than by merger, both the potential for vigorous upward competition against U.S. Steel, as well as the ability for strong downward competition against the smaller, less efficient steel producers. The District Court, by finding illegal the proposed merger between Bethlehem and Youngstown, encouraged the independent entry of new capacity in the Chicago area by Bethlehem.”

industry is dominated by the three national companies—the Linde Division of Union Carbide, Air Products and Chemicals, and Airco. Together these three firms share 60 percent of production. Four-firm concentration is 70 percent and eight-firm over 85 percent with concentration being on the upswing in recent years (*supra* pp. 10-11 [p. 1347-1348 herein]). The industrial gases industry has been classified as “highly concentrated,” and is very close to being among the relatively few “extremely high concentrated” industries in the American economy. Adams, “Public Policy in a Free Enterprise Economy,” *The Structure of American Industry* 467-69 (4th ed. 1971).

BOC argues that despite any *prima facie* case based on concentration ratios, the industry is competitive. In support of this it points to the fact that the “unit value” of many of the major industrial gases have dropped over the past several years as demonstrated from calculations derived from Census data. For example, the average unit value of shipments of oxygen dropped from \$1,100 per million cubic feet in 1963 to \$720 per million cubic feet in 1972, with the unit value of pipeline oxygen gas dropping from \$700 per million cubic feet in 1963 to \$480 per million cubic feet in 1972. Similarly, the average unit value of nitrogen dropped almost 20 percent from 1963 through 1972. The average unit value of carbon dioxide declined nearly 50 percent in that period and the unit value of argon dropped over 50 percent. BOC asserts that only for hydrogen has the unit value risen since 1963.

In contrast, BOC points out that the wholesale price index for all industrial commodities rose from 94.7 in 1963 to 117.9 in 1972. U.S. Bureau of the Census, Statistical Abstract of the United States 1973, Table No. 570, at 348.

For a number of reasons this argument, which has some superficial appeal, must be rejected. To begin with, the record shows that BOC is incorrect in stating that the unit value has risen only for hydrogen. The unit value of acetylene, an important industrial gas, increased 25 percent from 1963 to 1972 (BOC RX 190). The unit value of solid carbon dioxide has increased over that period (BOC RX 193). The unit value for cylinder and bulk oxygen in both gas and liquid form increased over that period (BOC RX 199). The unit value for nitrogen pipeline gas increased 13 percent between 1963 and 1972 (BOC RX 196). Thus, the unit value trend is quite a mixed picture.

But there is a more basic problem with BOC’s argument. There are very decisive economies of scale in the production of gases from a tonnage plant. The record shows that in recent years the size of new air separation plants has increased substantially and BOC admits that as a result “there is no question that economies of scale in tonnage plants have led to lower unit cost.” Thus, insofar as gases which are produced

in large part from tonnage plants (oxygen, hydrogen, argon, and nitrogen), there has been a reduction of the unit value due to the declining unit costs in production. There is also an "averaging down" effect on measurements of average unit value of these gases.

BOC responds, however, that the lower unit costs have been passed on to customers in the form of lower prices. Although this is true for pipeline nitrogen (since 1966), pipeline oxygen, and argon—since the unit value for shipments of these particular gases has declined—there is no way of knowing from the record whether all or what portion of reduction in production costs has been passed on.

Respondents also rely on testimony by witnesses that competition was and has remained "vigorous" and "strong" in the industry. Although there is evidence of price competition during the 1960's, when the industry was plagued by over-capacity due to circumstances unforeseen by the industry, general and vague statements cited by respondent are too equivocal to be probative on the degree and scope of competition existing during the time of the acquisition.²⁶ No actual price data were put in record by respondent and the evidence that is in the record indicates that demand has caught up with supply (and has exceeded supply in some areas). "Prices have gradually firmed up," one executive testified, "because the industry's practice back in the early 1970s was that they had excess capacity and they were using a kind of a marginal pricing philosophy * * *. As demand firmed up, marginal costing and marginal pricing disappeared and full costing and full pricing became the standard * * *." (Tr. 2723). Other witnesses agreed that air gases such as oxygen and nitrogen have been in short supply since 1971 and, as previously noted (*supra* p. 25 [p. 1357-58 herein]) this trend is expected to continue.

Economists teach us that in a high fixed-cost industry, leading firms are prone to avoid overt price competition. Scherer, *Industrial Market Structure and Economic Performance* 195 (1970); Neal, *Industrial Concentration and Price Inflexibility* 77 (1942). The record supports

²⁶ Respondent, for instance, quotes the testimony by the president of Liquid Air, Inc. that there has been "vigorous" price competition in the industry. When asked what "vigorous" meant, he replied "High enough to make a profit"—clearly a non-sequitur (Tr. 556). The witness from Union Carbide testified "I would say there is a fair amount of vigorous price competition" (Tr. 305, emphasis added). These and other general expressions of subjective opinions by industry witnesses cannot be given much weight, particularly in view of the rarity with which industry witnesses, in our experience, ever acknowledge the absence of vigorous competition in any form.

There is documentary evidence in the record that supports a finding that in 1966-1967 Union Carbide lost sales and market share because it raised prices but other firms did not follow (CX 232-Z-24, CX 232-S). Also the 1970 Perham-Greenfield study reported that industrial gases had become a commodity in the U.S.A. "and as a result are sold essentially on price" with the result being a depressed industry at that time or earlier. Although the study observed that there were current attempts to increase prices, the authors did not believe the increases would keep pace with inflation. However, as the above text indicates, by 1973 prices had firmed up and in June 1973 BOC started laying the groundwork for a takeover of BOC.

