In the Matter of

CERTAIN DYNAMIC RANDOM ACCESS MEMORIES, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME

Investigation No. 337-TA-242

USITC PUBLICATION 2034

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United States International Trade Commission / Washington, DC 20436

UNITED STATES INTERNATIONAL TRADE COMMISSION

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UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of	
CERTAIN DYNAMIC RANDOM ACCESS MEMORIES, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-242

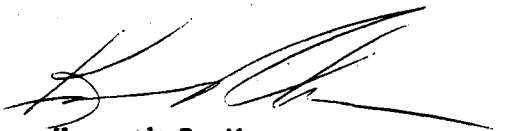
ERRATA TO COMMISSION ACTION AND ORDER

On September 21, 1987, the Commission issued an Action and Order in the above-captioned investigation, disposing of the issues on review and issuing a limited exclusion order prohibiting the entry of infringing DRAMs of 64 and 256 kilobits (and any combination thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd., whether assembled or unassembled. The Commission's order also prohibits the entry of infringing DRAMs of 64 or 256 kilobits (and any combination thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd.,. incorporated into a carrier of any form, including Single-Inline-Packages and Single-Inline-Modules, or assembled onto circuit boards of any configuration. The Commission has also determined to prohibit the entry of computers (such as mainframe, personal, and small business computers), facsimile equipment, telecommunications switching equipment, and printers containing infringing DRAMs of 64 or 256 kilobits (and any combination thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd.

It has come to the Commission's attention that there is a typographical error in paragraph 8 of the Commission's Order, which may lead to confusion in the application of the bonding provision of the Order, since it refers to the wrong paragraph of the Order (i.e., paragraph 6 rather than paragraph 7) in establishing the amount of the bond. Therefore, the Commission is issuing this errata. Paragraph 8 of the Commission's September 21, 1987, Order is corrected to read as follows:

> 8. Products identified in paragraphs (2), (3), (4), or (5) of this Order are entitled to entry into the United States from the day after this Order is received by the President, pursuant to subsection (g) of section 337 of the Tariff Act of 1930, until such time as the President notifies the Commission that he approves or disapproves this action, but no later than 60 days after the date of receipt of this Order by the President, under bond in the amounts identified in paragraph (7) of this Order. Persons importing such products shall certify to the best of their knowledge the number of DRAMs subject to this Order contained in such products, pursuant to procedures to be specified by the U.S. Customs Service;

By order of the Commission.



Kenneth R. Mason
Secretary

Issued: October 1, 1987

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of	
CERTAIN DYNAMIC RANDOM ACCESS MEMORIES, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-242

NOTICE OF ISSUANCE OF LIMITED EXCLUSION ORDER

AGENCY: U.S. International Trade Commission.

ACTION: Notice is hereby given that the Commission has issued a limited exclusion order in the above-captioned investigation prohibiting the unlicensed importation of certain dynamic random access memories (DRAMs) of 64 and 256 kilobits, or any combinations thereof (such as DRAMs of 128 kilobits), manufactured abroad by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd., or any of their affiliated companies, parents, subsidiaries, licensees, or other related business entities, or their successors or assigns, whether assembled or unassembled, or incorporated into a carrier of any form, including Single-Inline-Packages and Single-Inline-Modules, or assembled onto circuit boards of any configuration. The order also prohibits the unlicensed importation of computers (such as mainframe, personal, and small business computers), facsimile equipment, telecommunications switching equipment, and printers containing infringing DRAMs of 64 or 256 kilobits (or any combinations thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd., or any of their affiliated companies, parents, subsidiaries, licensees, or other related business entities, or their successors or assigns.

AUTHORITY: The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) and in section 210.58 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.58).

FOR FURTHER INFORMATION CONTACT: Judith M. Czako, Esq., Office of the General Counsel, U.S. International Trade Commission, telephone 202-523-0359.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on March 19, 1986, in response to a complaint filed on February 7, 1986, by Texas Instruments, Inc. (TI) of Dallas, Texas to determine whether there is a violation of section 337 (19 U.S.C. § 1337) and 19 U.S.C. § 1337a in the importation and sale of certain dynamic random access memories (DRAMs). The complaint alleged that such importation and sale by the nineteen named respondents constitute unfair methods of competition and unfair acts by reason of infringement of certain claims of ten U.S. patents owned by TI. The complaint further alleged that the effect or tendency of these unfair methods of competition and unfair acts is to destroy or substantially injure an industry, efficiently and economically operated, in the United States. During the course of the proceedings, thirteen of the original nineteen respondents were terminated from the investigation on the basis of license and settlement agreements.

On May 21, 1987, the presiding administrative law judge (ALJ) issued her initial determination (ID), finding that there is a violation of section 337 and 19 U.S.C. § 1337a in the importation and sale of certain DRAMs by two of the remaining respondents, Samsung Company, Ltd. and Samsung Semiconductor & Telecommunications Co., Ltd., and that there is no violation of section 337 and 19 U.S.C. § 1337a in the importation and sale of certain DRAMs by the other four remaining respondents, Hitachi, Ltd. and Hitachi America, Ltd. (the Hitachi respondents) and NEC Corporation and NEC Electronics, Inc. Subsequently, the Hitachi respondents were terminated from the investigation on the basis of a license and settlement agreement. 52 Fed. Reg. 26577 (July 15, 1987). On July 24, 1987, the Commission ordered review of certain portions of the ID, and requested written submissions regarding certain specific questions raised by the issues under review. The Commission vacated certain portions of the ID, including those concerning the Hitachi respondents, and determined not to review the remainder of the ID, which thereby became the determination of the Commission. The Commission also requested written submissions concerning the questions of remedy, bonding, and the public interest. 52 Fed. Reg. 29077 (Aug. 5, 1987). Having considered the record in this investigation, including the written submissions of the parties and comments from the U.S. Customs Service and members of the public, the Commission made its determinations disposing of the issues on review, and the questions of remedy, bonding, and the public interest.

Notice of this investigation was published in the Federal Register of March 19, 1986 (51 Fed. Reg. 9537).

Copies of the Commission's Action and Order, the nonconfidential versions of opinions issued in connection therewith, and all other nonconfidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 701 E Street NW., Washington, D.C. 20436, telephone 202-523-0161. Hearing-imparied individuals are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on 202-724-0002.

By order of the Commission.

Kenneth R. Mason
Secretary

Issued: September 21, 1987

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of CERTAIN DYNAMIC RANDOM ACCESS MEMORIES, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-242

COMMISSION ACTION AND ORDER

The Commission instituted the above-captioned investigation on March 19, 1986, in response to a complaint filed on February 7, 1986, by Texas Instruments, Inc. (TI) of Dallas, Texas. The investigation is to determine whether there is a violation of section 337 (19 U.S.C. § 1337) and 19 U.S.C. § 1337a in the importation and sale of certain dynamic random access memories (DRAMs). Notice of Investigation, 51 Fed. Reg. 9537 (March 19, 1986). The complaint alleged that such importation and sale by the nineteen named respondents constitute unfair methods of competition and unfair acts by reason of infringement of certain claims of ten U.S. patents owned by TI. The complaint further alleged that the effect or tendency of the unfair methods of competition and unfair acts is to destroy or substantially injure an industry, efficiently and economically operated, in the United States.

On May 21, 1987, the presiding administrative law judge (ALJ) issued her initial determination (ID) finding that there is a violation of section 337 and 19 U.S.C. § 1337a in the importation and sale of certain DRAMs by two of

the remaining respondents, Samsung Company, Ltd. and Samsung Semiconductor & Telecommunications Co., Ltd., and that there is no violation of section 337 or 19 U.S.C. § 1337a in the importation and sale of certain DRAMs by the other four remaining respondents, Hitachi, Ltd. and Hitachi America, Ltd. (the Hitachi respondents), and NEC Corporation and NEC Electronics, Inc. Subsequently, the Hitachi respondents were terminated from the investigation on the basis of a license and settlement agreement. 52 Fed. Reg. 26577 (July 15, 1987).

On July 24, 1987, the Commission determined to review certain portions of the ID. Specifically, the Commission ordered review of:

1. Whether U.S. Letters Patent 3,716,764 is valid and infringed by the accused imports. Review was limited to the validity and infringement issues arising out of the interpretation of the term "central region" in the patent claims, and the question of infringement under the doctrine of equivalents.

2. Whether U.S. Letters Patent 3,940,747 is valid and infringed by the accused imports. Review was limited to the question of infringement under the doctrine of equivalents.

3. Whether U.S. Letters Patent 4,081,701 is valid and infringed by the accused imports.

4. Whether U.S. Letters Patent 4,543,500 (the '500 patent) and U.S. Letters Patent 4,533,843 (the '843 patent) are valid and infringed by the accused imports.

5. Whether respondent NEC Corporation is licensed under the '500 and '843 patents.

6. Whether complainant TI's activities, and those of its licensees, with respect to the patents in issue constitute an industry or industries, efficiently and economically operated, in the United States.

7. Whether the infringing imports have the effect or tendency to substantially injure a domestic industry or industries.

The Commission requested written submissions concerning specific questions raised by the issues under review. The Commission vacated certain portions of the ID, including those concerning the Hitachi respondents, and determined not to review the remainder of the ID, which thereby became the determination of the Commission. The Commission also requested written submissions concerning the questions of remedy, bonding, and the public interest. 52 Fed. Reg. 29077 (Aug. 5, 1987).

ACTION

Having reviewed the record in this investigation, including the written submissions of the parties concerning the specific questions raised by the issues under review, the Commission has determined to reverse the portion of the ID finding that the imported DRAMs manufactured by respondent Samsung Company, Ltd. infringe claims 16, 17, and 19 of U.S. Letters Patent 3,716,764, and the portion of the ID finding that U.S. Letters Patent 4,543,500 is unenforceable. The Commission has also determined that there is a single industry, efficiently and economically operated, in the United States, devoted to the production of DRAMs under claims 1, 2, 3, 4, 5, and/or 6 of U.S. Letters Patent 4,081,701, claims 6 and/or 7 of U.S. Letters Patent 4,543,500, claims 6 and/or 7 of U.S. Letters Patent 4,533,843, claims 16, 17, and/or 19 of U.S. Letters Patent 3,716,764, and claims 1, 2, and/or 3 of U.S. Letters Patent 3,940,747. In addition, the Commission has determined that the infringing imports manufactured by respondent Samsung Company, Ltd. have the effect and tendency to destroy or substantially injure an industry,

efficiently and economically operated, in the United States. Although the Commission has determined to affirm the ID in all other respects, it has made certain additional findings and adopted certain different and additional reasons for its conclusions. Thus, the Commission has determined that there is a violation of section 337 of the Tariff Act of 1930 in the unauthorized importation into the United States, and in their sale, of certain dynamic random access memories which infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, or claims 6 or 7 of U.S. Letters Patent 4,533,843, and which have the effect and tendency to substantially injure an industry, efficiently and economically operated, in the United States.

Having determined that there is a violation of section 337, the Commission considered the questions of the appropriate remedy, bonding during the Presidential review period, and whether public interest considerations preclude the issuance of a remedy. The Commission considered the submissions of the parties, comments received from members of the public and the U.S. Customs Service, and the entire record in this investigation. The Commission has determined to issue a limited exclusion order prohibiting the entry of infringing DRAMs of 64 and 256 kilobits (and any combination thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd., whether assembled or unassembled. The Commission's order also prohibits the entry of infringing DRAMs of 64 or 256 kilobits (and any combination thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor &

Telecommunications Co., Ltd. incorporated into a carrier of any form, including Single-Inline-Packages and Single-Inline-Modules, or assembled onto circuit boards of any configuration. The Commission has also determined to prohibit the entry of computers (such as mainframe, personal, and small business computers), facsimile equipment, telecommunications switching equipment, and printers containing infringing DRAMs of 64 or 256 kilobits (and any combination thereof such as 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd.

The Commission has also determined that the public interest factors enumerated in section 337(d) of the Tariff Act of 1930 (19 U.S.C. § 1337(d)) do not preclude issuance of such an exclusion order and that the bond during the Presidential review period should be in the amount of $0.22 per 64K DRAM and $0.52 per 256K DRAM.

ORDER

Accordingly, it is hereby ORDERED THAT--

1. Dynamic random access memories of 64 or 256 kilobits (or any combination thereof such as dynamic random access memories of 128 kilobits) manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd., or any of their affiliated companies, parents, subsidiaries, licensees, or other related business entities, or their successors or assigns (hereinafter "SAMSUNG"), that infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, and/or claims 6 or 7 of U.S. Letters Patent 4,533,843, whether assembled or unassembled are excluded from entry into the United States for the remaining terms of the patents, except under license of the patent owner or as provided by law;

2. Dynamic random access memories of 64 or 256 kilobits (or any combination thereof such as dynamic random access memories of 128 kilobits) manufactured by SAMSUNG, that infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, and/or claims 6 or 7 of U.S. Letters Patent 4,533,843, incorporated into a carrier of any form, including Single-Inline-Packages and Single-Inline-Modules, are excluded from entry into the United States for the remaining terms of the patents, except under license of the patent owner or as provided by law;

3. Dynamic random access memories of 64 or 256 kilobits (or any combination thereof such as dynamic random access memories of 128 kilobits) manufactured by SAMSUNG, that infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, and/or claims 6 or 7 of U.S. Letters Patent 4,533,843, assembled onto circuit boards of any configuration, including memory expansion boards, are excluded from entry into the United States for the remaining terms of the patents, except under license of the patent owner or as provided by law;

4. Computers (such as mainframe, personal, and small business computers), facsimile machines, telecommunications switching equipment, and printers, manufactured by SAMSUNG, containing 64K or 256K DRAMs (or any combination thereof such as dynamic random access memories of 128 kilobits) manufactured by SAMSUNG, that infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, and/or claims 6 or 7 of U.S. Letters Patent 4,533,843, are excluded from entry into the United States for the remaining terms of the patents, except under license of the patent owner or as provided by law;

5. Computers (such as mainframe, personal, and small business computers), facsimile machines, telecommunications switching equipment, and printers, containing 64K or 256K DRAMs (or any combination thereof such as dynamic random access memories of 128 kilobits), manufactured by SAMSUNG, that infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, and/or claims 6 or 7 of U.S. Letters Patent 4,533,843, are excluded from entry into the United States for the remaining terms of the patents, except under license of the patent owner or as provided by law;

6. Pursuant to procedures to be specified by the U.S. Customs Service, persons seeking to import products identified in paragraphs (2), (3), (4), or (5) of this Order shall, prior to the entry of such products into the United States, certify that they have made appropriate inquiry and thereupon state that to the best of their knowledge and belief any DRAMs incorporated into, assembled onto, or contained in such products are not covered by this Order;

7. The dynamic random access memories ordered to be excluded are entitled to entry into the United States under bond in the amount of $0.22 per 64K DRAM and $0.52 per 256K DRAM from the day after this Order is received by the President, pursuant to subsection (g) of section 337 of the Tariff Act of 1930, until such time as the President notifies the Commission that he approves or disapproves this action, but no later than 60 days after the date of receipt of this Order by the President;

8. Products identified in paragraphs (2), (3), (4), or (5) of this Order are entitled to entry into the United States from the day after this Order is received by the President, pursuant to subsection (g) of section 337 of the Tariff Act of 1930, until such time as the President notifies the Commission that he approves or disapproves this action, but no later than 60 days after the date of receipt of this Order by the President, under bond in the amounts identified in paragraph (6) of this Order. Persons importing such products shall certify to the best of their knowledge the number of DRAMs subject to this Order contained in such products, pursuant to procedures to be specified by the U.S. Customs Service;

9. The Commission may amend this Order in accordance with the procedure described in 19 C.F.R. § 211.57;

10. A copy of this Action and Order shall be served upon each party of record in this investigation; and

11. Notice of this Action and Order shall be published in the Federal Register.

By order of the Commission.

Kenneth R. Mason
Secretary

Issued: September 21, 1987

TABLE OF CONTENTS

Table of Abbreviations

ALJ.....	the presiding Commission administrative law judge (Judge Saxon)
C.A.F.C.....	U.S. Court of Appeals for the Federal Circuit
C.C.P.A.....	U.S. Court of Customs and Patent Appeals (one of the predecessor courts to the CAFC)
DRAM.....	dynamic random access memory device
IA(s).....	Commission investigative attorney(s)
ID.....	initial determination
K.....	kilobit
M.....	megabit
NEC.....	NEC Corporation
NECEL.....	NEC Electronics, Inc. (NEC's U.S. subsidiary)
PTO.....	U.S. Patent and Trademark Office
SIM.....	single-incline-module
SIP.....	single-incline-package
TI.....	Texas Instrument, Inc.
TI Ex.....	Texas Instrument, Inc. exhibits
Tr.....	transcript of evidentiary hearing

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of CERTAIN DYNAMIC RANDOM ACCESS MEMORIES, COMPONENTS THEREOF AND PRODUCTS CONTAINING SAME	Investigation No. 337-TA-242

COMMISSION OPINION ON VIOLATION, REMEDY, BONDING, AND PUBLIC INTEREST [1/]

INTRODUCTION

The Commission instituted this investigation on March 19, 1986, in response to a complaint filed on February 7, 1986, by Texas Instruments, Inc. (TI) of Dallas, Texas. The investigation is to determine whether there is a violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) and 19 U.S.C. § 1337a in the importation and sale of certain dynamic random access memories (DRAMs). [2/] The complaint alleged that such importation and sale by the nineteen named respondents constitute unfair methods of competition and unfair acts by reason of infringement of certain claims of ten U.S. patents owned by TI. The complaint further alleged that the effect or tendency of these unfair methods of competition and unfair acts is to destroy or

1/ See also, Additional Views of Chairman Liebeler and Vice Chairman Brunsdale, Dissenting Views of Commissioner Eckes and Commissioner Rohr on Remedy and Public Interest.

2/ Notice of investigation, 51 Fed. Reg. 9537 (March 19, 1986).

substantially injure an industry, efficiently and economically operated, in the United States.

