

least thirty (30) days prior to any proposed change in the corporate respondent such as dissolution, assignment or sale, resulting in the emergence of a successor corporation, the creation or dissolution of subsidiaries or any other changes in the corporation which may affect compliance obligations arising out of this order.

X

It is further ordered, That the compliance report heretofore filed by respondent shall be considered by the Commission as if it had been filed under this order.

XI

It is further ordered, That this order shall become effective upon service.

 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 Cryoplants 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