There are also indications that the industry may tend towards parallel pricing practices. Thus, during the hearings in April 1974 Linde Division increased prices 10 to 15 percent. Airco immediately followed within a day or so with a price increase (Tr. 314).

this view with respect to the instant case. A BOC document reveals that at a private meeting on Sept. 6, 1973, a representative from one of the three dominant U.S. industrial gases firms told BOC's chairman that with respect to the U.S. industrial gases market, "the U.S. gas market has stabilized and that the three main competitors no longer encroach on each other's area of domination" (CX 95D).

Although current profit figures were not put in the record by BOC, indications are that profits have been rising.²⁷ In a statement to shareholders, Airco announced that the "1972 earnings performance of our Industrial Gases, Welding Products and Electronics Divisions was Outstanding" (CX 85X). Airco also stated to BOC during their July 1973 discussions that their "after tax return is better than AP [Air Products] or Linde: [for example] CO-2 is estimated to give a 10% after tax return" (CX 93E). A BOC staff document drafted in June 1973 for consideration by the BOC chairman and managing directors advised that although "* * * the general level of profitability in the leading industrial gases firms in the USA was poor throughout the 1960's, there is evidence that it is improving now and likely to establish a better plateau for the middle/late 1970's;" and that "skilful managements earned acceptable returns." It noted instances of two United States industrial gases firms having relatively high profit returns according to data published in *Fortune* (CX 76B-C).

BOC contends, however, that the threat of backward integration of tonnage users, *e.g.*, steel and chemical companies, will cause industrial gases suppliers to perform in a competitive manner. It argues that when a gases company bids on a tonnage supply contract it knows that the customer may consider purchasing his own plant as an alternative and this fact prevents the bidder from charging more than a reasonable rate of return. While there may be some check placed on profit margins on tonnage supply contracts as a result of the threat of vertical integration, this would not assure that prices and profits will not exceed a competitive level. To begin with, it is only for certain gases, particularly oxygen, where a single customer consumes quantities justifying an onsite tonnage plant that there is any real economic impetus for some customers to consider owning their own captive source of supply. Furthermore, any company that decided to integrate backward to produce its own oxygen would undoubtedly incur higher unit costs than an industrial gases company since the latter is

²⁷ A composite average of three firms' profit margin on sales between 1970 and 1972 placed in the record by BOC reveals there was a 46 percent gain from 4.92 percent to 7.17 percent (BOC RX 254). Although the consolidated rate of return on investment never exceeded 3 percent during that period, investment was calculated on the basis of "gross fixed plants and equipment" not taking into account depreciation (*ibid.*). Exclusion of such an important reduction of the capital base in a capital-intensive industry would result in a substantial understatement of return compared to commonly accepted rates of return.

frequently able to recoup a portion of costs by sale in the merchant market of nitrogen and argon which can be produced simultaneously in the air separation plant. Large users of gases historically have not found it feasible to enter into the industrial gases business. See also discussion of entry barriers, *supra*, pp. 14, 19 and n.13 [pp.1350, 1353, herein]. Finally, as the ALJ pointed out, any restraining effect on prices by the threat of backward integration would have little effect on prices in the merchant market. Prices for oxygen in the merchant market, for instance, are in the order of five to ten times the price of tonnage oxygen. The marginal potential contribution to the supply side of the merchant market, which is apt to be limited in geographic availability depending on the location of such customer, is unlikely to have a significant impact on that price level.

In sum, we fail to find convincing reasons to view entry by BOC as lacking competitive significance for this industry. Entry by BOC by internal growth (or expansion of toehold firm) would add a new competitor and decision-maker to an industry that is already highly concentrated and becoming more so. New entry into another geographical market by a strong, proven-and-tried competitor frequently has the effect of shaking up established industry leaders and sets in motion pressures on them to compete more vigorously in price or services in order to retain their existing market shares.

We conclude that that Section 7 has been violated and BOC should be ordered to divest itself of Airco.

II. INHALATION ANESTHETIC EQUIPMENT

The complaint also alleges that one of the effects of the acquisition of Airco stock may be substantially to lessen competition in the manufacture and sale of inhalation anesthetic equipment, or any submarket thereof, in the United States. "Inhalation anesthetic equipment" was defined by complaint counsel during the proceedings as equipment and accessories used in the administration of gas for anesthetic purposes. It is to be distinguished from equipment designed to aid patients in breathing ("inhalation therapy equipment"). The principal items of anesthetic equipment are anesthesia machines, vaporizers, face masks, ventilators, flow meters, and various connecting tubes. Many of these items are similar to "inhalation therapy equipment," except that they must be semi-conductive to prevent accidental electrocution or explosions in the operating room. This results in prices being higher than on corresponding therapy equipment.

At the time of the acquisition, Airco, through its Ohio Medical Products Division, was the leading seller of inhalation anesthetic

equipment in the United States. BOC, through two U.S. subsidiaries, Fraser Sweatman, Inc. and Harris Lake, Inc.,²⁸ also marketed certain types of inhalation anesthetic equipment.

The ALJ found that total sales of inhalation anesthetic equipment in the United States in 1972 was \$24,305,611. Airco's share of those was approximately 31 percent (\$7,616,338). The share collectively held by firms acquired by BOC amounted to 8 percent (\$2,013,362). The ALJ also found that sales were highly concentrated, the four largest manufacturers in 1972 having captured 64.5 percent of total sales and the eight largest, 88 percent. The ALJ found that the manufacture and sale of inhalation anesthetic equipment constituted a separate product market and the acquisition of Airco stock by BOC substantially lessened competition in that line of commerce.