On May 21, 1987, the presiding administrative law judge (ALJ) issued an initial determination (ID), finding that there is a violation of section 337 and 19 U.S.C. § 1337a in the importation and sale of certain DRAMs by two of the remaining respondents, and that there is no violation of section 337 and 19 U.S.C. § 1337a in the importation and sale of certain DRAMs by the other four remaining respondents. 3/ On July 24, 1987, 4/ the Commission ordered review of portions of the ID, vacated other portions of the ID, 5/ and determined not to review the remainder of the ID, which thereby became the determination of the Commission. 6/ The Commission requested written submissions responding to specific questions raised by the issues on review, as well as submissions concerning remedy, bonding, and the public

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3/ Of those four remaining respondents, two (Hitachi, Ltd. and Hitachi America, Ltd.) have since been terminated from the investigation on the basis of a license and settlement agreement. 52 Fed. Reg. 26577 (July 15, 1987).

4/ The original deadline for Commission review, July 10, 1987, was extended by the Commission. 52 Fed. Reg. 23631 (July 8, 1987).

5/ The Commission vacated those portions of the ID concerning the Hitachi respondents, based on the settlement agreement.

6/ 52 Fed. Reg. 29077 (Aug. 5, 1987). We note that some of the parties seem to have attempted to preserve issues for review by using such statements as "the ALJ made other erroneous findings which should be reviewed." Such statements do not properly raise issues in the manner specified in the Commission's rules. See 19 C.F.R. § 210.54(a)(1)(ii)-(iv). We further note that we relied on the fact that the parties abandoned certain issues when we made our determination to review only selected parts of the ID, and our present determination relies on the fact that the parties raised only limited challenges to the factual findings and legal conclusions contained in the ID.

interest. 7/

Having reviewed the record in this investigation, including the written submissions of the parties concerning the specific questions raised by the issues under review, the Commission has determined that there is a violation of section 337 of the Tariff Act of 1930 in the unauthorized importation into the United States, and in the sale, of certain dynamic random access memories manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd., which infringe claims 1, 2, 3, 4, 5, or 6 of U.S. Letters Patent 4,081,701, claims 6 or 7 of U.S. Letters Patent 4,543,500, or claims 6 or 7 of U.S. Letters Patent 4,533,843, and which have the effect and tendency to substantially injure an industry, efficiently and economically operated, in the United States.

The Commission has determined to issue a limited exclusion order prohibiting the entry of infringing DRAMs of 64 and 256 kilobits manufactured by Samsung Company, Ltd. and/or Samsung Semiconductor & Telecommunications Co., Ltd. The Commission has also determined that the public interest factors enumerated in section 337(d) of the Tariff Act of 1930 do not preclude

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7/ In addition to written submissions from the parties concerning the issues on review and the issues of remedy, the public interest, and bonding, the Commission received written submissions from the U.S. Customs Service, the Ministry of Trade and Industry of the Republic of Korea, and submissions from various companies which purchase and distribute DRAMs, and sell equipment and materials to DRAM producers.

issuance of such an exclusion order [8/] and that the bond during the Presidential review period should be in the amount of $0.22 per 64K DRAM and $0.52 per 256K DRAM.

PROCEDURAL HISTORY [9/]

This investigation was instituted on March 19, 1987, in response to a complaint filed by TI. [10/] TI complained of unfair acts and unfair methods of competition in the importation and sale of certain DRAMs, components thereof, and products containing the same, by reason of direct, contributory, and induced infringement of certain claims of eight U.S. product patents, and the manufacture abroad of the subject DRAM's in accordance with a method which, if practiced in the United States, would infringe certain claims of two U.S. process patents. [11/] The complaint alleged that these unfair acts and

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8/ See Dissenting Views of Commissioner Eckes and Commissioner Rohr on Remedy and Public Interest.

9/ Because of the length and complexity of the proceedings in this investigation, only those aspects of the procedural history which involved Commission determinations or which have been raised on review are discussed herein.

10/ Supplements to the complaint were filed on February 13, 27, and 28, 1986, in response to requests for further information and clarification by the Office of the General Counsel and the Office of Unfair Import Investigations (OUII).

11/ The ten patents at issue are U.S. Letters Patent 3,716,764, entitled Process for Encapsulating Electronic Components in Plastic (the '764 patent); U.S. Letters Patent 4,043,027, entitled Process for Encapsulating Electronic Components in Plastic (the '027 patent); U.S. Letters Patent 3,541,543, entitled Binary Decoder (the '543 patent); U.S. Letters Patent 3,940,747,

(Footnote continued on next page)

methods of competition have the effect or tendency to destroy or substantially injure an efficiently and economically operated domestic industry. The complaint, and the Commission's notice of investigation, named nineteen respondents. 12/ Nine Japanese respondents and the two Korean respondents allegedly engage in the manufacture and exportation to or importation into the United States of allegedly infringing DRAMs. Eight U.S. respondents allegedly

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(Footnote continued from previous page)
entitled High Density, High Speed Random Access Read-Write Memory (the '747 patent); U.S. Letters Patent 4,081,701, entitled High Speed Sense Amplifier for MOS Random Access Memory (the '701 patent); U.S. Letters Patent 4,543,500, entitled High Performance Dynamic Sense Amplifier with Voltage Boost for Row Address Lines (the '500 patent); U.S. Letters Patent 4,533,843, entitled High Performance Dynamic Sense Amplifier with Voltage Boost for Row Address Lines (the '843 patent); U.S. Letters Patent 4,249,194, entitled Integrated Circuit MOS Capacitor Using Implanted Region to Change Threshold (the '194 patent); U.S. Letters Patent 4,240,092, entitled Random Access Memory Cell with Different Capacitor and Transistor Oxide Thickness (the '092 patent); and U.S. Letters Patent 4,495,376, entitled Carrier for Integrated Circuit (the '376 patent).

12/ The nineteen respondents were: 1) Matsushita Electric Industrial Co., Ltd, a Japanese corporation; 2) Matsushita Electronics Corporation, a Japanese corporation affiliated with Matsushita Electric Industrial Co., Ltd.; 3) Matsushita Electric Corporation of America, a U.S. subsidiary of Matsushita Electric Industrial Co., Ltd.; 4) Hitachi, Ltd., a Japanese corporation; 5) Hitachi America, Ltd., a U.S. subsidiary of Hitachi, Ltd.; 6) NEC Corporation, a Japanese corporation; 7) NEC Electronics, Inc, a U.S. corporation affiliated with NEC Corporation; 8) Toshiba Corporation, a Japanese corporation; 9) Toshiba America, Inc., a U.S. subsidiary of Toshiba Corporation; 10) Mitsubishi Electric Corporation, a Japanese corporation; 11) Mitsubishi Electronics America, Inc., a U.S. subsidiary of Mitsubishi Electric Corporation; 12) Fujitsu, Ltd., a Japanese corporation; 13) Fujitsu Microelectronics, Inc., a U.S. subsidiary of Fujitsu Ltd.; 14) Sharp Corporation, a Japanese corporation; 15) Sharp Electronics Corporation, a U.S. subsidiary of Sharp Corporation; 16) OKI Electric Industry Company, Ltd., a Japanese corporation; 17) OKI America Inc., a U.S. subsidiary of OKI Electric Industry Company, Ltd.; 18) Samsung Company, Ltd., a Korean corporation; and 19) Samsung Semiconductor and Telecommunications Co., Ltd, a Korean subsidiary of Samsung Company, Ltd.

engage in the importation into and sale in the United States of allegedly infringing DRAMs.

Following institution, the investigation was referred to a presiding administrative law judge (ALJ). In response to a motion filed by the Toshiba respondents, on May 12, 1986, the ALJ issued an ID (Order No. 7) designating the investigation "more complicated." The Commission determined not to review that ID, which thereby became the determination of the Commission. 51 Fed. Reg. 22143 (June 18, 1986). The deadline for completion of the investigation was extended to September 21, 1987.

Neither the complaint nor the notice of investigation specified on the public record the patent claims and products involved in the allegations against each respondent. 13/ Instead, TI filed a confidential exhibit with the complaint 14/ indicating the specific claim(s) of each patent being asserted against each specific product of each respondent. During discovery, respondents were ordered to produce schematic drawings of their products which TI believed to be infringing. On May 9, 1986, TI filed a Supplement to Confidential Exhibit BC-1, in which it specified certain additional products of certain respondents which TI believed also infringed the patents in controversy. In addition, TI asserted in the Supplement that one of

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13/ Commissioner Eckes and Commissioner Rohr note that they have reservations concerning the failure of a complainant to specify on the public record the patent claims and products at issue in the complaint. Nothing in this investigation has satisfied them that this is appropriate, as a matter of Commission policy.

14/ Confidential Exhibit BC-1.

respondent NEC's [15/] products infringed U.S. Letters Patent 4,495,376 (the '376 patent), which previously had not been in issue with respect to any of NEC's products. NEC filed a motion to strike that portion of TI's Supplement which alleged infringement of the '376 patent by NEC, arguing that the inclusion of this allegation expanded the scope of the investigation, which could be done only by amendment of the complaint and notice of investigation. The ALJ granted NEC's motion. (Order No. 22, June 4, 1986). TI sought reconsideration, or in the alternative leave to appeal Order No. 22 to the Commission. The ALJ denied reconsideration, but granted leave to file an application for interlocutory review. (Order No. 36, June 17, 1986.) The Commission denied TI's application for interlocutory review. 51 Fed. Reg. 28988 (Aug. 13, 1986). Following issuance of the ALJ's final ID, TI appealed the ALJ's determination striking the allegation of infringement of the '376 patent by NEC.

The evidentiary hearing commenced on August 18, 1987. It was conducted in five segments, the first four devoted to the issues of patent validity and infringement, and the fifth devoted to the affirmative defenses and economic issues. The evidentiary hearing was concluded on February 6, 1987, and the record was closed on March 6, 1987. During the course of the proceedings before the presiding ALJ, thirteen of the respondents entered into settlement agreements with TI, and were terminated from the investigation.

15/ Respondents NEC (Japan) and its U.S. subsidiary NECEL, are sometimes collectively referred to as NEC.

On September 12, 1986, the Commission investigative attorney [16/] filed a motion requesting that the ALJ determine that the circumstances of the investigation warrant presentation of evidence and arguments to the ALJ concerning the issues of remedy, the public interest, and bonding. The ALJ determined that the ALJ did not have authority to act on the motion, but certified the motion to the Commission for resolution. (Order No. 143, September 25, 1987.) On January 8, 1987, the Commission determined that the ALJ should not be authorized to hear testimony or receive evidence concerning those issues. Commission Action and Order, January 15, 1987.

On November 20, 1986, TI and respondents Sharp Corporation and Sharp Electronics Corporation filed a joint motion to terminate the investigation as to those respondents on the basis of a license and settlement agreement. On December 23, 1986, the ALJ issued an ID terminating those respondents on the basis of the agreement. The Commission determined not to review that ID, which became the determination of the Commission. 52 Fed. Reg. 4393 (February 11, 1987).

On January 5, 1987, TI and respondents Fujitsu Limited and Fujitsu Microelectronics, Inc. filed a joint motion to terminate the investigation as to those respondents on the basis of a license and settlement agreement. On January 8, 1987, the ALJ issued an ID terminating those respondents on the basis of the agreement. The Commission determined not to review that ID,

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16/ Several attorneys from the Commission's Office of Unfair Import Investigations took part in the proceedings.

which became the determination of the Commission. 52 Fed. Reg. 4393 (February 11, 1987).

On January 28, 1987, TI and respondents Toshiba Corporation and Toshiba America, Inc. filed a joint motion to terminate the investigation as to those respondents on the basis of a license and settlement agreement. On February 5, 1987, the ALJ issued an ID terminating those respondents on the basis of the agreement. The Commission determined not to review that ID, which became the determination of the Commission. 52 Fed. Reg. 7495 (March 11, 1987).

On February 2, 1987, TI and respondents Matsushita Electric Industrial Co., Ltd., Matsushita Electronics Corp., and Matsushita Electric Corporation of America filed a joint motion to terminate the investigation as to those respondents on the basis of a license and settlement agreement. On February 12, 1987, the ALJ issued an ID terminating those respondents on the basis of the agreement. The Commission determined not to review that ID, which became the determination of the Commission. 52 Fed. Reg. 9554 (March 25, 1987).

On February 4, 1987, TI and respondents OKI Electric Industry Company and OKI America, Inc. filed a joint motion to terminate the investigation as to those respondents on the basis of a license and settlement agreement. On February 17, 1987, the ALJ issued an ID terminating those respondents on the basis of the agreement. The Commission determined not to review that ID, which became the determination of the Commission. 52 Fed. Reg. 9553 (March 25, 1987).

On February 6, 1987, TI and respondents Mitsubishi Electric Corporation and Mitsubishi Electronics America, Inc. filed a joint motion to terminate the

investigation as to those respondents on the basis of a license and settlement agreement. On February 17, 1987, the ALJ issued an ID terminating those respondents on the basis of the agreement. The Commission determined not to review that ID, which became the determination of the Commission. 52 Fed. Reg. 9553 (March 25, 1987).

On April 24, 1986, the NEC respondents filed a motion for summary determination terminating the investigation as to them. NEC argued that it had an implied license under the '500 and '843 patents, and hence could not infringe those patents, because of its express license from TI under U.S. Letters Patent 4,239,993 (the '993 patent). The '500 and '843 patents are the only patents in controversy asserted against NEC by TI. The '993 patent is not itself at issue in this investigation, but both the '500 and the '843 patents are continuations of the '993 patent. The ALJ denied NEC's motion on the ground that there existed genuine issues of material fact which rendered summary determination inappropriate. (Order No. 16, May 24, 1986).

On September 3, 1986, respondent NEC filed a motion for summary determination, and respondent NEC Electronics filed an alternative motion for summary determination. At the September 22, 1986, session of the evidentiary hearing, the ALJ denied those motions, stating that because they were filed after the evidentiary hearing commenced on August 18, 1986, the motions were not in compliance with Commission rule 210.50 (19 C.F.R. § 210.50), which requires that dispositive motions be filed at least 30 days prior to commencement of the evidentiary hearing. On September 24, 1986, the NEC respondents filed a motion for reconsideration of the ALJ's denial. At the

October 6, 1986, session of the evidentiary hearing, the ALJ denied reconsideration. On October 9, 1986, the NEC respondents filed a request for leave to file an application for interlocutory review of the ALJ's ruling. The ALJ granted that motion on October 22, 1986. (Order No. 149). The Commission determined to deny NEC's application for interlocutory review. 52 Fed. Reg. 7496 (March 11, 1987).

On January 6, 1987, the NEC respondents again filed a motion requesting termination of the investigation as to them. NEC argued that it should be terminated from the investigation because: (1) the '500 and '843 patents (as noted, the only patents asserted against NEC) are invalid for double patenting; and, in the alternative, (2) NEC has an implied license under those two patents. On March 18, 1987, the ALJ issued an ID (Order No. 306) granting NEC's motion for termination on the ground that NEC has an implied license under the '500 and '843 patents, but rejecting NEC's double patenting defense. The Commission determined to review the ID and remanded it to the ALJ with instructions to issue an ID in conformity with rule 210.53(d) (19 C.F.R. § 210.53(d)) that included findings and conclusions necessary for the disposition of all material issues of fact, law, or discretion presented in the record with respect to NEC and the other respondents. 52 Fed. Reg. 13324 (April 22, 1987).

On March 20, 1987, the Hitachi respondents filed a motion to terminate the investigation as to them. Hitachi, like NEC, argued that it has an implied license under the '500 and '843 patents. Hitachi also argued, with respect to the '376 patent (the only other patent asserted against Hitachi),

that the DRAMs manufactured by Hitachi do not have a tendency to injure the domestic industry because Hitachi had discontinued making and selling the only DRAM's that TI had alleged infringe that patent. The ALJ issued an ID granting Hitachi's motion with respect to the '500 and '843 patents, and denying the motion with respect to the '376 patent. (Order No. 324, April 2, 1987). The issues and arguments raised by the Hitachi motion and the ID were almost identical to those involved in the NEC ID (Order No. 306). The Commission determined to review and remand the ID to the ALJ with instructions to issue an ID in conformity with rule 210.53(d) that includes findings and conclusions necessary for the disposition of all material issues of fact, law, or discretion presented in the record with respect to Hitachi and the other respondents. 52 Fed. Reg. 18030 (May 13, 1987).

On May 21, 1987, the ALJ issued what is by far the longest ID in Commission history. The ALJ carefully addressed the issues of patent validity and infringement involving the ten patents in controversy, and addressed the economic issues involving the respondents remaining in the investigation. In brief, the ALJ determined that there is a violation of section 337 in the importation and sale of certain DRAMs by respondents Samsung Company, Ltd. and Samsung Semiconductor and Telecommunications Co., Ltd. The ALJ further determined that there is no violation of section 337 in the importation and sale of certain DRAMs by respondents Hitachi, Ltd., Hitachi America, Ltd., NEC Corporation, and NEC Electronics, Inc.

On June 1, 1987, after the ALJ's final ID was issued, TI and respondents Hitachi, Ltd. and Hitachi America, Ltd. (the Hitachi respondents), filed a

joint motion with the Commission to terminate the investigation as to those respondents on the basis of a license and settlement agreement. The Commission determined to terminate the investigation with respect to those respondents. 52 Fed. Reg. 26577 (July 15, 1987.)

Following the receipt of petitions for review and responses thereto from all parties remaining in the investigation, the Commission, on July 24, 1987, determined to review certain portions of the ALJ's final ID:

1. Whether U.S. Letters Patent 3,716,764 is valid and infringed by the accused imports. Review was limited to the validity and infringement issues arising out of the interpretation of the term "central region" in the patent claims, and the question of infringement under the doctrine of equivalents.

2. Whether U.S. Letters Patent 3,940,747 is valid and infringed by the accused imports. Review was limited to the question of infringement under the doctrine of equivalents.

3. Whether U.S. Letters Patent 4,081,701 is valid and infringed by the accused imports.

4. Whether U.S. Letters Patent 4,543,500 (the '500 patent) and U.S. Letters Patent 4,533,843 (the '843 patent) are valid and infringed by the accused imports.

5. Whether respondent NEC Corporation is licensed under the '500 and '843 patents.

6. Whether complainant TI's activities, and those of its licensees, with respect to the patents in issue constitute an industry or industries, efficiently and economically operated, in the United States.

7. Whether the infringing imports have the effect or tendency to substantially injure a domestic industry or industries.

The Commission requested written submissions concerning specific questions raised by the issues under review. The Commission vacated certain portions of the ID, including those concerning the Hitachi respondents, and

determined not to review the remainder of the ID, which thereby became the determination of the Commission. The Commission also requested written submissions concerning the questions of remedy, the public interest, and bonding. 52 Fed. Reg. 29077 (Aug. 5, 1987).

GENERAL BACKGROUND [17/]

A dynamic random access memory or DRAM is a monolithic integrated memory circuit containing thousands of memory storage cells (bits), each of which usually contains a transistor and capacitor. A stored program can be created in the DRAM by charging selected capacitors. The storage cells in a DRAM are arranged in a rectangular array of columns and rows, which allows each cell to be accessed independently (random access). The electrical charge stored in the cells must be regenerated (or refreshed) both after being accessed, and periodically because of charge leakage. This required regeneration of the charge makes the device "dynamic," as opposed to other random access memory circuits, called static RAM's (SRAMs), which do not require refresh charges. DRAMs vary in the speed at which the storage cells can be addressed (access time), and in density (the number of capacitors per DRAM, expressed as multiples of 1,024 bits, called kilobits, abbreviated K).

DRAM design and production technology have evolved continually since the introduction of the 1K DRAM in 1970. Every several years, DRAM capacity has quadrupled, i.e., following the 1K DRAM, the 4K, 16K, 64K, and 256K DRAM, were

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17/ A brief technological history of the DRAM can be found in the ID at 30-41, and a glossary of terms can be found at Appendix B to the ID.

introduced, and in late 1985, the 1 megabit (1,024,000 bits, represented as 1M) DRAM was introduced into the U.S. market. Each of these succeeding capacity DRAMs is known as a "generation" by the industry.

The time between successive DRAM generations has become compressed. As higher capacity DRAMs are introduced, demand for lower capacity DRAMs declines. Thus, by 1986, sales of 16K DRAMs were small, sales of 64K DRAMs were declining, and 256K DRAMs were becoming the dominant generation. The ability of a DRAM manufacturer to compete depends on its ability to keep up with competitors both in developing new generation DRAMs and in bringing the new generation to market. This involves substantial research and development in DRAM design, structure, and function. It also involves a substantial investment in production technology and methods, and a substantial "ramping up" effort to bring production yields to a commercially viable level.

DRAM production can be divided into several basic manufacturing operations. The initial stage is the growth of a silicon crystal, which is then sliced thinly, and one surface is highly polished (silicon wafer or slice production). 18/ Onto this surface is imprinted the electrical circuitry which performs the DRAM's function. This process is known as wafer fabrication, and is the core of the "front end" operations of DRAM production. Wafer fabrication involves repeated photolithographic steps, and the implantation of impurities (doping) in precise dispositions on the silicon

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18/ Silicon wafers are used in the production of many other semiconductors in addition to DRAMs.

wafer to form the transistors, capacitors, and other functional electrical elements of the DRAM. Following wafer fabrication, each individual chip or "die" on the wafer is electrically tested, and defective dice are marked for discards. Finally, the dice are cut apart, and each functional die is wire bonded to a metal lead frame and encapsulated in, usually, a plastic or ceramic housing. After final electrical and environmental testing, the functioning DRAMs are ready for sale. The process of wire-bonding, encapsulating, and testing are referred to as the "back-end" operations. DRAM's are sold to a variety of intermediate producers, who make circuit boards, and to end-users, such as manufacturers of computers, computer peripherals, telecommunications equipment, and other electronic devices requiring a dynamic memory capacity.

APPEAL OF ORDER NO. 22 [19/]

TI has appealed the ALJ's determination striking the allegation of infringement of the '376 patent by NEC. NEC opposed TI's petition for review on this issue.

The action of the ALJ in granting NEC's motion to strike TI's allegations of infringement of the '376 patent is analagous in substance and effect to the denial of a motion to amend a complaint. Indeed, the ALJ specifically noted that, in view of the circumstances of the investigation, the ALJ was deciding the motion to strike by applying the standards applicable to a motion to amend

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19/ The history of Order No. 22 is detailed above at pages 6-7.

a complaint. [20/] The ALJ concluded that the rights of respondent NEC would be prejudiced by the requested amendment because NEC previously had not been charged with infringement of the '376 patent, the issues of validity and enforceability would require extensive discovery, additional expense, and considerable time, and there was very little time remaining to prepare for the evidentiary hearing.

The Commission has been reluctant to second guess ALJ decisions on whether to allow amendment of a complaint. [21/] In this case, we agree with the ALJ that the appropriate standard for assessing NEC's motion is the standard for amendment of a complaint set forth in Commission rule 210.22(a). We believe that the ALJ's determination was correct, and therefore we affirm Order No. 22.

20/ Rule 210.22(a) provides that after institution, a complaint may be amended for good cause shown upon such conditions as are necessary to avoid prejudicing the public interest and the rights of the parties to the investigation by a change in the scope of the investigation which results from such amendment.

21/ This is particularly true when the ALJ has denied an amendment because too little time remains to prepare new claims for trial. In one recent case, the Commission reversed an ID granting a motion to amend a complaint adding new respondents, in part because insufficient time remained before the evidentiary hearing to allow the new respondents to prepare adequately for the hearing. Certain Miniature Hacksaws, Inv. No. 337-TA-237 (Commission Action and Order, July 14, 1986).

THE UNFAIR ACT -- PATENT ISSUES

The '764 Patent: Process for Encapsulating Electronic Components in Plastic [22/]

I. Background

U.S. Letters Patent 3,716,764 (the '764 patent) issued on February 13, 1973, and is assigned to TI. Claims 16, 17, and 19, the claims at issue, claim a process for manufacturing semiconductor devices. [23/] The ALJ found claims 16, 17, and 19 of the '764 patent valid, and infringed by Samsung under the doctrine of equivalents. The Commission determined to review the ALJ's findings of validity and infringement arising from the ALJ's interpretation of the term "central region" as it appears in the claims. [24/] On review, the Commission determines that the '764 patent is valid and not infringed. [25/]

II. Claim Construction

Claim construction is a question of law. [26/] The ALJ construed the claims based on the language of the claims, the specification, the prior art,

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22/ The patents at issue on review can be found in the Appendix to this opinion.

23/ A detailed description of the claimed invention is contained in the ID at 45-58.

24/ 52 Fed. Reg. 29077-9 (Aug. 5, 1987).

25/ Chairman Liebeler and Vice Chairman Brunsdale would affirm the ALJ's findings regarding validity and infringement of the '764 patent. See their Additional Views, infra.

26/ Fromson v. Advance Offset Plate, Inc., 720 F.2d 1565, 1569, 220 U.S.P.Q. 1137, 1142 (Fed Cir. 1983).

and expert testimony. 27/ On review before the Commission, TI argued that the ALJ interpreted the term "central region" as being the center portion of the lead frame where the semiconductor die and whisker wires are located. 28/ The IAs argued on review that the ALJ correctly interpreted the claims and did not interpret the term "central region" as being limited to the midpoints of the individual conductors. Rather, according to the IAs, the references in the ID to the term "midpoint" generally describe where the whisker wires are connected to the conductors. 29/ Samsung argued on review that the ALJ incorrectly construed the term "central region" as being the midpoint of the individual conductors. According to Samsung, the central region is the entire area enclosed in plastic.

The Commission concludes, based on the language of claim 16 that the term "central region" refers to the central region of the lead frame. The encapsulation process of claims 16, 17, and 19 of the '764 patent involves five steps. The first reference in the claims to the phrase "central region" is in clause 16(a) and expressly refers to "a central region of the assembly." 30/ The second reference to "central region" occurs in clause 16(b) and refers to the step of connecting a silicon wafer to one of the

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27/ ID at 52-110. Moeller v. Ionetics, Inc., 794 F.2d 653, 657, 229 U.S.P.Q. 992 (Fed. Cir. 1986).

28/ TI Submission on Issues Under Review at 4-5.

29/ Staff Response to Notice of Commission Decision Whether to Review Initial Determination, Specification of Issues for Review at 2.

30/ U.S. Letters Patent 3,716,764, col. 10, lines 40-41.

"conductor strips in the central region." [Emphasis added.] 31/ This clause refers to the requirement that the conductor strips be located in the central region of the assembly. Clause 16(c) is similar to clause 16(b) in that it refers to connecting electrodes on the wafer to the conductor strips that are at the central region. Clause 16(d) specifies that the central region of the assembly is enclosed in plastic to "surround the wafer and lead wires and part of the conductor strips." This clause describes the claimed process whereby the portion of the lead frame which contains the conductors and wafers, i.e., the central region, is encapsulated. Finally, the last step of the process, as claimed in clause 16(e), requires that the conductor strips be severed at "positions spaced from the central region to eliminate" the remainder of the metal sheet. The reference to central region in the severing step requires that the conductor strips extend from the encapsulated package for a sufficient distance to permit the conductors to be connected to a suitable receptacle. The Commission agrees with the ALJ that the central region could not include the entire area encased in plastic, 32/ as argued by Samsung, because the leads could not be severed at positions spaced from the central region as required by clause 16(e). 33/

Although the specification does not define the term central region, it describes the claimed process in detail. A careful reading of the

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31/ Id. col. 10, line 44-46.

32/ ID at 60.

33/ See Figures 8b, 8c, and 8d in the '764 patent.

specification supports the above definition of the term "central region." 34/ 35/

III. Validity

The Commission reviewed the ID's validity determination as it related to the interpretation of the "central region." The discussion of validity is limited accordingly. The Commission adopts the ALJ's findings of fact and conclusions of law to the extent they are not inconsistent with the Commission's determination.

Respondents argued that early semiconductor encapsulation work of IBM anticipated the claimed invention. The ALJ found that the prior work at IBM did not anticipate the claimed invention. Dr. Edward Wajda of IBM designed a miniaturized circuit that was encapsulated. One of Wajda's devices was comprised of encapsulated transistors and diodes suspended between leads of a frame. 36/ Wajda's device was made by cutting away a center portion of a metal sheet so that the strips did not extend over the entire sheet. 37/ The frame was shaped like two combs with the teeth extending toward each other.

The ALJ compared each process step enumerated in claim 16 with the prior

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34/ U.S. Letters Patent 3,716,764, col. 2, lines 29-36.

35/ See also ID at 61-62.

36/ See Matsushita Physical Exhibit H.

37/ ID at 67.

art process of Wajda. [38/] The ALJ found that Wajda's process would satisfy step (a) of claim 16. [39/] However, Wajda's process according to the ALJ did not satisfy steps (b) and (c) of claim 16 since Wajda encapsulated semiconductor wafers prior to attaching them to the conductor strips. [40/] According to the language of claim 16, Wajda's process did not "conductively connect one face of a semiconductor wafer to one of said conductor strips" or "conductively connect electrodes on the opposite face of the wafer to conductor strips." [41/] In Wajda's process, after the encapsulated semiconductors were attached to the device, the portion of the lead frame containing the semiconductors was then encapsulated, so that six strips (leads) extended from the side of the encapsulated package. Clause 16(d) is therefore satisfied by Wajda's process, as the ALJ found. The ALJ also found that the severing step of clause 16(e) was satisfied. [42/] In summary, the Commission concludes that the Wajda process does not anticipate the claimed invention because it does not disclose steps 16(b) and (c). Claims 17 and 19 are not anticipated because they are dependent on claim 16.

38/ A detailed description of Wajda's process and the ALJ's analysis is in the ID at 64–69.

39/ Id. at 68–69.

40/ ID at 65, Tr 1185, 1177–1180, Matsushita Physical Exhibit H.

41/ U.S. Letters Patent 3,716,764, col. 10, lines 44–49.

42/ ID at 70.

Respondents alleged that U.S. Letters Patent 3,348,105 [43/] (Doyle '105) anticipated or rendered obvious the claimed invention. Doyle '105 discloses an encapsulated semiconductor device. The semiconductor device (wafer) is soldered between the ends of two conductor strips. [44/] The ALJ determined that the Doyle '105 patent disclosed most of the elements claimed in the '764 patent, but that Doyle '105 did not disclose steps 16(b) and (c). With respect to step 16(b) the ALJ stated ——

> The '105 patent does not disclose "conductively connecting one face of a semiconductor wafer to one of said conductor strips in the central region" because it teaches the soldering of a semiconductor device between two conductor leads at the ends of the two leads, not in the center or midpoint of the conductor. [45/]

The Commission disagrees with the ALJ's determination that step 16(b) is not satisfied by Doyle '105 because Doyle '105 shows soldering a wafer between two conductor leads in the central region of a lead frame. [46/] Although Doyle '105 discloses clause 16(b), the Commission agrees with the ALJ's finding that Doyle '105 does not anticipate claim 16 of the '764 patent because Doyle '105 does not show step 16(c). [47/] Step 16(c) requires that separate lead wires connect one face of the semiconductor wafer to one of the

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43/ Matsushita Exhibit 101.

44/ Matsushita Exhibit 101.

45/ ID at 74.

46/ Solder conducts electricity.

47/ ID at 74.

conductor strips and Doyle '105 does not disclose using a separate lead wire. 48/

The ALJ determined that Doyle '105 disclosed claim steps 16(d) 49/ and 16(e). In summary, Doyle '105 does not anticipate claim 16 because it does not disclose claim step 16(c). The ALJ also concluded that claims 17 and 19 were not anticipated by Doyle '105, because they are dependent on claim 16.

Respondents argued that the TI X-386 transistor 50/ anticipated the '764 patent under 35 U.S.C. § 102(b) because it was sold by TI more than one year before the effective filing date of the '764 patent. 51/ According to respondents, the process used to produce the TI X-386 transistor is the same as that of claim 16. Therefore, if the TI X-386 transistor was in commercial use prior to the effective filing date of the '764 patent, the '764 patent would be invalid. The ALJ found that the TI X-386 transistor was not sold or used by anyone except TI prior to the critical filing date. 52/ The Commission expressly adopts that finding. The Commission, however, does not

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48/ Id.

49/ On page 74 of the ID the ALJ stated that "[t]he elements of claim 1(d) [sic] are disclosed in the '105 patent." We assume that this is typographical error and that the ALJ meant "claim 16(d)."

50/ The TI X-386 transistor was an experimental transistor made by TI according to a manual process. See TI Ex. 40 F.

51/ Respondents' Post-hearing Memorandum as to the Invalidity of U.S. Patent No. 3,716,764 at 23-24, and Respondents' Proposed Post-hearing Findings of Fact and Conclusions of Law as to the Invalidity of U.S. Patent No. 3,716,764, FF 160-161, 166.

52/ ID at 88.

adopt that portion of the ID discussing the TI X-386 transistor and section 102(f). 53/ 54/

Based on the above analysis and the analysis in the ID, the Commission determines that the claimed invention is not anticipated. The Commission adopts the ALJ's determination that the invention of the '764 patent is nonobvious and adopts the ID with respect to that issue.

IV. Infringement

TI alleges that Samsung's DRAM encapsulation process infringes claims 16, 17, and 19 of the '764 patent. The ALJ determined that Samsung's process infringes those claims under the doctrine of equivalents. 55/ The Commission determined to review only the issue of whether Samsung's process infringes the '764 patent under the doctrine of equivalents. 56/

For the reasons given below, the Commission reverses the ALJ's conclusion regarding infringement and determines that the Samsung DRAMs at issue do not infringe the '764 patent. 57/

53/ 35 U.S.C. § 102(f)(1982).

54/ ID at 90.

55/ The ALJ's discussion of infringement is contained in the ID at 110-122.

56/ 52 Fed. Reg. 29077 (Aug. 5, 1987).

57/ Chairman Leibeler and Vice Chairman Brunsdale do not join in this portion of the opinion. See note 25 supra.

A. Samsung's Process

The steps used by Samsung to encapsulate its DRAMs was fully described in the ID. 58/ The Commission adopts that description for purposes of the following analysis. The relevant steps in Samsung's encapsulation process are summarized below.

At the start of Samsung's encapsulation process, the DRAM to be encapsulated is attached to a "die pad" which is connected to the lead frame used in the process. Whisker wires are used to connect the DRAM to the conductors which comprise the lead frame. After the DRAM is connected to the die pad and the whisker wires are connected between the conducting leads and the DRAM, the lead frame is placed in a mold. Encapsulating fluid is then injected into the mold. After the encapsulating fluid hardens, a trimming device severs part of the conductors to form separate finished DRAMs. As part of the severing step, the die pad support arms are severed, so the die pad cannot be electrically connected to any outside circuit.

B. Analysis

The doctrine of equivalents is a judicially created doctrine which insures that a party that does not literally infringe a patent is prevented from "stealing the benefit of the patent" by making a device containing only minor changes to the patented device. The Supreme Court has stated that an accused device or process that does not literally infringe a claim may be found to infringe that claim if the accused device or process "performs

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58/ ID at 111-115. See also ID at 153-156 (description of Samsung's encapsulation process in the context of the '027 patent).

substantially the same function in substantially the same way to obtain the same result" as the claimed product or process. Graver Tank & Mfg. Co. v. Linde Air Products Co., 339 U.S. 605, 608 (1950). 59/

In examining the range of equivalents to which an invention is entitled, the fact-finder must look at the prosecution history of the patent, the pioneer/non-pioneer status of the invention, and the prior art. D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 1575, 225 U.S.P.Q. 236, 239 (Fed. Cir. 1985). If the fact-finder finds that the accused process fails to meet one prong of the "function, way, result" test, then the fact-finder cannot find infringement under the doctrine of equivalents. Sealed Air Corp. v. U.S.I.T.C., 645 F.2d 976, 984, 209 U.S.P.Q. 469, 476 (C.C.P.A. 1981). In analyzing the "way" in which a function is performed, the fact-finder must look closely at all of the limitations contained in the claims. Perkin-Elmer Corp. v. Westinghouse Electric Corp., 822 F.2d 1528, 1533, 3 U.S.P.Q. 2d 1321, 1325 (Fed. Cir. 1987).