BOC's threshold challenge to this portion of the initial decision is with respect to the definition of the product market and the completeness of sales data placed in the record.

*A. Inhalation Anesthetic Equipment and Accessories as a
Line of Commerce*

Both here and before the ALJ, BOC has objected to the market definition as being too broad. A review of the specific items encompassed within the asserted market demonstrates that there is lack of interchangeability, and therefore lack of competition between or among the items.²⁹

The ALJ responded that (1) the principal item, the *anesthesia machine*, "consists of nearly every product" in the asserted market; and (2) the remaining items in the asserted market are necessary in order for the patient to effectively receive the anesthetic vapors.³⁰

While these facts may be true, they do not establish that production

²⁸ Fraser Sweatman was the U.S. subsidiary of Cyprane, Ltd. a United Kingdom company which was acquired by BOC in 1972. Harris Lake, Inc. was the subsidiary of Harris Calorific Company, a United States company, full control of which was acquired by BOC in November 1973.

²⁹ Included in the initial decision's market are the following items: (1) "Anesthesia machines" (the essential elements of which are a cart, regulators, flow meters, vaporizers, conducting tubes, masks, CO₂ absorption canisters, and rebreathing reservoir bags); (2) anesthesia vaporizers (containers that convert a liquid anesthetic into a vapor); (3) rebreathing reservoir bags; (4) anesthesia conducting tubes that carry the gas from the anesthesia machine to the patient; (5) anesthesia airways (curved tubes inserted into a patient's mouth); (6) anesthesia face masks; (7) connecting Y-pieces; (8) adapters and fittings; (9) carbon dioxide absorption canisters; (10) flow meters; (11) yokes, hand screws, and valves; (12) anesthesia ventilators (devices which mechanically assist a patient's breathing during anesthesia); (13) anesthesia respirometers (measures volume of breathing); (14) endotracheal tubes and cuffs; (15) laryngoscopes for anesthesia; (16) forceps for anesthesia; (17) disposable breathing circuits; (18) other miscellaneous anesthesia accessories. The market as defined encompasses equipment whether sold for use in hospitals, by the veterinary profession, or the dental profession.

³⁰ The ALJ found that there is a degree of interchangeability, both in the supply side (technological similarity leading to production flexibility) and the demand side among surgical, veterinary, and dental anesthesia machines. Although BOC disputes this finding, we find the record supports the inclusion of veterinary and dental machine production output capacity in the same market with surgical machines. The machines are very similar in their makeup and the principles of producing them are the same. Many of the components are identical. Cf. *The Budd Co.*, Dkt. 8848, Commission Opinion, Aug. 29, 1975 [supra]; *Beatrice Foods Co.*, Dkt. 8864, Commission Opinion, July 1, 1975 [supra].

and sale of all inhalation anesthetic equipment are in a single economic market. Automobiles “consist of” tires, mufflers, spark plugs, etc., but this does not mean that the production of automobiles may be lumped with the production of all tires, mufflers, etc., into a single product market. Automotive parts that are sold separate and apart from the sale of automobiles (aftermarket sales) obviously are not in the same market as assembled automobiles. So it is with inhalation equipment. A purchaser may buy a completed “anesthesia machine” from one manufacturer but purchasers also buy separate components from different manufacturers. Table I of the ALJ’s findings disclose that only eight of the 23 firms whose output is included in the total market manufacture and sell anesthesia machines; and anesthesia machine sales represent only 22 percent of total inhalation anesthetic equipment sales. The ALJ’s second point—complementarity in end use among the products—does not establish that the products belong in the same economic market. Automobiles need oil and gasoline to be operable, but no one would surely contend that automobiles, oil, and gasoline are all in the same product market.

On appeal complaint counsel seek to bolster the ALJ’s finding on the ground that inhalation anesthetic equipment is a “cluster” market within the meaning of *U.S. v. Philadelphia National Bank*, 374 U.S. 321, 356-7 (1963); *A.G. Spalding & Bros., Inc.*, 56 F.T.C. 1125 (1960), *aff’d*, 301 F.2d 585 (3d Cir. 1962) and *U.S. v. Bethlehem Steel Corp.*, 168 F. Supp. 576 (S.D.N.Y. 1958). But as we pointed out in *Sterling Drug, Inc.* 80 F.T.C. 477, 595 n.19 (1972) in “those cases it was established or undisputed that resource flexibility existed or that the product groupings were sold as a full line by most firms.” See also *U.S. v. Grinnell Corp.*, 384 U.S. 563, 572 (1966). It is not asserted by complaint counsel that there is ease of production flexibility such that any manufacturer of one item within the product grouping can readily manufacture any of the other items from existing facilities.³¹ And unlike the “industrial gases”, which we found to constitute a single line of commerce, there is no evidence that manufacturers offer a full or nearly full line of such products. Only 4 of the 23 companies in the asserted inhalation anesthetic equipment market produce as many as half of the items making up the asserted market and none of the companies make all of them. Even among the four companies having the greatest volume of overall sales, two made less than half of the items. Although some manufacturers apparently serve as primary suppliers of certain equipment to other firms which resell them as part

³¹ It appears that the products can be grouped into three types of production processes; production of rubber goods, production of plastic goods, and production of metal goods by machine shop tools and foundry castings. BOC’s contention that there is no cross-elasticity of production facilities across these categories is not challenged by complaint counsel.

of a broader line of inhalation equipment, the record does not show the extent this occurs and complaint counsel's market is limited to sales at the manufacturing and import level. Also unlike the record with respect to the industrial gases industry, there is no evidence that the manufacture of "inhalation anesthetic equipment" is viewed as a distinct industry. On the basis of this record, we cannot agree that the manufacture of all inhalation anesthetic equipment constitutes a single economic market.