In order to analyze whether Samsung's encapsulation process as a whole is equivalent to the process claimed in the '764 patent, the Commission may limit its discussion to only a few claim limitations if those claim limitations demonstrate that Samsung's process does not satisfy the "function, way, result" test. See, e.g., Perkin-Elmer, 822 F.2d at 1533, 3 U.S.P.Q. 2d at 1325. The Commission only examines the limitations discussed below, because

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59/ This test will be referred to in the remainder of this opinion as the "function, way, result" test.

those limitations show that Samsung's process does not perform substantially the same functions claimed by the '764 patent in substantially the same way as claimed by the '764 patent.

The limitations that the Commission will examine are: (a) the step of connecting the semiconductor device to a conductor; (b) the existence of a side piece; and (c) the severing step. In the following analysis, the Commission adopts most of the ALJ's basic factual findings, since the Commission's examination of the record in light of the parties' petitions for review leads the Commission to conclude that those factual findings are supported by the record.

(a) The step of connecting the semiconductor device to a conductor — Clause (b) of claim 16 of the '764 patent requires:

> conductively connecting one face of a semiconductor wafer to one of said conductor strips in the central region . . . .

Claim 16(b) (emphasis added). The ALJ found that the die pad used in Samsung's encapsulation process "is not a 'conductor strip' as [that term is] used in the claims." 60/

In reaching that conclusion, the ALJ found that a "conductor" is a piece of metal which provides an electrical connection between the semiconductor device, such as a DRAM chip, and circuitry which is outside of the

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60/ ID at 119 (emphasis added).

chip. 61/ The ALJ, however, went on to state that although the die pad was not a conductor, the die was conductively connected to conductor strips in the central region, and so the Samsung process was the equivalent of the claimed process.

In its petition for review TI asserts that the ALJ incorrectly found that the die pad is not a conductor. TI's assertion, however, is incorrect. Under TI's interpretation any conductive strip could serve as a conductor, whether or not it would attach the DRAM to any outside circuitry. However, the prior art showed methods for encapsulation which did not involve attaching a semiconductor device directly to a conductor strip connected to the outside circuitry. Thus, one of the points of novelty of the '764 patent was its requirement that the semiconductor device be attached to a conductor strip connected to the outside circuitry. In light of the prior art, TI's interpretation of the term "conductor strip" is too broad. Moreover, the ALJ found that the DRAMs in Samsung's processes are conductively connected to the die pad in order to provide a reverse bias voltage circuit, rather than to connect the DRAM to the outside circuitry. 62/ Using the the die pad in this manner was neither claimed nor taught by the '764 patent.

As noted above, a fact-finder must look to the claim limitations of a patent in order to determine whether an accused process performs substantially the same function in substantially the same way as that claimed in the patent

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61/ ID at 118.

62/ ID at 113.

at issue. Perkin-Elmer, 822 F.2d at 1533, 3 U.S.P.Q. 2d at 1325. Here, the claims of the '764 patent require that one face of the DRAMs at issue be connected to a conductor strip connected to the outside circuitry. The die pad is not such a conductor strip. The die pad is not equivalent to the conductor strips claimed in the '764 patent, because Samsung's die pad performs a different function (i.e., creation of a reverse bias voltage circuit) than that performed by the "conductor strip" claimed in the '764 patent (i.e., a connection to the outside circuitry).

The conclusion that the die pad is not equivalent to a conductor strip could also be reached by stating that Samsung's process performs the same function (i.e., conductively connecting the DRAM to a strip) but in a different way (i.e., to a strip which is not a "conductor"). In any event, the Commission finds that this difference between Samsung's encapsulation process and the process claimed in the '764 patent means that the accused process is not the equivalent of that claimed in the '764 patent.

(b) The existence of a side piece — Clause (a) of claim 16 of the '764 patent states in pertinent at part:

> a substantially flat metal sheet having recesses therein which divide the sheet into a plurality of conductor strips which are spaced apart from one another for at least a major part of their lengths and which are joined together at at least one of their ends by at least one side piece which is spaced from the central region of the assembly . . . .

Claim 16(a) (emphasis added). The ALJ found that the "dam bars" used in Samsung's encapsulation process are not side pieces "because they are not at 'at least one of the ends of the conductor strips.'" 63/ The ALJ, however,

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63/ ID at 120. See also Samsung Exhibit 14 (illustrating a "dam bar").

went on to find that Samsung's dam bars were equivalent to the claimed side piece.

In its petition for review TI did not question the ALJ's finding regarding the nonexistence of the side piece in the Samsung process, even though that finding precluded a finding of literal infringement and even though TI sought reversal of the ALJ's finding that there was no literal infringement. Thus, TI may be deemed to agree with the ALJ that the dam bars are not side pieces as defined by the '764 patent. 64/

Moreover, the Commission finds that the dam bars do not function in substantially the same way as the side piece claimed in the '764 patent. The side piece in the process claimed in the '764 patent is used to hold the conductor strips in place during encapsulation by connecting the conductor strips "at at least one of the ends of the conductor strips." The use of a side piece also allows a single piece of metal to be used in the encapsulation process.

While the dam bar also helps hold the conductor strips or "leads" in place, it does so by connecting the middle sections of the leads. 65/ The ends of the leads of one lead frame are joined to the ends of the leads in a neighboring lead frame, rather than to the dam bar. 66/ The dam bars also serve the function of forming a "dam" during the injection of the

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64/ 19 C.F.R. § 210.54(a)(2).

65/ ID at 111.

66/ Samsung Physical Exhibits A, B, and O.

encapsulation fluid, thus keeping the encapsulating fluid from flowing outside of the proper boundaries. 67/

The dam bars used in Samsung's encapsulation process therefore perform a different function—providing a dam during encapsulation—from that of the side piece claimed in the '764 patent. Moreover, the dam bar performs the function of "joining the conductor strips" in a different way--by connecting the conductor strips in the middle—than the side piece claimed in the '764 patent. Indeed, if any part of Samsung's process can be said to perform the "joining" function in a substantially the same way as the side piece, it is the leads in the neighboring lead frames. 68/ The Commission therefore finds that the Samsung process does not contain an element which is "equivalent" to the side piece claimed in the '764 patent.

(c) The severing step — The severing step is described in clause (e) of claim 16 of the '764 patent which requires:

> [S]evering the conductor strips at positions spaced from the central region to eliminate the remainder of the sheet including the side piece.

Claim 16(e) (emphasis added). The ALJ found that the Samsung process included

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67/ ID at 154.

68/ Such neighboring leads are also not equivalent to the side piece claimed in the '764 patent. The neighboring leads are not equivalent because they perform a different function (the neighboring leads are useful conductors in other DRAMs rather than merely joining pieces) in a different way (the neighboring leads are narrow strips that lie in the same direction as the reference leads rather than being at right angles to those leads) to obtain a different result (after the severing step a separate DRAM is formed rather than a piece of scrap metal).

the claimed severing step. 69/

As noted above, however, the Commission finds that the Samsung encapsulation process does not use a side piece or the equivalent of a side piece. Therefore, the limitation in clause (e) cannot be fully met by the Samsung process.

In light of the above discussion, the Commission finds that several elements (or their equivalents) of the '764 claims are not found in the Samsung process. 70/ Therefore, after examining Samsung's process in its entirety, the Commission finds that the Samsung encapsulation process does not perform substantially the same function in substantially the same way to obtain the same result as the process claimed in the '764 patent.

C. Conclusion regarding the '764 patent

The Commission reverses the ID's conclusion regarding infringement under the doctrine of equivalents, and determines that the Samsung encapsulation process at issue does not infringe claims 16, 17, and 19 of the '764 patent under the doctrine of equivalents.

The '747 Patent: High Density, High Speed Random Access Read-Write Memory

The '747 patent relates to the overall structure of a DRAM which uses one

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69/ ID at 121.

70/ Although the Commission has not explicitly discussed claims 17 and 19, the above discussion applies equally to those claims because those dependent claims incorporate the limitations in question.

transistor memory cells. [71/] TI alleges that Samsung's 64K, 128K, and 256K DRAMs infringe claims 1, 2, and 3 of the '747 patent. The ALJ found that Samsung's DRAMs do not infringe the '747 patent. The Commission determined to review only that part of the ID relating to infringement under the doctrine of equivalents. [72/] In so doing, the Commission gave particular consideration to TI's arguments regarding prosecution history estoppel and the application of the doctrine of equivalents to the '747 patent. For the reasons stated below, the Commission affirms the ALJ's conclusion that the Samsung's DRAMs at issue do not infringe the '747 patent.

Prosecution History Estoppel -- The ALJ concluded that prosecution history estoppel prevents claim 1 of the '747 patent from covering sense amplifiers which do not have one means for performing both sensing and refreshing (restoring) and which do not include dummy cells. [73/] TI disputed this conclusion and argued that the ALJ's interpretation of the '747 patent claims impermissibly limits the '747 patent to the embodiment in the specification.

In the patent application which became the '747 patent, TI originally submitted 27 claims to the PTO. [74/] All of the original claims were rejected as vague and indefinite under 35 U.S.C. § 112, and original claims 1,

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71/ A description of the '747 patent is contained in the ID at 241-253.

72/ 52 Fed. Reg. 29077 (Aug. 5, 1987).

73/ ID at 190.

74/ TI Ex. 603 at 22-27.

2, and 3 were also rejected as anticipated under 35 U.S.C. § 102. TI amended original claims 1, 2, and 3, by submitting an amendment which replaced those three claims with a single amended claim 1. 75/ In amending claim 1, TI changed the original limitation requiring a "sense amplifier means" to a limitation requiring a single "sense and refresh amplifier means" (emphasis added). TI also added the limitation that the sense and refresh amplifier means include "two dummy cells." The ALJ found that this prosecution history estopped TI from covering DRAMs with separate sense and refresh amplifier circuits or without dummy cells.

In its petition for review TI argued that the limitations of original claim 3 were added to claim 1 simply to overcome the indefiniteness rejection. Thus, TI argues, no estoppel should have been found.

TI's argument is incorrect, since original claim 3 was rejected as both indefinite and anticipated. 76/ Moreover, in amending original claim 1, TI stated:

> Claims 1, 2 and 3 (now Claim 1) were rejected as anticipated by Stein et al, Tu, or the IEEE Journal article. The claim is distinguished by reciting the means for providing read-in and write-out operations in the manner described; this is not set out by Stein et al in their patent or in their publication, nor in Tu.

TI Ex. 603 at 49 (emphasis added). See also ID at 289. Thus, TI explicitly acknowledged that its amended claim 1 was amended to overcome the prior

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75/ TI Ex. 603 at 46-47. After a further amendment, amended claim 1 ultimately became claim 1 of the '747 patent.

76/ TI Ex. 603 at 39. The PTO examiner cited three prior art references in making the section 102 rejection — a Stein patent, a Stein article, and a Tu patent. Id. at 43.

art, 77/ and so the amendments added to the claims work an estoppel as found by the ALJ. Mannesmann Demag Corp. v. Engineered Metal Products Co., 793 F.2d 1279, 1284, 230 U.S.P.Q. 44, 48 (Fed. Cir. 1986).

The ALJ properly interpreted the prosecution history as requiring that a single sense and refresh amplifier means and dummy cells be included in any infringing device. Contrary to TI's argument, this does not mean that the ALJ limited the '747 patent to its specification. Instead, it means only that the range of equivalents covered by the '747 patent does not include devices which do not have a single sense and refresh amplifier means and dummy cells.

Doctrine of Equivalents -- The ALJ's determined that Samsung's DRAMs do not infringe the '747 patent under the doctrine of equivalents. The Commission adopts the analysis contained in the ID on this issue.

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TI contends that the ALJ erred on two counts in concluding that Samsung's 64K and 128K DRAMs do not infringe the '747 patent under the doctrine of equivalents. 78/ First, [ ]

77/ The Commission notes that if TI did not mean to amend claim 1 so that all of the additional limitations of amended claim 1 were added to overcome the prior art, it should not have used the language quoted above. TI is bound by its choice of language, and so cannot now argue that it did not add certain limitations to overcome the prior art.

78/ TI's Petition for Review of the Initial Determination at 58-59.

[ ] [79/] [ ] Second, TI contends that the ALJ erred by not comparing the accused Samsung DRAMs as a whole to the claims at issue. Both of these objections can be resolved by analyzing whether Samsung's 64K and 128K DRAMs as a whole perform substantially the same function in substantially the same way to obtain the same result as the DRAMs claimed in the '747 patent. Graver Tank Mfg., Co. v. Linde Co., 339 U.S. 605, 608 (1950).

Claim 1, clause (d) of the '747 patent states in pertinent part:

> a plurality of sense and refresh amplifier means, . . . each [sense and refresh] amplifier means including two dummy storage cells, each storage cell being directly coupled to a different one of the same portions of each data line, ...

Claim 1(d) (emphasis added).

The ALJ found that Samsung's 64K and 128K DRAMs [ ] [80/] Moreover, as noted above, the Commission determines [

] [81/]

79/ The function of the dummy storage cells is to provide a reference voltage for determining whether a stored voltage represents a logical "1" or a logical "0."

80/ ID at 295.

81/ TI contends that this conclusion is in error. See TI's Petition for

(Footnote continued on next page)

The ALJ also found that Samsung's 64K and 128K DRAMs [

] 82/ [

] 83/

[

] When

taken together, those two findings fully support the conclusion that the Samsung 64K and 128K DRAMs are not equivalent to the DRAMs claimed in the '747

(Footnote continued from previous page)
Review of the Initial Determination at 56. II's argument, however, concentrates only on the patent claims. Under 35 U.S.C. § 112, paragraph 6, means-plus-function claims, such as the claims of the '747 patent, cannot be read in isolation. Instead, such claims must be read in conjunction with the patent specification.

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82/ ID at 296. [

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83/ [

] Cf. Perkin-Elmer Corp. v. Westinghouse Electric Corp., 822 F.2d 1528, 1533-1534, 3 U.S.P.Q. 2d 1321, 1325 (Fed. Cir. 1987).

patent. The Commission therefore affirms the ALJ's conclusion that Samsung's 64K and 128K DRAMs do not infringe the '747 patent under the doctrine of infringement.

The ALJ found that Samsung's 256K DRAM [

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TI contends that the ALJ's analysis regarding Samsung's 256K DRAM contains two errors. First, [

] 84/ Second, TI contends that the ALJ erred by not examining the 256K DRAM in its entirety when determining that the DRAM did not infringe the '747 patent. The Commission, however, finds that there is no error in the ALJ's analysis with respect to either point.

[

] 85/ [

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84/ TI's Petition for Review of the Initial Determination at 57-59.

85/ ID at 301-302.

[ ] 86/ [

] When taken together, those two findings support the conclusion that the Samsung 256K DRAMs are not equivalent to the DRAMs claimed in the '747 patent. The Commission therefore affirms the ALJ's conclusion that Samsung's 256K DRAM does not infringe the '747 patent under the doctrine of infringement.

Conclusion regarding the '747 patent

The basic factual findings and the legal analysis in the ID regarding infringement of the '747 patent are correct. The Commission, therefore, adopts the ID and affirms the ID's conclusion that Samsung's 64K, 128K, and 256K DRAMs do not infringe claims 1, 2, and 3 of the '747 patent under the doctrine of equivalents.

86/ [

] Cf. Perkin-Elmer, 822 F.2d at 1533-1534, 3 U.S.P.Q. 2d at 1325.

The '701 Patent: High Speed Sense Amplifier for MOS Random Access Memory

The '701 patent is an improved sense amplifier for a DRAM using one transistor memory cells. 87/ TI alleges that Samsung's 64K, 128K, and 256K DRAMs infringe claims 1-6 of the '701 patent. The ALJ found that Samsung's DRAMs infringe the '701 patent both literally and under the doctrine of equivalents. The Commission determined to review only the issue of whether Samsung's DRAMs infringe the '701 patent. 88/ The Commission affirms the ALJ's conclusion that the Samsung DRAMs at issue literally infringe the '701 patent, but vacates the ALJ's findings regarding infringement under the doctrine of equivalents.

The ID does not include findings on "all material issues of fact" regarding the issue of infringement because it does not contain specific findings regarding whether all elements of the '701 patent are found in Samsung's DRAMs. 89/ Neither does the ID refer to any admissions or stipulations by the parties which would obviate the need for specific findings. The Commission has therefore determined to supplement the explicit factual findings which exist in the ID. 90/

87/ A discussion of the '701 patent is contained in the ID at 310-315.

88/ 52 Fed. Reg. 29077 (Aug. 5, 1987).

89/ Cf. 5 U.S.C. § 557(c) (1982) (the Administrative Procedure Act requires that an agency opinion contain findings on all material issues of fact).

90/ The Commission notes that in its petition for review, Samsung questioned

(Footnote continued on next page)

With respect to Samsung's 64K DRAM, [91/] the ALJ stated:

> Complainant offered testimony to prove that the 64K DRAMS literally infringed claims 1 through 6 of the '701 patent. (Tr. 9755-9769, Tr. 9498-9499, 9507; TI Exs. 2369, 2429.)
>
> After consideration of the testimony of the witnesses on both sides and the arguments of the parties, it is found that the Samsung 64K DRAM and the 128K DRAM contain each and every element of claims 1-6 or the equivalent.

ID at 378. The ALJ made similar statements about Samsung's 256K DRAM:

> The Samsung 256K DRAM, part number KM41256, is depicted in TI Exhibit 2205A. The Samsung 256K device literally infringes claims 1 through 6 of the '701 patent. (Tr. 9773-9793)
>
> * * *
>
> After consideration of the testimony and the arguments of the parties, it is found that each element of claims 1-6 or the equivalent is present in all of the Samsung DRAMs. (Tr. 9791-9792.)
>
> Complainant proved that the Samsung 256K DRAM literally infringes claims 1-6 of the '701 patent.

ID at 380, 382.

These statements indicate that after examining the evidence offered by all of the parties, the ALJ found the testimony of TI's two expert witnesses

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(Footnote continued from previous page)
the failure of the ID to contain findings regarding the timing and voltage level of certain voltage signals used in Samsung's 64K and 256K DRAMs. See Samsung's Petition for Review of the Initial Determination at 62, 65. Although Samsung did not raise the failure of the ID to contain other findings, and hence under the Commission's rules Samsung has abandoned those issues, the Commission has determined as a matter of policy to supplement the infringement analysis contained in the ID. This does not mean that the Commission is abrogating the general rule that all material issues not raised in a petition for review will be deemed to have been abandoned.

91/ Samsung's 128K DRAM is simply two 64K DRAMs stacked together. ID at 521. Therefore, only the 64K DRAM need be discussed.

to be the most credible. [92] Because the ALJ's conclusions were based on the ALJ's credibility determination, the Commission defers to the ALJ's conclusion.

TI submitted proposed annotated findings of fact regarding whether Samsung's DRAMs infringe the claims of the '701 patent at issue ("TI's Annotated Findings of Fact"), [93] and the Commission has determined to adopt TI's Annotated Findings of Fact numbers 161-172, 174-185, and 187-188 [94] and affirm the ALJ's finding of literal infringement. [95]

92/ The ALJ cited pages in the transcript of the evidentiary hearing which contain a series of questions by TI's counsel regarding whether the Samsung DRAMs contain each and every element of the claims of the '701 patent, and the step-by-step answers of TI's expert witnesses. Those questions and answers thoroughly explore all elements of the claims of the '701 patent at issue. Each of the claims was compared to exhibits showing the circuits and the timing diagrams for each of Samsung's DRAMs at issue, i.e., TI Ex. 2202A (the 64K DRAM) and TI Ex. 2205A (the 256K DRAM).

93/ See Annotated Complainant's Proposed Findings of Fact and Conclusions of Law as to NEC, Hitachi, and Samsung -- U.S. Patent No. 4,081,701 (March 6, 1987). The Commission notes that contrary to the full title of the above document, the annotated version regarding Samsung does not contain any proposed findings regarding NEC or Hitachi. Instead, the document is meant to provide a fully annotated version of an earlier version of TI's proposed findings of fact numbers 161-188 regarding Samsung's infringement of the '701 patent. See TI's Annotated Findings of Fact at 1.

94/ Such an explicit adoption of TI's Annotated Findings of Fact fully comports with the ALJ's credibility finding discussed above and comports with case law, especially since the ALJ provided "reasoned insights" into the case. See Anderson v. City of Bessemer City, North Carolina, 470 U.S. 564, 579 (1985); Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1375, 231 U.S.P.Q. 81, 86-87 (Fed. Cir. 1986), cert. denied, 107 S. Ct. 1606 (1987). See also 5 U.S.C. § 557(c) (1982) (the Administrative Procedure Act allows parties to file proposed findings of fact).

95/ In light of the Commission's adoption of TI's Annotated Findings of Fact and the Commission's determination that Samsung's 64K and 256K DRAMs literally infringe the '701 patent, the Commission determines not to make an alternative finding regarding infringement under the doctrine of equivalents. Graver Tank Mfg., Co. v. Linde Co., 339 U.S. 605, 607 (1950); Hughes Aircraft Co. v. United States, 717 F.2d 1351, 1361, 219 U.S.P.Q. 473, 480 (Fed. Cir. 1983). The Commission therefore vacates the ALJ's doctrine of equivalents finding. The Commission notes that two of TI's proposed findings of fact, numbers 173 and 186, contain conclusory statements regarding the doctrine of equivalents. See TI's Annotated Findings of Fact at 9, 15-16. Since the Commission does not reach the issue of infringement under the doctrine of equivalents, the Commission does not adopt those two findings.

Conclusion regarding the '701 patent

The factual findings discussed by the ALJ regarding infringement of the '701 patent are correct. The Commission therefore adopts those findings, as supplemented by certain of TI's Annotated Findings of Fact. The Commission also affirms the ID's determination that Samsung's 64K, 128K, and 256K DRAMs literally infringe the '701 patent. Having determined that the DRAMs at issue literally infringe the claims of the '701 patent, the Commission vacates the ID's determination regarding infringement under the doctrine of equivalents.

The '500 and '843 patents: Sense Amplifiers [96/]

I. Background

U.S. Letters Patent 4,543,500 (the '500 patent) was issued on September 24, 1985, and U.S. Letters Patent 4,533,843 (the '843 patent) was issued on August 6, 1985. Both the '500 and '843 patents relate to sense amplifiers for DRAMs and both grew out of the same parent patent, U.S. Letters Patent 4,239,993 (the '993 patent). [97/] The ALJ found the '500 patent valid but unenforceable, and the '843 patent valid and infringed with respect to claims 6 and 7. [98/] Respondents argued that the patents are invalid or unenforceable under 35 U.S.C. §§ 102 and 103, for TI's failure to file a

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96/ A detailed description of the '500 and '843 patents is contained in the ID at 383-532.

97/ Copies of the '500, '843, and '993 patents can be found in the Appendix.

98/ Claims 6 and 7 of the '500 and '843 patents, which differ somewhat, are set out in the ID at page 386.

supplemental oath, for double patenting, for TI's failure to disclose the best mode as required under 35 U.S.C. § 112, and for TI's practice of filing numerous continuation patent applications. Finally, NEC argued that it is licensed to practice both the '500 and '843 patents. The ALJ also found that NEC is impliedly licensed to practice both the '500 and '843 patents.

The Commission determined to review the ALJ's determinations of validity and infringement with respect to both patents. Having considered the record and the arguments of the parties, the Commission affirms the ALJ's conclusions regarding validity and infringement of both patents, reverses the ALJ's determination that the '500 patent is unenforceable, and affirms with modification the ALJ's conclusion that NEC is licensed under the '500 and '843 patents.

II. Claim Construction

1. The '500 patent claims

The claims 6 and 7 of the '500 patent claim the precharge voltage in relation to the pull-up means voltage. The ALJ determined that claims 6 and 7 of the '500 patent require that the precharge bit line voltage be equal to the pull-up voltage of the bit line. With respect to the word line voltage, the ALJ determined that the word line is boosted above the supply voltage. 99/ The Commission agrees with the ALJ's construction of the claims and adopts the ID with respect to construction of the '500 patent claims.

99/ ID at 393.

2. The '843 patent claims

The ALJ construed the claims of the '843 patent, based on the prosecution history and the prior art. 100/ According to the ALJ, the precharge voltage level in the device claimed in the '843 patent can be slightly less than the full supply voltage level (i.e., one threshold voltage below the supply voltage), but not low enough to be half of the supply voltage. The claims of the '843 patent are not broad enough to cover DRAMs that utilize mid-point sensing. 101/ The Commission agrees with the ALJ's construction of the claims and adopts the ID with respect to construction of the '843 patent claims.

III. Validity

The Commission expressly adopts the ALJ's determination of validity with regard to the '500 and '843 patents.

IV. Enforceability of the '500 Patent

During the early part of this investigation, TI contended in response to NEC/Hitachi Interrogatory No. 55 that the claims of the '500 patent should be construed as requiring that the word boost voltage level not be raised above the supply voltage level. After the portion of the evidentiary hearing on the '500 patent, TI moved to change its answer, contending that its earlier answer

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100/ ID at 410-427.

101/ ID at 426.

was erroneous (Motion No. 242-442). TI moved to change its construction of the '500 patent claims so that the claims were limited to DRAMs where the word boost voltage was raised above the supply voltage level. In its original answer to the interrogatory, and in its answer as amended, TI asserted two different positions regarding the scope of the claims of the '500 patent. NEC opposed TI's motion before the ALJ. In Order No. 297 the ALJ granted TI's motion to change its answer to NEC/Hitachi Interrogatory No. 55.

In the ID, the ALJ determined that the '500 patent was unenforceable with respect to NEC and Samsung because TI changed its interrogatory answer with regard to the scope of the claims of the '500 patent. Even though the ALJ permitted TI to change its interrogatory answer after the evidentiary hearing, the ALJ nevertheless found that Samsung and NEC "might" have presented a different case with respect to validity if they had been apprised of TI's revised contention earlier. 102/ Therefore, the ALJ concluded that NEC and Samsung "might" have been deprived of due process. 103/

On review before the Commission, TI alleged that the due process issue was not raised before the ALJ; that TI's position was clear at the hearing; and that the respondents were not prejudiced because there was considerable evidence, viz., the language of the claims, the prosecution history, the specification, and expert testimony, all indicating that TI's initial response to the interrogatory was incorrect. 104/

102/ ID at 414.

103/ Id.

104/ ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984), TI Ex. 2006, and Complainant's Reply Brief in Support of Motion to Amend its Answer, p. 37.

On review, respondents argued that they have been prejudiced by TI's change in position because they have been denied the opportunity to present additional evidence at the evidentiary hearing; that respondents did not put on any evidence regarding TI's revised scope of the claims; and that they would have sought additional discovery and the issue of claim interpretation would have been pursued much more thoroughly if it had been apprised of TI's changed contention earlier. 105/ 106/

The IAs argued that NEC's development of the record is an implied consent to TI's change and that NEC has not been prejudiced by TI's change in position so as to be deprived of due process of law. 107/

The Commission determines that NEC and Samsung were not prejudiced by TI's revision of its interrogatory answer so as to be denied due process of law. The Commission, therefore, reverses the ALJ's finding that the '500 patent is unenforceable with respect to NEC and Samsung.

Patent claim interpretation is a question of law. Parties are not bound to their interrogatory answer, as if their answers were admissions -- "Interrogatories do not supersede or supplement pleadings, nor do they bind parties as an allegation or admission in a pleading or pre-trial

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105/ Written Submissions of Respondents NEC Corporation and NEC Electronics, Inc. on Review of Initial Determination at 2-7.

106/ NEC did not address the impact of the prosecution history on claim interpretation. Rather, NEC argued that prosecution history estoppel is not available to a patentee; prosecution history estoppel is only applicable as a defense to patent infringement. Id. at 7-11.

107/ Staff Reply Brief on Review at 6.

order." [108/] Regardless of a party's response to an interrogatory, the construction of the claims must be reviewed for consistency with the testimony and other evidence offered at trial.

In the present investigation, TI and respondents NEC and Samsung were all in possession of the essential materials that would be used to construe the claims in dispute in this case — the claims themselves, the specification, the prosecution history, and expert testimony, if necessary. One of the most pertinent items of evidence in construing claims is the prosecution history. [109/] During the prosecution of the '500 patent, TI's patent attorney argued, in response to a PTO rejection under section 103, [110/] that the claimed invention differed from the prior art because the prior art did not show a DRAM sense amplifier in which the word line was boosted above the supply voltage. [111/] Specifically, TI stated that "the combined references do not meet the claims because the feature of boosting the word line voltage level above V_{dd} (the supply voltage) to store a higher voltage is not shown in either reference." [112/] This statement by TI indicates that it construed the '500 claims as requiring that the word line be boosted above the supply

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108/ Donovan v. Crisostomo, 689 F.2d 869, 875 (9th Cir. 1982).

109/ Moeller v. Ionetics, Inc., 794 F.2d 653, 229 U.S.P.Q. 992 (Fed. Cir. 1986).

110/ 35 U.S.C. § 103.

111/ NEC/Hitachi Exhibit 11, Amendment of Feb. 14, 1983, at 5.

112/ Id.

voltage level, V_{dd}. In short, the prosecution history showed that TI's original interrogatory answer was wrong.

An examination of the pretrial briefs filed by the parties demonstrates that respondents were aware of and litigated both alternative interpretations of the claims and thus they were not prejudiced by TI's changed answer. In its Trial Memorandum, filed on October 10, 1986, prior to the hearing on the '500 patent, TI commented that the Intel 2104a DRAM, an alleged item of prior art, did not show boosting the word line above the supply voltage, V_{dd}, thereby implying that the claims of the '500 patent are drawn to DRAMs which boost the word line above V_{dd}. 113/ Respondents, in their Trial Memorandum, filed on October 23, 1986, argued that:

> even if the language of [the '500 patent] were to be construed to be limited to means for boosting the word line address voltage above V_{dd}, these claims are invalid under 35 U.S.C. § 102(g) as anticipated by the Intel 2118 DRAM, the MOSTEK 4816 DRAM or the National 4295 DRAM. 114/

Based on the above trial memoranda, it is clear that respondents were aware of TI's alternative claim interpretations.

It is also clear that in preparing their invalidity defense, respondents were not relying on TI's original interrogatory answer as being the only possible claim construction. During the evidentiary hearing, respondents argued invalidity based on both alternative claim interpretations. First,

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113/ TI Trial Memorandum at 36-37.

114/ Trial Memorandum of Respondents as to Invalidity of U.S. Patents 4,543,500 and 4,533,843 at 27-28.

respondents argued that the claims, as originally interpreted by TI, were anticipated by the Intel 2104a DRAM, which precharged the bit line to a level slightly below the supply voltage level and did not boost the word line to a voltage higher than the supply voltage. 115/ Respondents offered alternative evidence that if the claims were interpreted as covering DRAMs which boosted the word line above the supply voltage level, then the claims would be invalid in view of several items of alleged prior art, i.e., the claimed invention would be invalid as anticipated and/or obvious. 116/ 117/ In addition, TI's expert, Dr. Foss, testified concerning the scope of the claims. 118/ This evidence supports TI's position that respondents were aware of TI's changed claim construction prior to the hearing.

In summary, the Commission concludes that respondents were not prejudiced by TI's correction of its answer to NEC/Hitachi Interrogatory No. 55, so as to be denied due process of law, and that the '500 patent is enforceable.

V. NEC's Licensing Defense

NEC argued that it is impliedly licensed under the '500 and '843 patents because of an express license under a related patent, U.S. Letters Patent

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115/ Tr 12261, line 11 – 18, and Tr 12263, line 24 to Tr 12264, line 4, and Tr 12331-348.

116/ The ALJ concluded that those items, the Mostek 4816 DRAM and National Semiconductor DRAM, were not prior art. ID at 434-450.

117/ Tr 12287, lines 13-25, NEC/Hitachi Exhibits 176, 177, NEC/Hitachi Exhibits 168, 169, and Tr 12507, lines 4-21.

118/ Tr 11119, line 20 to 11120, line 3.

4,239,993 (the '993 patent). TI argued that a disclaimer provision in the express license of the '993 patent (hereinafter referred to as the "'993 license") precludes the finding that NEC is licensed to practice the '500 and '843 patents. The ALJ determined that NEC is impliedly licensed under the '500 and '843 patents. On review, the Commission determines that NEC is licensed by TI to practice the '500 and '843 patents for several alternative reasons as explained below. NEC does not, therefore, infringe the '500 and '843 patents.

First, the terms of the '993 license necessitate the Commission's finding that NEC is also licensed under the '500 and '843 patents. In 1975, NEC and TI entered into a cross license agreement, i.e., the '993 license. 119/ In Article III of the '993 license TI granted NEC--

[

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The term LICENSED PRODUCTS is defined in Article I, Section 12 of the '993 license as [

] (Emphasis added.) Items (a) through (e) are [

] The 1975 Agreement was to be effective until [ ]

119/ NEC Exhibit 502

In [ ] TI and NEC amended the '993 license. [120/] Paragraph 2 at page 3 of the Amendment provided that [

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Usually, the grant of a license under a patent is expressed in terms of the claims of the patent. However, the '993 license was not written in terms of the claims. The parties' use of the term [ ] in the '993 license expands the license beyond merely the subject matter claimed in the '993 patent. If the parties had intended that the '993 license be restricted to the patent claims, the language should have reflected that intent. [

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The '500 and '843 patent applications were continuation applications of the '993 patent, and claimed the benefit of the filing date of the '993 patent. [121/] All three patents, thus, have the same specification. Under sections 120 and 121 of title 35, [122/] the '500 and '843 patents are

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120/ NEC Exhibit 503.

121/ The effective filing date of a patent application determines which references qualify as prior art with respect to that application. Thus, if a continuation application is entitled to the filing date of the parent application, any material that became public after the filing date of the parent application is not prior art under 35 U.S.C. § 102 with respect to that application.

122/ 35 U.S.C. §§ 120, 121.

entitled to the filing date of the '993 patent if the subject matter claimed in the '500 and '843 patents is disclosed in the specification of the '993 patent in accordance with section 112. In other words, the specification of the '993 patent must describe the inventions claimed in the '500 and '843 patents as required by section 112.

When TI filed the '500 patent application, it implicitly admitted that the inventions claimed in the '500 and '843 patents are supported by the specification of the '993 patent. At that time, TI described the invention of the '500 patent as follows:

> This continuation application [the '500 patent application] is directed to the subject matter as in amended claim 1 of the originally filed application [the '993 patent application], without certain clauses. 123/

TI made a similar statement when it filed the '843 patent application. 124/ For purposes of obtaining allowance of the '500 and '843 patents, TI argued before the PTO that the subject matter of the claims of the '500 and '843 patents was disclosed in the specification of the '993 patent. TI's representations to the PTO lead the Commission to conclude that the subject matter of the '500 and '843 claims is [ ] the licensed '993 patent. Thus, NEC is licensed under the '500 and '843 patents.

Second, the Commission determines that NEC is licensed under the '500 and '843 patents because the inventions claimed in the '500 and '843 patents are

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123/ NEC/Hitachi Exhibit 11.

124/ NEC/Hitachi Exhibit 12.

obvious variants of the invention claimed in the '993 patent, as the ALJ found. 125/ While this finding of the ALJ was made in connection with the ALJ's legal conclusion regarding the terminal disclaimers filed by TI with respect to the '500 and '843 patents, it is a factual matter and the Commission has considered this finding of the ALJ in connection with the language of the license. During the investigation, TI filed terminal disclaimers in order to overcome NEC's defense of obviousness type double patenting. The Commission does not believe it is appropriate to ignore the fact that had the Commission not determined that the terminal disclaimers effectively overcame NEC's double patenting defense, the '500 and '843 patents would be invalid for double patenting. 126/ As noted in the Commission's discussion of the terms of the '993 license, the term [ ] expands the '993 license to include devices (DRAMs) beyond merely those claimed in the '993 patent. At the very least, the '993 license extends to devices that are obvious variants of the invention claimed in the '993 patent. Since the devices claimed in the '500 and '843 patents are obvious variants of the invention claimed in the '993 patent, NEC is licensed under the '500 and '843 patents. 127/

125/ ID, Appendix C at 10-11.

126/ The ALJ found that the inventions claimed in the '500 and '843 patents were obvious variants of the invention claimed in the '993 patent. ID, Appendix C at 10-11.