The ALJ based his decision on the existence of such an overall market and apparently did not deem it necessary to consider whether competition was substantially lessened in submarkets of the asserted overall market, although this was pleaded in the complaint. Sales data on a product-by-product basis were placed in the record and we have calculated the following market shares of BOC and Airco in the three product lines in which both competed to a significant degree, measured in terms of dollar sales at the manufacturing level in 1972.

<i>Sales (\$)</i>		<i>Market Share</i>
	<i>Anesthesia Machines</i>	
All	5,229,834	100%
Airco	2,413,231	46%
BOC	822,888	16%
	<i>Anesthesia Vaporizers</i>	
All	1,109,951	100%
Airco	273,712	25%
BOC	579,495	52%
	<i>Anesthesia Face Masks</i>	
All	1,170,623	100%
Airco	1,035,901	88%
BOC	36,275 ³²	3%

Although BOC maintains that the market share data with regard to inhalation equipment are incomplete, we are satisfied that they are a sufficiently reliable basis for measuring concentration and market shares with regard to the above product lines. For instance, in its own analysis of the anesthesia machine market BOC placed Airco as dominating sales "with approximately 55-60% of the market" (CX 169B). Testimony by knowledgeable industry witnesses indicated that at least 90 percent of industry sales were accounted for by the 23 firms listed by complaint counsel as selling inhalation anesthetic equipment. Recognizing that "the development of precise market data could be 'prohibitively expensive and burdensome to obtain' in industries

³² \$36,275 is the figure listed in the initial decision. However it understates the degree of actual competition between BOC and Airco since Harris Lake (BOC) reported sales of face masks of \$76,942 in 1972 although they were manufactured for them by another firm.

characterized by a central core of firms surrounded by a fringe of much smaller competitors," the Commission has accepted the Supreme Court's teaching in *Brown Shoe* that "precision in detail is less important than the accuracy of the broad picture." *Avnet*, 82 F.T.C. 391, 465, *aff'd*, 511 F.2d 70 (7th Cir. 1975); *Papercraft Corp.*, 78 F.T.C. 1352, 1405-06 (1971), *aff'd*, 472 F.2d 927 (7th Cir. 1973); see *Brown Shoe Co., v. U.S.*, 370 U.S. 294, 342 n.69 (1962). We find that the above tabulations reflect the approximate size of these product markets.

Clearly in these three product lines the challenged acquisition has substantially lessened competition. In addition to being the two largest manufacturers of anesthesia machines, BOC and Airco are number one and number two, respectively, in the manufacture and sale of anesthesia vaporizers. Although BOC challenges the ALJ's findings that entry barriers in inhalation anesthetic equipment are high, when such substantial market shares are held by participants in a horizontal merger, lack of high entry barriers is not a defense in any event. Absence of substantial entry barriers does not itself ensure that lost competition will be restored. *Ekco Product Co.*, 65 F.T.C. 1163, 1208-09 (1964), *aff'd*, 347 F.2d 745 (7th Cir. 1965); *American Brake Shoe Co.*, 73 F.T.C. 610, 684-85 (1968), *aff'd*, 420 F.2d 928 (6th Cir.). See also Brodley, "Oligopoly Power Under the Sherman and Clayton Acts" 19 Stan. L. Rev. 285, 349 (1967). Furthermore the record amply supports the ALJ's findings that significant entry barriers exist.

III. INHALATION THERAPY EQUIPMENT

The complaint also alleges that competition may be substantially foreclosed in the manufacture or sale of "inhalation therapy equipment" or submarkets thereof. Inhalation therapy equipment is defined by complaint counsel as equipment used to aid patients to breathe, rather than to anesthetize them.

As in the case on inhalation anesthetic equipment, the alleged product market consists of a wide variety of equipment which are mostly nonsubstitutable and are generally made by different production methods.³³ Production of the various equipment is fragmented among many different companies. The initial decision lists some 30 firms in the field and one witness stated that his company had identified some 59 companies making one or more pieces of such

³³ The ALJ found the following items as comprising the inhalation therapy equipment market: (1) ventilators (sometimes called respirators) which force air or oxygen into the patients lungs; (2) humidifiers and nebulizers, which humidify the air or oxygen; (3) resuscitators (emergency devices); (4) delivery tubing; (5) face masks; (6) flow meters; (7) nasopharyngeal catheters and cannulae; (8) oropharyngeal airways; (9) drain and condensation bottles; (10) adapters and fittings; (11) yokes, handscrews and valves; (12) respirometers; (13) bacteria filters; (14) tracheotomy tubes; (15) incubators used to control or assist in breathing; (16) oxygen tents; (17) IPPB (intermittent positive pressure breathing devices).

equipment. The majority of firms have sales under \$1 million. None of the companies manufactures all items of inhalation therapy equipment. Among the four firms having the greatest aggregate sales, only two manufacture as many as half the items. Although Airco manufactures 10 out of the 16 types of equipment comprising the market, the BOC firms manufactured at most only two types. As in the case of inhalation anesthetic equipment there is a failure to demonstrate that the leading firms manufacture a full or nearly full line of inhalation equipment.³⁴ Accordingly, we conclude that it has not been established that the manufacture of inhalation therapy equipment constitutes a single, overall market.³⁵