127/ The Commission need not address the issue of whether the terminal

(Footnote continued on next page)

Third, the Commission determines that TI's filing of the terminal disclaimers to defeat NEC's defense of double patenting establishes that NEC is licensed under the '500 and '843 patents. The terminal disclaimers must be treated consistently when considering these two issues; if the terminal disclaimers are effective to defeat NEC's double patenting defense, they cannot be ignored when considering the licensing issue. The U.S. Court of Customs and Patent Appeals (the C.C.P.A.) has repeatedly held that terminal disclaimers are effective in overcoming obviousness type double patenting rejections. 128/ The C.C.P.A. stated that --

> When a terminal disclaimer causes two patents to expire together a situation is created which is tantamount for all practical purposes to having all the claims in one patent.

In re Braithwaite, 379 F.2d 594, 154 U.S.P.Q. 29, 34 (C.C.P.A. 1967).

The terminal disclaimers that TI filed in connection with the '500 and '843 patents include a common ownership provision that provides that the '500 and '843 patents will be enforceable only for and during such period as the '500 and '843 patents are commonly owned with the '993 patent. 129/ TI's

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(Footnote continued from previous page)
disclaimers are admissions of double patenting because the ALJ made a determination that if the terminal disclaimers had not been filed there would be obviousness type double patenting.

128/ In re Jentoft, 393 F.2d 633, 157 U.S.P.Q. 363 (C.C.P.A. 1968), In re Boylan, 392 F.2d 1017, 157 U.S.P.Q. 370 (C.C.P.A. 1968).

129/ The intent of the common ownership provision is to prevent different patents claiming patentably indistinct inventions from being separately

(Footnote continued on next page)

filing of the terminal disclaimers containing common ownership provisions in this investigation results in the '500, '843, and '993 patents being merged into one for the "practical purpose" of construing the '993 license. These actions of TI considered in light of the C.C.P.A.'s decisions, leads the Commission to conclude that NEC is licensed under the '500 and '843 patents.

As noted above, TI argued that a disclaimer provision [130/] in the '993 license precludes finding that NEC is licensed to practice the '500 and '843 patents. That provision states:

[

] [131/]

The Commission finds that the existence of the disclaimer provision does not preclude the finding that NEC is licensed. In the case of Green v. Aerosol Research Co. [132/] the Seventh Circuit found an implied license even though the express license contained a disclaimer similar to the one quoted above. The court interpreted the disclaimer as excluding subject matter of a substantially different nature and not devices already protected by the [other

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(Footnote continued from previous page)
asserted against accused infringers. In re Van Ornum, 214 U.S.P.Q. 761 (C.C.P.A. 1982).

130/ NEC Exhibit 503, Article IX, section 3.

131/ Id.

132/ Green v. Aerosol Research Co., 374 F.2d 791, 152 U.S.P.Q. 657, (7th Cir. 1967).

patent]." [133/] In view of all the facts surrounding the TI/NEC license, the Commission finds that the above-quoted disclaimer provision does not preclude the finding that NEC is licensed.

Fourth and finally, the Commission determines that NEC is licensed to practice the '500 and '843 patents as a matter of patent law. Generally speaking, if one has an express license to practice a patent, he gets an implied license to practice any other patent owned by the licensor that is necessary for the licensee to practice the patent expressly licensed. [134/] After analyzing the facts in this investigation in light of the Seventh Circuit's decision in Minnesota Mining & Mfg. Co. v. E.I. DuPont de Nemours & Co., [135/] the Commission agrees with the ALJ's conclusion that NEC is licensed as a matter of patent law.

In Minnesota Mining & Mfg., supra, the Seventh Circuit found an implied license after carefully analyzing an interference settlement agreement between 3M and DuPont. As part of the settlement agreement, 3M and DuPont cross-licensed each other under two specific patents. After the agreement was executed, 3M notified DuPont of a dominating 3M patent application, and subsequently sued DuPont for infringement of the dominating patent. DuPont argued that although the agreement did not expressly include the dominating

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133/ Green, 374 F.2d at 794.

134/ Einhorn, Patent Licensing Transactions, 1984 § 1.03[1].

135/ Minnesota Mining & Mfg. Co. v. E.I. DuPont de Nemours & Co., 448 F.2d 54, 171 U.S.P.Q. 11 (7th Cir. 1971)

patent, DuPont was impliedly licensed under the dominating patent. The court agreed with DuPont:

> Applying the policy of fairness underlying the doctrine of estoppel, courts have consistently held that it is inequitable for a licensor of a patent to negate the licensed right by asserting against the licensee a later-acquired dominating patent. 136/
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> * * *
>
> It is inconceivable that DuPont would have agreed to the terms of the agreement as written if it had been aware of the [dominating] application and the possibility of its maturing into a dominating patent. Yet 3M knew of this possibility, either actually or constructively, at the time the settlement agreement was signed, but remained silent. 137/

The ALJ found, using an analysis similar to the Seventh Circuit's analysis in 3M, that NEC is impliedly licensed to practice the '500 and '843 patents. The claims of the '500 and '843 patent are broader in scope than the claims of the '993 patent. Since the NEC DRAMs alleged to infringe the '500 and '843 patents satisfy all of the elements of claim 1 of the '993 patent under the doctrine of equivalents, NEC is practicing the '993 patent. 138/ Indeed, the ALJ specifically found that NEC's DRAMs practice the '500 and '843 patents. NEC cannot practice the '993 patent without infringing the '500 and '843 patents. To avoid an inequitable result, NEC must be found to be licensed under the '500 and '843 patents.

In summary, the Commissin affirms the ALJ's conclusion that NEC is licensed to practice the '500 and '843 patents for the reasons discussed above.

136/ 448 F.2d at 57, 171 U.S.P.Q. at 13.

137/ 448 F.2d at 58, 171 U.S.P.Q. at 14.

138/ ID, Appendix C, 6, ID at 685-691.

VI. Infringement [139/]

TI alleges that Samsung's 64K, 128K, and 256K DRAMs infringe claims 6 and 7 of the '843 patent and that Samsung's 256K DRAM infringes claims 6 and 7 of the '500 patent. The ALJ determined that Samsung's 256K DRAM literally infringes the two patents, while Samsung's 64K and 128K DRAMs do not infringe those patents. After reviewing the ID in light of both the record and the parties' petitions for review, the Commission has concluded that the ALJ's analysis is correct. The Commission, therefore, affirms the ALJ's determination that Samsung 256K DRAMs infringe both the '500 and '843 patents, while its 64K and 128K DRAMs do not infringe either patent.

139/ TI alleges that various NEC DRAMs infringe claims 6 and 7 of both the '500 and '843 patents. Because the Commission finds that NEC has a license to practice the '500 and '843 patents, the Commission need not determine whether NEC's DRAMs infringe the claims at issue of '500 and '843 patents. The Commission therefore vacates that part of the ID which deals with whether NEC infringes claims 6 and 7 of the '500 patent and claims 6 and 7 of the '843 patent.

THE DOMESTIC INDUSTRY

The term "domestic industry" for purposes of section 337 is not defined in the statute. However, the legislative histories of section 316 of the Tariff Act of 1922 and of section 337 of the Tariff Act of 1930 indicate that the intent of the statute is the protection of domestic manufacture of goods. 140/

The dynamic nature of contemporary manufacturing defies a static, snapshot approach to definition or determination of scope of a domestic industry. This is particularly so when the industry is one that is as competitive and dependent on evolving technology as the industry producing dynamic random access memories. However, the rapidly changing character of industry today is not limited to high technology products such as monolithic integrated memory circuits but is just as evident in the production of simple toys.

The Commission's industry determinations have evolved over six decades and by necessity have not adhered to any rigid formula. Nonetheless, while these determinations have been made regarding a myriad of industries, involving varying factual circumstances and rapid transformations in the nature of manufacturing, there are a series of common threads in the Commission's domestic industry analysis.

140/ 62 Cong. Rec. 5879; 71 Cong. Rec. 4638, 4648. Chairman Liebeler and Vice Chairman Brunsdale join in the Commission's discussion of domestic industry, but have certain Additional Views regarding the scope of the domestic industry, infra.

In patent-based investigations the Commission has defined "domestic industry" starting from the domestic operations of the patent owner and its licensees devoted to the exploitation of the patent(s) in controversy [141/] and extending to the commercial product which results from exploitation of the patent(s). [142/] The scope of the domestic industry in patent-based investigations has been determined on a case by case basis in light of the realities of the marketplace [143/] and encompasses not only the manufacturing operations but may include, in addition, distribution, research and development and sales. [144/]

In this investigation, the ALJ utilized and felt constrained by the Commission's decision in Certain Apparatus for the Continuous Production of Copper Rod, Inv. No. 337-TA-52, to find a number of separate patent-based

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141/ Chain Door Locks, Inv. No. 337-TA-5, USITC Pub. No. 770 (1976); Trash Pumps, Inv. No. 337-TA-43, USITC Pub. No. 943 (1979); Certain Methods for Extruding Plastic Tubing, Inv. No. 337-TA-110, USITC Pub. No. 1287 (1982); Certain Slide Fastener Stringers and Machines and Components Thereof, Inv. No. 337-TA-85, USITC Pub. No. 1141 (1981); see H.R. Rep. No. 93-571, 93d Cong., 1st Sess. 78 (1973).

142/ Frischer & Co. v. Bakelite Corp., 39 F. 2d. 245 (C.C.P.A. (1930); Electronic Pianos, Inv. No. 337-TA-31, USITC Pub. No. 721 (1975); Certain Personal Computers, Inv. No. 337-TA-140, USITC Pub. No. 1504 (1984).

143/ Slide Fastener Stringers, supra; Certain Apparatus for the Continuous Production of Copper Rod, Inv. No. 337-TA-52, USITC Pub. No. 1017 (1979).

144/ Certain Personal Computers, supra; Certain Double-Sided Floppy Disk Drive, Inv. No. 337-TA-215, USITC Pub. No. 1860 (1986).

industries. 145/ The ALJ read Copper Rod to require that "[f]or the practice of multiple patents by a complainant in a Section 337 case to be considered a single domestic industry, all the patents must be practiced in all of the products in issue." 146/ Using a value-added analysis, the ALJ considered the nature and significance of TI's activities related to its DRAM production, and concluded that there was sufficient "domestic" activity within the requirements of section 337. 147/ The ALJ also found that TI's domestic DRAM business is efficiently and economically operated.

On review, TI and the IAs have adhered to their previous position, that the exploitation of the patents in this investigation results in a single commercial product, and that therefore the Commission should determine that

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145/ In that investigation, the complainant alleged infringement of two patents and misappropriation of 14 trade secrets. Both of the patents and all of the trade secrets were related to the production, set-up, and operation of the complete system for continuous production of copper rod. However, the patents related to separate portions of the machinery, while the trade secrets applied to engineering and start-up operations and technical assistance. The Commission concluded that since the patents and trade secrets were "intimately related to the sale of the complete system . . . for [the Commission] to segment the industry in this investigation, as [respondent] would have us do, would ignore realities of the market for continuous copper rod production." Copper Rod at 55.

146/ ID at 754.

147/ In the value-added analysis in this investigation, the ALJ concluded that several elements which are not within the limits described by previous Federal Circuit and Commission decisions -- research and development, upstream and downstream production activities, general, marketing, and overhead expenses, profits, and royalties from licenses -- should be included in the value-added analysis. However, the ALJ further noted, the record did not contain data on all of these elements, and in the case of profits, TI has suffered substantial losses.

there is a single domestic industry devoted to the exploitation of the several patents. Samsung argues that the '764 patent defines a separate industry, and takes no position as to whether the practice of the other patents in controversy constitutes a single industry or multiple industries. NEC argues that the Commission should define multiple patent-based industries. In addition, NEC argues that the Commission should separate industries by DRAM density (generation), arguing that there are critical distinctions in the nature and use of different DRAMs in the marketplace. In addition, both TI and the IAs have supported the ALJ's value-added analysis, while NEC and Samsung repeat their arguments against the inclusion of certain elements in the analysis.

In this investigation, there are two major issues regarding the scope of the domestic industry. We must determine whether there are one or more "industries" to be analyzed, and we must determine whether any such industry or industries is sufficiently "domestic" for purposes of section 337.

The issue of whether there are one or more industries in an investigation generally arises in the context of a complaint alleging the exploitation of multiple intellectual property rights. As we noted earlier, the ALJ felt constrained by the Commission's decision in Copper Rod to find separate patent-based industries. In Certain Personal Computers the Commission defined the domestic industry as those portions of complainant Apple Computer Inc.'s operations devoted to production of Apple II and Apple III series personal computers. Personal Computers involved alleged infringement of two patents and two copyrights in computer programs. The Apple III computer did not

incorporate the two copyrighted programs at issue in that case, although it did incorporate the patented inventions, while the Apple II computers incorporated both the copyrighted programs and the patented inventions. 148/ Despite this, the Commission found a single domestic industry.

In this investigation, there is an even more compelling reason than in Computers for a determination that there is only one industry. In the instant case the exploitation of all five valid patents 149/ remaining in controversy 150/ results in the production of a single commercial product, DRAMs. 151/

148/ Certain Personal Computers, supra, at 18 & 41.

149/ For purposes of this analysis we have chosen to look at an industry defined in terms of the five patents that, of those alleged in the complaint, have been found to be valid, although only three of those five patents were found to have been infringed. The Commission has not previously addressed the issue of whether to define an industry only in terms of valid patents or of valid and infringed patents. The parties in this investigation did not address this issue in their submissions.

In choosing to look at a broader, five-patent industry, we note that our conclusions as to the nature and significance of the domestic activities of that industry would be the same, if not even stronger, based upon a three-patent industry. In view of the lack of controlling precedent or argument by the parties, we determine that it would be more appropriate to use the broader five-patent industry than the more specific three-patent industry in this investigation.

150/ We note that since the Commission vacated those portions of the ID concerning Hitachi, there are no findings of fact or conclusions of law remaining with regard to the '376 patent. Therefore, that patent is no longer involved in this investigation, and is not included in our analysis of the domestic industry.

151/ We conclude that the definition of separate industries on the basis of DRAM density is not appropriate. NEC argues that some respondents import only

(Footnote continued on next page)

Texas Instruments exploits the '747 patent in its production of 16K, 64K, 256K, and 1M DRAMs, which account for virtually all current DRAM production. Of the remaining patents, TI practices the '764 patent in the assembly of its 64K and 256K DRAMs primarily in its [ ] plants, and in [ ] 152/ With respect to the '701 patent, TI exploits this patent in its production of 64K and 256K DRAMs in the United

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one or another density of DRAM, that not every product of every respondent is accused of infringement, and that DRAMs of different densities do not compete with each other, and are not necessarily made using the same equipment or facilities by respondents. NEC's view, that the Commission should consider the imported products in determining industry, originated with the first Headboxes case, Certain Headboxes and Papermaking Machine Forming Sections for the Continuous Production of Paper and Components Thereof, Inv. No. 337-TA-82, USITC Pub. No. 1138 (1981). That approach has since been thoroughly discredited. See Certain Products with Gremlins Character Depictions, Inv. No. 337-TA-201, USITC Pub. No. 1815 (1986). The Commission's determination of domestic industry is not based on the imported products subject to investigation, but on an examination of the domestic exploitation of the patents at issue. Several of the patents are exploited in the production of more than one density of DRAM, and thus it would be inappropriate to find these to be the products of different industries. In addition, whether respondents manufacture different densities of DRAMs using the same equipment or facilities is irrelevant to the domestic industry issue. The record is clear that TI uses many of the same processes and equipment in manufacturing DRAMs of different densities, and therefore this is not a basis for defining separate industries by DRAM density. Finally, the Commission has held that competition between domestic products and imports, or between various domestically produced products, should not be used to define separate domestic industries. Certain Products with Gremlins Character Depictions, Inv. No. 337-TA-201, USITC Pub. No. 1815 (1986) at 5-6. Therefore, that DRAMs of different densities are not perfect substitutes for each other, and may not compete directly with one another does not, in our view, support a conclusion that the different densities are the product of separate domestic industries.

152/ Tr. at 39, 91, 1896-97, 1912-41, 1924-25, 1936-39, 1924-25, 1951-54, 13,691, TI Ex. 5410 at 663. We determine that TI's practice of the '764 patent in its Far East assembly operations is not properly included in the domestic industry.

States. Finally, TI exploits the '500 and '843 patents in its production of 64K and 256 DRAMs in the United States, and NECEL exploits those patents in the production of one model of 256K DRAM, [

] at its California facility. The substantial overlap among the different generations of DRAMs produced in accordance with one or another of the patents in controversy supports the conclusion that they are the product of a single industry. Based upon the foregoing, we conclude that our analysis should proceed on the basis that there is a single industry which exploits the patents in the production of DRAMs.

Turning to consider if this industry is sufficiently "domestic" we are confronted with the reality that TI conducts many of its DRAM production activities outside the United States. In a case where the product under investigation is produced partly in the United States and partly abroad, the Commission traditionally examines the nature and significance of the activities in the United States in order to determine whether a domestic industry exists. 153/ One method the Commission has frequently used in conducting this analysis is a consideration of the value added to the product by domestic activities as a percentage of the product's total value. 154/ In conducting a value-added analysis, the Commission has previously declined to include certain potential domestic value-added elements in considering the

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153/ Certain Miniature, Battery-Operated, All-Terrain Wheeled Vehicles, Inv. No. 337-TA-122, USITC Pub. No. 1300 (1982), aff'd sub nom. Schaper Mfg. Co. v. U.S. International Trade Commission, 717 F.2d 1368 (Fed. Cir. 1983).

154/ E.g., Certain Cube Puzzles, Inv. No. 337-TA-112, USITC Pub. No. 1334 (1983); Certain Double-Sided Floppy Disk Drives, supra.

domestic industry issue. [155/] Among those elements excluded have been profits, [156/] royalty income, [157/] general research and development expenditures, [158/] and upstream and downstream production activities. [159/] The Commission has never determined the exact percentage of domestic value added necessary to constitute a domestic industry under section 337.

The value-added analysis is only one factor in our consideration, and is not necessarily dispositive in determining whether the nature and significance of domestic activities are sufficient to support the conclusion that a domestic industry exists. [160/] It is clear that section 337 was intended to protect domestic industries in their production and production-related activities. [161/] However, it is both the nature and significance of domestic activities which determine whether an industry is domestic.

Complainant TI's operations [ ] cover every aspect of DRAM production, from initial product and process research and development,

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155/ See, e.g. Certain Miniature, Battery-Operated, All-Terrain Wheeled Vehicles (Toy Trucks), supra.

156/ Certain Modular Structural Systems, Inv. No. 337-TA-164, USITC Pub. No. 1668 (1984).

157/ Toy Trucks, supra; Certain Products with Gremlins Character Depictions, Inv. No. 337-TA-201 USITC Pub. No. 1815 (1986).

158/ Schaper, supra; Certain Rotary Wheel Printing Systems, Inv. No. 337-TA-185, USITC Pub. No. 1857 (1986).

159/ Certain Modular Structural Systems, supra.

160/ Toy Trucks, supra, aff'd sub nom. Schaper Mfg. Co. v. U.S. International Trade Commission, 717 F. 2d 1368.

161/ E.g. H. Rep. No. 571, 93d Cong., 1st Sess. 78 (1973).

through prototype development, to commercial wafer fabrication. Although TI's primary assembly operations are conducted in the [ ] TI does prototype assembly, and some assembly of DRAMs for [ ] in the United States. In addition, TI performs substantial service operations such as modification of products for specific customer requirements.

The only significant difference between this and other cases in which a value-added analysis has been done is that here we have considered current DRAM research and development as a domestic production-related activity, and included it in the value-added analysis. While the Commission has held in other cases that product design and research and development alone are not sufficient to constitute a domestic industry, 162/ in this case there is ongoing manufacturing activity in the United States which is dependent on continued research and development. In the DRAM business, product and process design, research, and development continue to be important during actual DRAM manufacturing. The record in this investigation demonstrates that there is a continuing refinement of product and process during manufacturing, and that there is spillover of knowledge developed in connection with one particular DRAM to other DRAMs. 163/ Consequently, we determine that in the DRAM industry, current research and development are production-related activity, and properly included in the domestic industry.

162/ Toy Trucks, supra; Certain Products with Gremlins Character Depictions, supra; Certain Personal Computers, supra

163/ See Certain Double-Sided Floppy Disk Drives and Components Thereof, supra, Views of Chairwoman Stern at 21-22.

Upstream and downstream production activities, i.e., the production of silicon crystals, chemicals, and lead frames, and production of Single-Inline-Modules (SIMs) and Single-Inline-Packages (SIPs), are not part of DRAM production in the United States. Accordingly, we have not included these activities in the domestic value-added analysis. While TI does manufacture many of the inputs into its DRAM production, the value of those upstream production activities is properly reflected as direct material costs. SIP and SIM production are carried out after a DRAM has been manufactured, in some cases after final assembly, and represent the production of different commercial products than a DRAM. We determine that these activities fall outside the domestic industry.

We therefore have excluded the value added by upstream and downstream production activities, as well as royalties and overhead, and general and administrative expenses from our analysis. No arguments have been made which would lead to a conclusion that these latter activities are any more production-related in the DRAM industry than in any other industry. Therefore, there is no reason to depart from precedent with respect to exclusion of royalties, overhead, and general and administrative expenses from the analysis. Excluding the items discussed above from the ALJ's value-added analysis, 164/ the resulting domestic value added for TI's 64K and 256K DRAMs in 1986 was [ ] and [ ] percent, respectively. Particularly in light

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164/ We have excluded the line item entries for "other overhead", Singapore costs, all U.S. G&A, SIP processing, and all corporate overhead from the ALJ's analysis in the ID at Appendix A, Tables 1 and 2. In addition, we have excluded the line item for "inventory" since it is not clear from the ALJ's explanation how this represents a production-related cost.

of the nature of activities in the United States, we determine that this is sufficient to qualify as "domestic."

Respondents argue that TI is primarily a Japanese DRAM manufacturer, alleging that TI's Japanese operations are far more significant than its U.S. operations, and that having made the choice to produce in Japan, TI cannot avail itself of section 337. We do not believe that TI's substantial, and to some extent greater, production-related activities at its Japanese DRAM facilities, vitiate the domestic character of its DRAM operations in the United States. We also do not believe that TI's Japanese wafer fabrication operations can be included in a domestic industry, nor that the Commission should consider the U.S. value added to DRAMs wafer fabricated by TI overseas in analyzing whether there is a domestic industry. Such an industry would have little, if any, direct production-related activity in the United States, and would be based primarily on U.S. research and development, upstream and downstream manufacturing activity, and U.S. corporate direction. These elements are not sufficient to support the conclusion that TI DRAMs wafer fabricated abroad are the product of a domestic industry. We have focused solely on the activities which take place in the United States in connection with DRAMs which are at least partially manufactured in the United States. That TI has manufacturing operations abroad, and the extent of those activities, are not relevant to the question of whether there is a domestic industry. 165/

165/ See Additional Views of Chairman Liebeler and Vice Chairman Brunsdale, infra.

The Commission determines the existence of a domestic industry as of the time the complaint is filed. 166/ The complaint in this investigation was filed in February 1986. Respondent NEC argues that neither TI nor Motorola were producing DRAMs in the United States at that time, and that therefore there is no domestic industry. We concur that Motorola is not a part of the domestic industry, since it ceased producing DRAMs in the United States in [ ] before the complaint was filed. 167/

With respect to TI, NEC argues that there was a relatively small volume of TI production of [ ] DRAMs during [ ] and production of [ ] DRAMs was shifted from TI's [ ] plant to its Japanese plant during the second half of [ ] 168/ TI's 256K production facility in Dallas, DMOS IV, is a new plant, which started production only in 1985. [ ] However, this does not mean that the domestic industry did not exist at that time. Bringing a DRAM wafer fabrication facility fully on-line is not merely a matter of turning on the equipment. It frequently requires

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166/ Bally/Midway Mfg. Co. v. U.S. International Trade Commission, 714 F.2d 1117 (Fed. Cir. 1983). Deterioration in the condition of the domestic industry during the Commission's proceedings does not undermine the conclusion that a domestic industry existed at the time the complaint was filed.

167/ Although Motorola maintained the capability to recommence production of DRAMs at the time the complaint was filed, we determine that this is not sufficient to support the conclusion that it was part of the domestic industry. At the time the complaint was filed in February 1986, Motorola did not conduct production-related activities, although it did conduct research and development, sold DRAMs from inventory, and performed service activities. These activities, however, are not sufficiently production-related in nature to be considered part of the domestic industry for purposes of section 337 in the absence of accompanying manufacturing activity.

168/ TI planned to recommence [ ] at [ ] in 1987.

months of refinement of product and process design. TI was operating its DMOS IV plant at the time the complaint was filed. [

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This is sufficient to fulfill the requirement that the domestic industry exist at the time the complaint is filed. 169/

In addition, since respondent NEC is licensed under the '500 and '843 patents, the operations of NEC's subsidiary NECEL, devoted to production of 256 DRAMs under those patents in California, are also part of the domestic industry. NECEL performs both wafer fabrication and assembly operations at its California plant. The nature and significance of these operations in the context of the DRAM industry are sufficient that they should be included in the domestic industry.

We also adopt the ALJ's conclusions with respect to efficient and economic operation of the domestic industry. The Commission has considered a range of factors in determining whether a domestic industry is efficiently and economically operated. Those factors include: (1) the use of modern equipment and manufacturing facilities; (2) investment in research and development; (3) profitability of the relevant product line; (4) substantial expenditures on advertising, promotion, and development of consumer goodwill; and (5) effective quality control programs. 170/ TI's operations fulfill all but the third of these criteria, profitability. NEC argues that the

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169/ See Additional Views of Chairman Liebeler and Vice Chairman Brunsdale, infra.

170/ Certain Methods for Extruding Plastic Tubing, supra; Certain Coin Operated Audio Visual Games and Components Thereof, Inv. No. 337-TA-105, USITC Pub. No. 1220 (1982).

problems experienced by TI at its DMOS IV plant support the conclusion that the domestic industry was inefficient and uneconomical. NEC also argues that the relatively higher costs of TI's U.S. manufacturing operations, compared with its Japanese operations, indicate that the U.S. industry was inefficient and uneconomical, as does TI's decision to have a team of production engineers from its Japanese plant work on bringing the DMOS IV plant on line.

The relative cost structures of TI's U.S. and Japanese operations are irrelevant to the question of efficient and economic operation of the U.S. industry. While a showing that TI's operations were significantly higher cost than those of other U.S. producers might be probative on this issue, there are too many variables between production in the U.S. and Japan for such a comparison to be meaningful. Similarly, the nationality of the engineers responsible for working out the problems in bringing TI's DMOS IV plant up to commercial production qualification is irrelevant. Finally, as noted previously, DRAM wafer fabrication is a highly sensitive and complicated manufacturing operation. The fact that TI had problems, [

] does not mean that the domestic industry was inefficient or uneconomical, particularly in view of TI's systems in place for dealing with, and eventual resolution of, those problems, and its ability to produce commercially acceptable DRAMs.

Accordingly, we determine that there is a single domestic industry, efficiently and economically operated, devoted to the production of DRAMs under claims 1, 2, 3, 4, 5, and/or 6 of U.S. Letters Patent 4,081,701, claims 6 and/or 7 of U.S. Letters Patent 4,543,500, claims 6 and/or 7 of U.S. Letters Patent 4,533,843, claims 16, 17, and/or 19 of U.S. Letters Patent 3,716,764, and claims 1, 2, and/or 3 of U.S. Letters Patent 3,940,747. 1/1/

SUBSTANTIAL INJURY

The complainant in a section 337 investigation must show that respondents' unfair methods of competition and unfair acts have the effect or tendency to destroy or substantially injure the domestic industry. 172/ Satisfaction of section 337's injury requirement does not automatically follow from proof of infringement of an intellectual property right. 173/ Complainant bears the burden of establishing both injury and a nexus between the unfair acts and the injury to the domestic industry. 174/ The owner of a patent, who is entitled to exclude others entirely from exploiting the patent, is required to show a smaller quantum of injury in order to prevail under section 337 than would be required in a non-intellectual property right case. 175/ The Federal Circuit has declined to articulate a particular quantum of injury necessary to satisfy the injury requirement, holding that

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171/ To the extent not inconsistent with the foregoing discussion, we adopt the ALJ's findings of fact concerning domestic industry.

172/ 19 U.S.C. § 1337(a). Tendency to substantially injure is discussed below.

173/ Corning Glass Works v. U.S. International Trade Commission, 799 F.2d 1559, 1566 (Fed. Cir. 1986); Textron v. U.S. International Trade Commission, 753 F.2d 1019, 1028 (Fed. Cir. 1985).

174/ Optical Waveguide Fibers, Inv. No. 337-TA-189, USITC Pub. No. 1754 (1985), aff'd sub nom. Corning Glass Works v. U.S. International Trade Commission, supra; Drill Point Screws, Inv. No. 337-TA-116, USITC Pub. No. 1365 (1983).

175/ Corning Glass Works, v. U.S. International Trade Commission, supra; Bally/Midway v. U.S. International Trade Commission, 714 F.2d 1117, 1124 (Fed. Cir. 1983).

determination of injury is the type of question which the Commission is best suited to answer, on the basis of the particular facts of each case. 176/

While there is no all-inclusive standard, the domestic industry must normally establish that the infringer holds, or threatens to hold, a significant amount of the domestic market for the product in question or has made signiificant sales of that product. 177/ The specific level of any indicator of injury is not dispositive of the issue of substantial injury, and the Commission considers the special characteristics of each industry in assessing its condition.

We adopt the ALJ's conclusion that TI's DRAM business suffered substantial injury in 1986. 178/ Employment and production in the United States declined, and TI suffered [ ] losses in 1985 and 1986 on its domestically-produced DRAMs.

We believe that the conclusion that infringing imports of Samsung 64K and 256K DRAMs have contributed to substantial injury to the domestic industry is warranted by the evidence of record. 179/

176/ Corning Glass Works v. U.S. International Trade Commission, supra, at 1568.

177/ Textron Inc. v. U.S. International Trade Commission, supra, at 1029.

178/ ID at 807.

179/ The only infringing imports remaining under investigation are Samsung's imports of 64K and 256K DRAMs. The ALJ determined, and we affirm the determination, that Samsung's 64K and 256K DRAMs literally infringe the '701 patent, and that Samsung's 256K DRAMs literally infringe the '500 and '843 patents. With respect to Samsung's DRAMs, we have reversed only the ALJ's determination that Samsung's 64K and 256K DRAMs infringe the '764 patent under the doctrine of equivalents.

Samsung's U.S. market share for 64K DRAMs [ ] during all four quarters of 1985, [ ] during the first two quarters of 1986, and [ ] again during the third quarter of 1986. The domestic industry's [180/] U.S. market share for 64K DRAMs declined throughout 1985 and the first three quarters of 1986. [181/] Samsung's market share for 1985 was [ ] percent, while the domestic industry held [ ] percent of the market. Samsung's market share during the first three quarters of 1986 was [ ] percent, while the domestic industry's share fell precipitously to [ ] percent. Samsung's market share was subtstantial during this period, while TI was suffering losses.

The transitional period for 64K and 256K DRAMs occurred in early or mid-1985. [182/] The record demonstrates that consumption of 64K DRAMs, as would be expected, declined substantially during the entire period 1985-86. [183/] Thus, the domestic industry lost market share during a period

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180/ The portion of the domestic industry devoted to production of 64K DRAMs consists only of [ ] There was no proof offered that any other domestic DRAM producer manufactured 64K DRAMs in connection with any of the patents at issue, with the exception of [ ] which the ALJ determined practiced the '764 patent until it shut down operations in [ ] However, we have determined that [ ] is not part of the domestic industry.

181/ ID Appendix A at 22, Table 12a.

182/ The ALJ defined the transitional period as the point where the price of a newer generation, higher density, DRAM had declined to four or five times the price of the prior generation, at which point the newer generation becomes competitive in the market. DRAM users will design equipment to accomodate the new generation, and newer DRAMs tend to be substituted for the older DRAM, since the price of the newer DRAM is low enough. A residual market will remain for the older generation DRAM, although the cost per bit of memory will eventually become higher for the older generation, for those uses where the older generation provides sufficient memory capacity, if the cost per unit of the older generation remains below the cost per unit of the newer generation.

183/ Appendix A at 21, Table 12.

of declining U.S. consumption, while infringing imports increased and held a significant share of the U.S. market for the 64K DRAMs.

Samsung did not import any 256K DRAMs until 1986. Infringing imports of Samsung 256K DRAMs [ ] from [ ] percent of domestic consumption in the first quarter of 1986, to [ ] percent in the second quarter, and to [ ] percent in the third quarter. The domestic industry's [184/] market share decreased from [ ] percent in the fourth quarter of 1985, [185/] to [ ] percent in the first quarter of 1986, then increased to [ ] percent in the second quarter, and to [ ] percent in the third quarter. Overall, the domestic industry accounted for [ ] percent of domestic consumption during the first three quarters of 1986, while Samsung's imports accounted for [ ] percent. TI, considered alone, accounted for [ ] percent of domestic consumption in the first two quarters of 1986, and [ ] percent of domestic consumption in the third quarter. [186/] Samsung's U.S. market share for 256K DRAMs was substantial and increased, indicating that Samsung's infringing imports were a cause of substantial injury to the domestic industry.

U.S. consumption of 256K DRAMs increased significantly throughout 1985-86. The share of consumption accounted for by non-infringing imports and non-domestic industry 256K DRAMs was [ ] percent in the first quarter of 1986, [ ] percent in the second quarter, and [ ] percent in the third

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184/ The portion of the domestic industry devoted to production of 256K DRAMs includes TI's operations and NECEL's California operations producing 256K DRAMs under the '500 and '843 patents.

185/ Only NECEL was producing 256K DRAMs at this time. TI did not sell any of its domestic 256K DRAM production during 1985.

186/ ID Appendix A at 31, Table 15a.

quarter. In an expanding market for 256K DRAMs, Samsung's ability to rapidly increase its market share to a significant level indicates that infringing Samsumg imports were a cause of substantial injury.

Since the record contains no evidence of downstream imports containing infringing Samsung DRAMs, we have not considered downstream imports in determining causation of substantial injury by infringing Samsung imports. Similarly, since there is no evidence in the record as to the volume (or price) of infringing Samsung DRAMs imported through the gray (parallel) market, we have not considered such imports in assessing causation of substantial injury by Samsung's infringing imports.

Based on the evidence in the record of this investigation, we conclude that the significant volumes of imported infringing Samsung 64K and 256K DRAMs contributed to the substantial injury suffered by the domestic industry during 1986. 187/

TENDENCY TO SUBSTANTIALLY INJURE

The Commission in its determination of tendency to substantially injure the domestic industry considers such factors as substantial foreign manufacturing capacity combined with the intention to penetrate the U.S. market. 188/ The Federal Circuit has declined to specify a legal standard regarding what is required to establish a tendency to substantially injure,

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187/ To the extent not inconsistent with the foregoing discussion, we adopt the ALJ's findings of fact concerning substantial injury.

188/ See, e.g. Certain Methods for Extruding Plastic Tubing, supra.

but has rejected the standard that unfair methods or acts that result in even "conceivable losses of sales" establish a tendency to substantially injure the domestic industry. 189/

The ALJ concluded that infringing Samsung imports have the tendency to substantially injure the domestic industry. It is clear that Samsung has enjoyed a fair degree of success in the U.S. DRAM market, and is seeking to increase its presence in that market, [ ] The evidence of Samsung's [ ] production capacity, as well as its demonstrated ability and intent to penetrate the U.S. market, support an affirmative determination with respect to tendency to substantially injure the domestic industry.

If Samsung does indeed cease production of 64K DRAMs, as it claims it plans to do, 190/ the possibility exists that it can shift that production capacity to 256K or [ ] DRAMs, 191/ which represent the growing sectors of the market. Samsung has an established sales and marketing system in the United States, and seeks to increase its market presence, in part by qualifying its product with major customers. 192/ In addition, the pricing

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189/ Corning Glass Works, supra, at 1568.

190/ Tr. at 16,168-69.

191/ There are as yet no imports of Samsung [ ] DRAMs, so there is no finding as to infringement by these potential imports. Consequently, we have not considered them in our analysis of tendency to substantially injure.