Turning to the individual product lines comprising inhalation therapy equipment, there is no evidence of any significant competition between Airco and BOC. BOC's sales in this field were virtually limited to respirometers and Airco did not manufacture this item. As to the possibility that potential competition may have been eliminated or lessened, complaint counsel stated during the hearing that they were basing their case in inhalation therapy equipment solely on the foreclosure of "actual" competition between the firms, not on any charge that BOC's importance to the market was due to future entry on a much grander scale. Respondent's counsel clearly relied on complaint counsel's statement and refrained from eliciting testimony relating to any issue of potential entry.

Accordingly, the allegation that both actual and potential competition in inhalation therapy equipment or submarkets thereof have been substantially diminished as a result of the BOC acquisition of Airco stock must be dismissed.

IV. AIRCO

Although Airco did not enter into an agreement to sell its assets to BOC (*compare Dean Foods Co.*, 70 F.T.C. 1146, 1292 (1966)), by certain actions and agreements detailed above, *supra* p. 4 [p. 1342-43 herein], Airco's board of directors facilitated BOC's acquisition of Airco stock. Thus Airco's board, in exchange for Airco's representation on BOC's board of directors, consented to BOC's tender offer for Airco shares

³⁴ Therefore the so-called "cluster market" cases cited by complaint counsel are unavailing. In *Philadelphia National Bank*, *supra*, there was no dispute that commercial banks offered the various services that make up "commercial banking." In *Bethlehem Steel*, *supra*, the major producers, including the two merging firms, produced the cluster of iron and steel products accepted as an alternative market in that case. In *Spalding*, *supra*, the leading firms, including the two merging firms, sold athletic equipment as a full line to retail distributors. See also *U.S. v. Grinnell Corp.*, 384 U.S. at 572 n.6, where the Court in holding that a "cluster of services" market had been demonstrated cited the fact that 24 out of the 38 firms offered a full line of the four types of central service station protection services, and nearly all the remaining firms offered three out of four of the services.

³⁵ Even if such a market definition were accepted, we would probably have difficulty upholding a violation in that line of The BOC firms, however, accounted for about one-half of one percent of sales.

and advised Airco's shareholders of their consent and that a closer association of Airco and BOC would be beneficial to Airco. These actions technically constituted violations of the Federal Trade Commission Act since they were intended to, and did, facilitate an acquisition of stock that violated Section 7 of the Clayton Act. Were it not for the fact that Airco should be subject to certain provisions of the order to restore Airco's independence from BOC control, it would probably not be necessary to retain Airco as a respondent in this proceeding. Nevertheless the joinder appears desirable for purposes of assuring that certain preacquisition agreements between Airco and BOC are rescinded,³⁶ and we shall not disturb the ALJ's findings that Airco violated the Federal Trade Commission Act with respect to the acquisition.

V. RELIEF

The ALJ ordered BOC to divest its stock in Airco within one year. In addition he required BOC to assign its stock to a voting trustee who would vote the Airco stock pending divestiture. This latter provision, which was not sought by complaint counsel, is not necessary in our estimation unless future events dictate the need for such trusteeship to accomplish divestiture. Cf. *U.S. v. Kennecott Copper Corp.*, 249 F. Supp. 154, 165 (S.D.N.Y. 1965). Accordingly, it will be deleted. We do not agree with BOC that the one-year period for divestiture is too short.

The ALJ's order also prohibits BOC from acquiring, directly or indirectly, during the next 10 years, the business of any firm engaged in the business of industrial gases without approval of the Federal Trade Commission. Since requirement of advance Commission approval of acquisitions in this field might make it difficult for BOC to compete for the acquisition of a toehold firm as a basis for future entry should an occasion arise where the owner is attempting to sell his company quickly, we shall permit the acquisition of a firm selling less than \$25 million a year in industrial gases without the requirement of obtaining Commission approval.³⁷ We will, however, require BOC to obtain Commission approval before acquiring any company engaged in the manufacture or sale of anesthesia machines, anesthesia vaporizers, or anesthesia face masks since BOC is already engaged in those lines of commerce in the United States.

The ALJ's order also appropriately requires BOC and Airco to cease any representation on each other's respective boards of directors. In

³⁶ Had Airco not been joined as a respondent in this proceeding, a finding of violation of Section 7 and an order of divestiture against BOC might nevertheless supercede and render unenforceable these agreements between Airco and BOC. However, we need not reach this question.

³⁷ Based on 1972 Census data, shipments totaling \$25 million would represent approximately 4 percent of the national market.

addition the order requires Airco to cease and desist from taking any steps to implement any provision of the agreements between Airco and BOC of July 25, 1973, and of Dec. 10, 1973. We think the latter provision is unnecessarily broad in one respect. Airco's "right of first refusal" allows Airco to purchase or designate a purchaser for such shares in whole for cash in an amount equivalent in value to the consideration for which BOC proposes to sell such shares to a transferee (CX 108 B). If the Airco corporation itself should purchase back the acquired stock, the ownership of Airco would be in approximately the same status as prior to the BOC takeover. On the other hand, if Airco should seek to designate a purchaser, there should be no objection provided sale to the designee does not raise antitrust problems. No reasons have been presented by complaint counsel as to why Airco should not have an opportunity to exercise this right subject to Commission approval of the designee.

As to a second point raised by Airco—the desirability of retaining the provision contained in the July 25 agreement that restricts BOC from disseminating certain confidential Airco business information—complaint counsel has offered no objection to this suggested change and we cannot perceive any. Accordingly the order will be modified in this respect also.

An appropriate order accompanies this opinion.

FINDINGS AS TO THE FACTS, CONCLUSIONS AND ORDER

The Federal Trade Commission issued its complaint in this matter on Feb. 26, 1974, charging that respondents, The British Oxygen Company Limited, BOC Financial Corporation, BOC Holdings Limited, and British Oxygen Investments Limited had violated Section 7 of the amended Clayton Act (15 U.S.C. §18) in acquiring 4 million shares of the stock of Airco, Incorporated and further charging these respondents and Airco, Incorporated with violation of Section 5 of the Federal Trade Commission Act (15 U.S.C. §45). Testimony and other evidence in support of and in opposition to the allegations of the complaint were received in evidentiary hearings and in an initial decision of Oct. 18, 1974, the administrative law judge concluded that the principal charges were supported by the evidence and entered an order that would require divestiture of the acquired firm and other relief.

The Commission, having considered the appeal filed by the respondents and the entire record, and having determined that the law judge's findings of fact and conclusions, as modified herein and as supplemented by the attached Commission opinion, should be adopted as the findings and conclusions of the Commission, now makes its findings as to the facts, its conclusions drawn therefrom and its order.

1. through 35. With the exception of Finding 18, the Commission adopts the Preliminary Statement and Findings 1 through 36 of the initial decision.

36. Finding of Fact 36 of the initial decision is revised to read:

The Bureau of the Census classifies the production and marketing of industrial gases as a separate and distinct industry under Standard Industrial Classification (SIC) 2813 (CX 296A-F, CX 312A-K). The United States industrial gases industry has been defined by Census from at least 1945 through the present as those establishments primarily engaged in manufacturing gases for sale in compressed, liquid and solid forms (CX 340A-B, CX 336A-B, CX 338A-B; CX 339A-B, CX 296A). The gases classified by Census as industrial gases are acetylene, carbon dioxide, argon, helium, hydrogen, nitrogen, oxygen, nitrous oxide, other elemental gases, and compressed and liquified gases (CX 299D, CX 300A-D, CX 312C-D). The same group of gases have been classified as industrial gases by Census since at least 1954 (CX 337A-C).

37. through 52. The Commission adopts Findings 37 through 52 of the initial decision.

53. Finding of Fact 53 of the initial decision is revised to read:

There is no price data in the record as such. BOC respondents contend that price competition in the industry is extremely rigorous, and reference is made to testimony of industry executives (Dempster 556; Baker 436-37; Flamm 305). This testimony is, however, somewhat equivocal. Mr. Flamm of Linde stated that between Linde, Air Products and Airco—"they argue their service is equal, I would say a fair amount of vigorous price competition" (Flamm 305). Further, this testimony, which is of the most general nature, must be viewed in perspective with the supply-demand situation existing during the past 2 years, and testimony that prices have firmed, marginal pricing has disappeared and full pricing has become the standard. Respondents also rely upon the observations in the Perham-Greenfield (BOC) report on the United States industrial gases market as of 1969-1970 (BOC RX 62). The report also covers the period 1969-early 1970. The supply-demand situation and industry pricing practices changed substantially from early 1970 to the end of 1973 when the challenged acquisition occurred (Findings of Fact 50-52).

54. Finding of Fact 54 of the initial decision is revised to read:

BOC respondents placed several charts in evidence which demonstrate that average unit value of major industrial gases has declined in recent years (BOC RX 246; BOC PF 123). Conclusions regarding prices have been drawn from data compiled by the Bureau of the Census on the total value and quantity of shipments of the various gases, f.o.b.

plant, with the unit value (*i.e.*, the ratio of total value of shipments to total quantity of shipments) used as an approximation of price. Declining unit value has little significance in establishing that the marketplace is highly competitive. The basic pattern in the industry has been an increase in volume purchased by individual customers and a trend toward pipeline delivery. Thus, the increasing use of tonnage oxygen with low delivery costs has had an averaging-down effect on the unit value of shipments. Economies of scale in production and delivery has also effected lower unit costs (Baker 2745-46).

55. through 65. The Commission adopts Findings 55 through 65 of the initial decision with the exception that the reference to "BOC RX 254" in the second sentence of Finding 58 should read: "*Id.* Figures 20 and 21."

66. The Commission adopts Finding 66 of the initial decision except for the first two sentences thereof.

67. through 80. The Commission adopts Findings 67 through 80 of the initial decision.

81. Finding 81 of the initial decision is revised to read:

Industry witnesses testified that their pricing and marketing decisions had not been affected by the perceived potential entry of BOC (Flamm 336-37; Dempster 567-68; Kimmerling 881-82; Baker 446).

82. through 91. The Commission adopts Findings 82 through 91 of the initial decision, striking the word "Bangladesh" in Finding 85 and changing "19 countries" in Finding 89 to read "17 countries."

92. Finding 92 of the initial decision is revised to read:

In October 1969, Dr. Muller was told by the chairman of BOC to terminate all activities other than searching for opportunities for BOC in the U.S. industrial gases field (CX 42, CX 248A-B). In December 1969, the chairman of BOC informed Dr. Muller that BOC should be represented in the United States; the only questions were what, how, when and where (CX 47A).

93. and 94. The Commission adopts Findings 93 and 94 of the initial decision, revising the last sentence of Finding 94 to read:

Throughout Dr. Muller's association with BOC, BOC continually stressed its interest in entering the U.S. industrial gases market (CX 42, 47A; Muller 668).

95. The Commission adopts Finding 95 of the initial decision, revising the first sentence to read:

By 1969, BOC had made a definite decision to investigate possible entry into a number of U.S. markets, with first priority to be given to the U.S. industrial gases market (CX 40A, CX 246).

96. Finding 96 of the initial decision is revised to read:

[Delete subtitle]

In November 1969, Mr. Johnson of Loeb, Rhodes and Company, an investment banking firm, was told by BOC executives that BOC was interested in making an acquisition of some consequence in the United States in the industrial gases line of business.

Mr. Johnson indicated that he had earlier relations with Chemetron that involved negotiations for the acquisition of Chemetron by another company. BOC executives expressed an interest in pursuing possible acquisition of Chemetron. In January 1970, a meeting was arranged between BOC and Chemetron officials. Chemetron's management made it clear that they were interested in permitting BOC to acquire only a minority interest, enough to protect against a takeover by other companies. The BOC representative in turn indicated that he doubted that his board of directors would be interested in anything less than a majority interest. BOC later informed Johnson that it was not interested in pursuing the matter further (CX 223, 224, 225; Tr. 832-35).

97. Finding 97 of the initial decision is adopted, deleting the subtitle.

98. Finding 98 of the initial decision is revised to read:

[Delete subtitle]

BOC considered Burdett Oxygen Company of Cleveland (Burdett-Cleveland) a possible acquisition candidate in 1969 (CX 40A). In 1969, BOC told Burdett-Cleveland that it might be interested if the company ever wished to dispose of its operations (CX 216). Mr. Perham and Mr. Greenfield of BOC visited Burdett-Cleveland during BOC's 1970 study of the U.S. industrial gases market. Although the authors of the report considered the company to have management problems and to be in financial trouble, they expressed the view that "possibly their strategy in obtaining three tonnage supply schemes could be made to work if the business ever is available at a realistic price * * * We recommend we watch and wait with only a minor possibility it could be of interest to us" (CX 232 D-E, in camera).

99. Finding 99 of the initial decision is revised to read:

Early in 1970, an investment banker told BOC that 50 percent of the stock of Burdett-Cleveland could be purchased for \$4-5 million. In April 1970, BOC informed the banker that there was a possibility that BOC could be interested in a majority position in Burdett-Cleveland (CX 233A, CX 234). After BOC was told it was then impossible to obtain control, BOC told the banker that if the situation changed it should be alerted as it might still be interested (CX 243). In September-October 1970, BOC told Burdett-Cleveland and its bankers that it was

interested in buying Burdett's Niagara Falls, N.Y., industrial gases plant for its Canadian operation across the border. However nothing came of the matter (CX 244A, CX 245).

100.-102. The Commission adopts Finding 100 of the initial decision, but vacates Findings 101 and 102.

103.-111. The Commission adopts Findings 103 through 111 of the initial decision, but deletes the sentence in Finding 110: "The Brazilian market has a growth rate comparable to the U.S. market."

112. The Commission adopts Finding 112 of the initial decision, revising the last sentence to read: "At the time BOC acquired Airco stock, there were a number of small regional U.S. industrial gases producers, some of which presumably were available for acquisition (see, e.g. Tr. 736, 788, 876, 393, 2734-35, 2750, 2781, 260).

113.-121. The Commission adopts Findings 113 through 121 of the initial decision, deleting the first sentence of Finding 121.

122. The Commission adopts Finding 122 of the initial decision but substituting the following for the first two sentences thereof: "The Z-79 Committee of the American National Institute consists of the leading manufacturers of IAE, representatives of the medical professional societies in the United States and representatives of the Federal Government (Hedley-Whyte 1212-13).

123.-127. The Commission adopts Findings 123 and 124 of the initial decision, deleting the first sentence of Finding 124. Findings 125-127 are vacated.

128.-140. Findings 128 through 138 and Finding 140 of the initial decision are adopted except for characterizations of sales of IAE as constituting a single market. Finding 139 is vacated.

141.-149. Findings 141 through 149 of the initial decision are adopted, except for Finding 143 which is vacated.

Tables I and II *in camera* of the initial decision are adopted by the Commission.

150.-153. Findings 150 through 153 of the initial decision are vacated and the following findings are entered in lieu thereof:

Prior to the acquisition of Airco, BOC competed with Airco in the manufacture or sale of anesthesia machines, anesthesia vaporizers and anesthesia face masks. (CX 135-141, 146, 147; 150; Physical Exhibit A, Table I *in camera*). The manufacture and sale of anesthesia machines, anesthesia vaporizers, and anesthesia face masks is in each of these product lines a line of commerce for purposes of Section 7 of the Clayton Act. BOC's stock acquisition has substantially lessened competition in these lines of commerce.

154.-174. The Commission adopts Findings 154 through 174 of the

initial decision except to the extent they characterize sales of ITE as constituting a single market.

175.-182. Findings 175 through 182 of the initial decision are vacated.

The following Conclusions of the initial decision are adopted except as indicated:

Conclusion IA

Conclusion IB

Conclusion IC, except for the last sentence of the first paragraph.

Conclusion ID

Conclusion IE

Conclusion IF (entitled "BOC Exerted Beneficial Influence etc. * * *" at pp. 93-96 [pp. 1320-1321, herein]) is vacated.

Conclusion IG (entitled "The Acquisition of Airco etc. * * *" at pp. 96-102 [pp. 1322-1327 herein]) is adopted, except that in the first paragraph on p. 100 [p. 1325 herein] "17 different countries" is substituted for "19 different countries" and the final sentence is deleted. Further, the third sentence in the second paragraph on p. 101 [p. 1326, herein] is deleted and "See Finding 112" is substituted therefor.

Conclusion IH is vacated.

Conclusion II is adopted.

Conclusion IIA is vacated.

Conclusion IIB is adopted.

Conclusion IIC is vacated.

Conclusion III is vacated and the following is entered therefor: There is insufficient evidence that competition has been lessened in the sale of inhalation therapy equipment as the result of the acquisition.

Conclusion IV is adopted to the extent it is not inconsistent with the final order and opinion of the Commission.

Conclusions of Law at pp. 114-116 [pp. 1336-1337 herein] are adopted to the extent they are not inconsistent with the findings and opinion of the Commission.

The following final order is hereby entered:

FINAL ORDER

For the purpose of this order, "BOC" shall include all subsidiary or related corporations and all successor corporations of The British Oxygen Company Limited; BOC Financial Corporation; BOC Holdings Limited; and British Oxygen Investments Limited; and "Airco" shall include all subsidiary or related corporations and all successor corporations of Airco, Inc.

Final Order

I

It is ordered, That BOC, its officers, directors, agents, representatives and employees, shall within one (1) year from the date this order becomes final, divest itself absolutely and in good faith, subject to the prior approval of the Federal Trade Commission, of all rights, title and interest including without limitation all shares of stock and all assets, properties, rights and privileges, tangible or intangible, including without limitation all plant, equipment, machinery, raw material reserves, inventory, customer lists, trade names, trademarks, good will, and other property of whatever description acquired by BOC as a result of its acquisition of the stock of Airco.

II

It is further ordered, That none of the stock, assets, properties, rights and privileges, tangible or intangible, required to be divested by BOC pursuant to Paragraph I above, shall be divested directly or indirectly to anyone who is, at the time of the divestiture, an officer, director, employee, or agent of, or under the control, direction or influence of BOC, or who owns or controls more than one percent of the capital stock of BOC.

III

It is further ordered, That respondent BOC shall cease and desist for a period of ten (10) years from the date this order becomes final from acquiring, directly or indirectly, through subsidiaries or otherwise, the whole or any part of the stock, share capital or assets (other than products sold in the normal course of business) of any concern, corporate or noncorporate, engaged at the time of acquisition in any State of the United States in any or all of the business of (1) industrial gases, or (2) anesthesia machines, or (3) anesthesia vaporizers, or (4) anesthesia face masks, without the prior approval of the Federal Trade Commission. The foregoing restriction (1) shall not apply to the acquisition of a concern which in the two most recent reporting years prior to the acquisition has reported value of shipments of industrial gases (SIC 2813) to the Bureau of Census not in excess of \$25 million in the aggregate in each of the two years; *Provided, however*, That BOC has not already acquired any interest in a concern engaged in any portion of the business of manufacturing or selling industrial gases in the United States and no longer retains an ownership interest in Airco at the time of such acquisition.

The prohibited acquisitions in the above paragraph shall include but not be limited to the entering into of any arrangement between BOC,

and any concern engaged in any or all of the aforesaid businesses pursuant to which BOC obtains the market share of any such concern (a) through such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, under its own trade name or labels and thereafter manufacturing or distributing any of said products under the BOC trade name, or (b) by reasons of such concern discontinuing its participation in the industries mentioned in this paragraph, or any segment thereof, and thereafter transferring to BOC its customer lists, or in any other way making available to BOC access to its customers or its customer accounts.

IV

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

V

It is further ordered, That BOC cease any and all representation on the board of directors of Airco, and cease and desist from taking any steps to nominate, seat, or admit any representatives of Airco to the board of directors of BOC.

VI

It is further ordered, That BOC shall within sixty (60) days from the date this order becomes final, and every sixty (60) days thereafter until BOC has fully complied with the provisions of this order, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which BOC intends to comply or has complied with this order. All compliance reports shall include, among other things that are from time to time required, a summary of contacts or negotiations with anyone for the specified stock, assets, properties, rights, and privileges, tangible or intangible, the identity of all such persons, and copies of all written communications to and from such persons.

VII

It is further ordered, That Airco cease and desist from taking any steps toward achieving union of interest between Airco and BOC,

Final Order

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including but not limited to merger, acquisition, consolidation or joint venture in any market referenced herein.

VIII

It is further ordered, That Airco cease and desist from taking any steps to implement any provision of the agreements between Airco and BOC of July 25, 1973, and of Dec. 10, 1973. The foregoing provision shall not apply (1) to Airco's right of first refusal as set forth in paragraph 4 of the Dec. 10, 1973 agreement, subject, however, to Commission final approval of the exercise of that right; (2) to the restrictions on dissemination of information contained in the July 25, 1973 agreement.

IX

It is further ordered, That Airco cease any and all representation on the board of directors of BOC, and cease and desist from taking any steps to nominate, seat, or admit any representative of BOC to the board of directors of Airco.

X

It is further ordered, That Airco shall within sixty (60) days from the date this order becomes final, submit in writing to the Federal Trade Commission a verified report setting forth in detail the manner and form in which Airco has complied with this order.