192/ Tr. at 16,170, TI Exs. 4210 at 4, 4236, 4267, 4268, 4292 at 15-16, 4292b.

of Samsung's imported DRAMs is not restricted by the Fair Market Value (FMV) prices established for Japanese producers by the U.S./Japanese Semiconductor Agreement. This fact, in light of the [ ] unit values of Samsung's DRAMs during 1985 and 1986, supports the likelihood that the prices of Samsung DRAMs will continue to be at the [ ] of the market, exerting a [ ] pressure on domestic prices despite the FMV pricing of Japanese imports. These factors support the conclusion that infringing Samsung imports have the tendency to injure the domestic industry. 193/

193/ To the extent not inconsistent with the foregoing discussion, we adopt the ALJ's findings of fact concerning tendency to substantially injure.

REMEDY

The Commission has broad discretion in selecting the form, scope, and extent of the remedy in a section 337 proceeding, and judicial review of its choice of remedy necessarily is limited. 194/ In addition, the Commission has the power to make factual determinations in the remedy phase of a section 337 investigation, to the extent necessary, in order to reach its determination. These factual determinations may be made on the basis of the evidence of record in the violation phase of the investigation, or on the basis of information submitted by the parties in the remedy phase of the investigation.

Complainant TI requested that the Commission issue a very broad general exclusion order in this case. 195/ TI also requested that the Commission

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194/ Viscofan, S.A. v. United States, 787 F.2d 544, 548 (Fed. Cir. 1986) (affirming Commission remedy determination in Certain Processes for the Manufacture of Skinless Sausage Casings and Resulting Product, Inv. No. 337-TA-148/169, USITC Pub. No. 1624 (1984)).

195/ TI sought an exclusion order prohibiting the importation of: (1) infringing DRAMs, and components thereof such as die, wafers and slices, single-in-line package modules (SIPs), single-in-line memory modules (SIMMs), and any other devices used as holders of or transporting media for DRAMS (holder devices); (2) printed circuit boards, memory expansion boards, and other boards that contain infringing DRAMs; (3) computers (such as mainframe, small business, and personal computers), facsimile and telecommunications equipment, computer printers, and subassemblies of any of the foregoing which are manufactured by either Samsung or NEC, containing infringing DRAMs; (4) computers (such as mainframe, small business and personal computers), facsimile and telecommunications equipment, computer printers, and subassemblies of any of the foregoing containing infringing DRAMs; (5) lead frames, masks, reticles, instruments, equipment, or any other materials or products, the importation of which the U.S. Customs Service is satisfied would

(Footnote continued on next page)

issue broad cease and desist orders against NEC and Samsung. 196/

Samsung, after arguing that public interest considerations are paramount in determining remedy, and preclude issuance of a remedy in this investigation, argued that any remedy granted by the Commission should be a "conditional" exclusion order, limited to 64K and 256K DRAMs, which would self-destruct if TI did not offer to license Samsung on terms comparable to those offered the previously settling respondents.197/

The Commission investigative attorney (IA) recommended that the Commission issue a limited exclusion order directed at NEC and

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(Footnote continued from previous page)
contribute to or induce the infringement of one or more claims of one or more of the patents identified in Paragraph (1).

196/ TI requested that the Commission issue orders requiring NEC and Samsung to: (1) cease and desist from marketing, distributing, selling and/or offering for sale imported DRAMs or components thereof, or DRAMs or components thereof fabricated by NEC and Samsung in the United States, in violation of section 337; (2) cease and desist from violating section 337 by inducing or contributing to the infringement of certain claims of the patents TI contends are infringed, including the '764 patent; (3) cease and desist from violating section 337 by using contributorily infringing lead frames, masks, reticles, instruments, equipment, or any other materials or products to fabricate DRAMs or components thereof in the United States. "DRAMs" is defined in the proposed orders as all DRAMs, including but not limited to, 64K, 128K, 256K, and 1M DRAMs, components thereof, SIPs, SIMMs, and other devices used as holders of or transporting media for DRAMs. See Attachments 1, 2, and 3, to Brief of Complainant Texas Instruments Incorporated on Remedy, Public Interest and Bonding Issues (hereinafter TI Brief) for the text of the proposed orders.

197/ Brief to the Commission by Samsung Company, Ltd. and Samsung Semiconductor & Telecommunications Co., Ltd. Regarding Public Interest, Remedy, and Bonding (hereinafter Samsung Brief) at 19-20.

Samsung, [198/] and that the Commission issue cease and desist orders against NEC and Samsung, prohibiting the importation and use of materials, components and equipment in the manufacture of DRAMs in the United States that infringe the relevant patents. [199/]

Exclusion order — In determining whether to issue a general exclusion order, the Commission balances the complainant's interest in obtaining protection from all potential foreign infringers, against the inherent potential of a general exclusion order to disrupt legitimate trade. [200/] The Commission requires that a complainant seeking a general exclusion order prove "both a widespread pattern of unauthorized use of its patented invention and certain business conditions from which [the Commission] might reasonably infer that foreign manufacturers other than the respondents to the investigation may attempt to enter the U.S. market with infringing

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198/ The order proposed by the IA would exclude: (1) infringing DRAMs manufactured by NEC or Samsung; (2) components or carriers, such as circuit boards and single-in-line packages, that contain the infringing DRAMs manufactured by NEC or Samsung; (3) finished products in the form of computers, telecommunications switching equipment, and facsimile equipment made abroad by NEC or Samsung, containing infringing DRAMs; (4) equipment and materials provided by NEC or Samsung for U.S. production of DRAMs that infringe the relevant patents. See Staff Reply Brief on Remedy, Public Interest and Bonding (hereinafter Staff Reply Brief) for the IA's modified proposed exclusion order.

199/ See Brief of the Commission Investigative Staff on Remedy, Public Interest and Bonding (hereinafter Staff Brief) for the IA's proposed cease and desist order.

200/ Certain Airless Paint Spray Pumps and Components Thereof, Inv. No. 337-TA-90, USITC Pub. No. 1199 at 17-20 (1981) (hereinafter Spray Pumps).

articles." 201/ In Spray Pumps, the Commission stated that in order to establish a widespread pattern of unauthorized use, there must be:

(1) a Commission determination of unauthorized importation into the United States of infringing articles by numerous foreign manufacturers; or

(2) pending foreign infringement suits based upon foreign patents which correspond to a domestic patent in issue; and

(3) other evidence which demonstrates a history of unauthorized foreign use of the patented invention. 202/

We conclude that the issuance of a general exclusion order is not warranted in this investigation. The evidence of record concerning a widespread pattern of unauthorized use of TI's patented technology is not sufficient to justify the potentially extreme disruption of legitimate international trade that might result from the issuance of such an order. Despite TI's allegations to the contrary, there has been no Commission determination of unauthorized importation into the United States of infringing articles by numerous foreign manufacturers other than respondents. The Commission's determination of infringing imports relates only to Samsung's DRAMs. 203/ The ALJ's determination of infringement by Hitachi imports was vacated by the Commission, and no determination of infringement was made with

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201/ Spray Pumps at 18.

202/ Id. at 18-19 (footnotes omitted) (emphasis added).

203/ Although the ALJ determined that NEC's DRAMs would infringe the '500 and '843 patents if not licensed, we do not consider this evidence of infringement to be sufficient to support the conclusion that there is a widespread pattern of infringement.

respect to any other imports. We do not believe that a conclusion of infringement by the now-settled respondents can be made on the basis of their settlement agreements. The settlement agreements entered into by the former respondents do not admit infringement, and it is generally recognized that a respondent may choose to settle a section 337 investigation for reasons other than an admission of violation.

TI made no allegations concerning foreign infringement suits based on the foreign patents corresponding to the U.S. patents in suit. TI's evidence that other non-respondent companies are poised to enter the U.S. market with infringing DRAMs is not convincing. Infringement was a hotly contested issue in this investigation, and involved numerous extremely complicated technical questions. We do not believe that TI's affidavits and claim charts, 204/ submitted during the remedy phase of the investigation, and its arguments based on joint ventures and licensing agreements, are a sufficient basis for the Commission to conclude that it is probable that potential imports will be infringing. This is particularly true in light of the ALJ's conclusion (with which we agree) that it is possible to make completely functional DRAMs without infringing any of the patents in controversy. TI has not, therefore, demonstrated a widespread pattern of unauthorized use of its patented technology.

204/ In addition, we note that most of the claim charts TI has submitted involve the '764 patent, which we have determined is not infringed in this investigation, and the '092 patent, which the ALJ determined is not practiced by the domestic industry, a conclusion which the Commission determined not to review.

In cases where the conditions to support a general exclusion order are not present, but a violation of section 337 has nonetheless been determined to exist, or where the violation is limited to one or a small number of respondents, the Commission has concluded that issuance of a limited exclusion order, directed at the respondent(s) involved in the violation, is appropriate. 205/ We have concluded that a limited exclusion order should be issued in this investigation.

We have determined to exclude both assembled and unassembled infringing DRAMs manufactured by Samsung. The infringement which we have found is in the electric circuitry embodied in the silicon chip itself. Although we have defined the industry on the basis of the commercial product, the assembled DRAM, in usable form, it is appropriate to prohibit importation of unassembled DRAMs, that is, importation of the fabricated wafers or chips (die), with the infringing DRAM circuitry embodied therein, since it is the chips themselves, which make up the wafer, that have been determined to infringe.

We have determined to exclude only infringing imports of 64K and 256K DRAMs (including combinations thereof, i.e., 128K DRAMs). These were the only Samsung DRAMs determined to infringe any of the patents in controversy. Samsung is not currently importing [ ] DRAMs into the United States, and it appears from the record that Samsung does not even manufacture [ ] DRAMs at this time.

205/ Certain Processes for the Manufacture of Skinless Sausage Casings and Resulting Product, supra; Certain Aramid Fiber, Inv. No. 337-TA-194, USITC Pub. 1824 (1986).

There is no information in the record concerning any other density (generation) of Samsung DRAM. Although there is an obvious connection between generations of DRAMs, including the application of knowledge gained in the development and manufacture of an earlier generation to the development and manufacture of a later generation, there are also significant differences. We do not believe that infringement of the patents in controversy by future imports, particularly future generation DRAM imports, can be inferred from the determination of infringement in this investigation. DRAM technology changes and evolves rapidly even within one generation. The likelihood of change in a future generation, such that TI's patents in controversy are not infringed, is high.

Moreover, the ALJ correctly determined that it is possible to manufacture a functional DRAM without infringing any of the patents in controversy. This may hold true for future DRAMs as well. Since there has been no determination of infringement against any Samsung DRAMs other than 64K and 256K DRAMs, there is no unfair act or method of competition in the importation or sale of any Samsung DRAMs other than 64K or 256K, and combinations thereof. Consequently, there can, in our view, be no injury to the domestic industry by reason of unfair imports of DRAMs other than 64K and 256K DRAMs. We have, therefore, determined not to exclude imports of DRAMs other than Samsung 64K or 256K DRAMs.

We are concerned that a limited exclusion order covering only Samsung DRAMs in traditional dual-inline-packages, ready for plugging into circuit boards would be ineffective, since it could easily, and would almost

certainly, be circumvented. The Commission has discretion to fashion an effective remedy. Therefore we determine that it is appropriate to include within the scope of our exclusion order what are effectively alternate packages for DRAMs, i.e., single-inline-packages, single-inline-modules, and other carriers for DRAMs.

In addition, we believe the possible circumvention of a limited exclusion order by the importation of infringing DRAMs already mounted on circuit boards, warrants the exclusion of such "stuffed" boards. A circuit board is a relatively low cost item, and most of the value of a stuffed board is the DRAMs mounted on it. It is certainly possible, and we believe it likely, that importers would choose to invest the relatively small amount of time and effort necessary to stuff circuit boards abroad with infringing DRAMs, in order to evade an exclusion order. Moreover, Samsung itself has downstream production facilities and could itself mount infringing DRAMs on circuit boards for export to the United States. Therefore, we have determined to exclude circuit boards containing infringing DRAMs.

We have also determined to exclude certain other downstream products. The ALJ concluded that imports of infringing DRAMs in downstream products injured the domestic industry, by adversely affecting the sales of competitive downstream products of TI's customers, and therefore adversely affecting the demand for the U.S. industry's DRAMs. While there is no evidence of any Samsung DRAMs imported in downstream products, 206/ there is clearly nothing

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206/ Samsung's downstream products were imported containing Fujitsu DRAMs, which are now licensed.

to prevent the use of Samsung DRAMs in downstream products, and an exclusion order covering only Samsung's infringing DRAMs, but not products containing infringing Samsung DRAMs, would certainly encourage such a practice, and cause injury to the domestic industry. The evidence of record demonstrates that a substantial proportion of the DRAMs imported into the United States from 1983 through 1985 were imported embedded in downstream products. 207/ Similarly, the aggregate value of DRAMs contained in the four categories of downstream products we have determined to exclude was significant in 1986. 208/ Consequently, we conclude that it is appropriate to prohibit importation of computers (such as mainframe, small business, and personal computers), facsimile machines, telecommunications switching equipment, and printers, which contain infringing Samsung 64K or 256K DRAMs (or any combination thereof).

We conclude that it is not appropriate to issue a "conditional" exclusion order of the nature requested by Samsung. We do not believe the Commission should interfere with TI's legitimate rights to license its patents to whom it pleases, on whatever terms it can negotiate. 209/

In order to warrant the exclusion of upstream products or components of the article(s) determined to be the subject of the unfair act, the Commission has relied upon a determination of contributory or induced infringement

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207/ TI Ex. 4966a.

208/ See TI Ex. 5272.

209/ See Holmes, Intellectual Property and Antitrust Law 24-1 et seq. (1987).

involving those upstream products. 210/ We decline to exclude upstream products, i.e., capital equipment, photomasks, reticles, lead frames, silicon slices, in this case. Contrary to TI's argument, the ALJ did not make a determination of induced or contributory infringement in this investigation. 211/ The only mention of contributory infringement in the ID concerns the question of whether NECEL's California operations are a part of the domestic industry. The ALJ concluded that since NEC is licensed under the '500 and '843 patents, NECEL's operations are part of the domestic industry. In passing, she concluded that if NEC were not licensed, NECEL's importation of upstream articles for use in its manufacture of DRAMs under the '500 and '843 patents would be contributorily infringing. The ALJ did not discuss the elements of contributory or induced infringement, nor did she make the necessary findings, e.g., whether the articles in question have a substantial non-infringing use. 212/ Moreover, the ALJ did not even mention contributory or induced infringement in connection with Samsung. Samsung's U.S. manufacturing affiliate (Samsung Semiconductor, Inc.) was not a party to

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210/ Certain Personal Computers, supra.

211/ The Commission also did not make any determinations of induced or contributory infringement in this investigation.

212/ The existence of a substantial non-infringing use for the accused components is a defense to an allegation of contributory infringement. 35 U.S.C. § 271(c).

this investigation. [213/] In light of these facts, we conclude that there is insufficient support in the record for the exclusion of upstream articles used in the manufacture of DRAMs.

Cease and desist orders — The Commission has determined not to issue a cease and desist order against Samsung. Section 337 states: "[i]n lieu of taking action under subsection (d) or (e) of this section [which provide for issuing permanent and temporary exclusion orders, respectively] the Commission may issue . . . an order directing such person to cease and desist from engaging" in unfair acts. Commissioner Eckes and Commissioner Lodwick note that the plain language of the statute permits the issuance of a cease and desist order only when the Commission has determined not to issue an exclusion order. Nothing in the legislative history supports another view. [214/] The limit of the statute's flexibility is reached when in a given investigation an exclusion order and a cease and desist order are based upon the finding of separate unfair acts. [215/] That is not this investigation.

213/ Samsung Semiconductor, Inc. also markets and sells DRAMs for the Korean Samsung respondents.

214/ The Report of the Senate Finance Committee on the bill that became the Trade Act of 1974 states:

> Section 337(f) of the Act, as amended by this bill, would be a new provision authorizing the Commission to issue cease and desist orders in lieu of excluding articles, against any person violating, or believed to be violating section 337. Such an order could be modified or revoked at any time, and when revoked, could be replaced by an exclusion order. It is clear to your committee that the exclusion of articles from entry, is so extreme or inappropriate in some cases that it is often likely to result in the Commission not finding a violation of this section, thus reducing the effectiveness of section 337 for the purposes intended.

S. Rep. 1298, 98th Cong., 1st Sess. 198.

215/ Certain Airtight Cast-Iron Stoves, Inv. No. 337-TA-69, USITC Pub. No. 1126 (1981); Certain Molded-In-Sandwich Panel Inserts and Methods for Their

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Commissioner Rohr notes that, in his view, the Commission has the authority to issue cease and desist orders in addition to an exclusion order in appropriate situations. In this case cease and desist orders would be aimed at inventories of DRAMs held in the United States by Samsung. Although there is evidence that Samsung had imported substantial volumes of infringing DRAMs and is continuing to sell such DRAMs from inventories, he does not believe that the volumes of infringing DRAMs that would be affected by cease and desist orders are sufficiently significant to warrant this additional remedy.

Chairman Liebeler and Vice Chairman Brunsdale would issue cease and desist orders to Samsung Co., Ltd. and to Samsung Semiconductor and Telecommunications Co., Ltd., prohibiting those firms from marketing, distributing, selling, or offering for sale in the United States 64K and 256K DRAMs imported in violation of section 337. An exclusion order will have no effect on infringing imports already in the United States; it will only affect future imports. In order to prevent the harm from the sale of inventories of infringing DRAMs already in the United States we would also issue cease and desist orders. It is consistent with the statute for the Commission to issue both orders because they apply to different goods; the exclusion order to future imports and the cease and desist orders to goods already in the United

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Installation, Inv. No. 337-TA-99, USITC Pub. No. 1246 (1982); Certain Plastic Food Storage Containers, Inv. No. 337-TA-152, USITC Pub. No. 1563 (1984); Certain Compound Action Metal Cutting Snips and Components Thereof, Inv. No. 337-TA-197, USITC Pub. No. 1831 (1986) (Commissioners Eckes and Lodwick dissenting); Certain Nut Jewelry and Parts Thereof, Inv. No. 337-TA-229, USITC Pub. No. 1929 (1986); Certain Miniature Hacksaws, Inv. No. 337-TA-237, USITC Pub. No. 1948 (1987) (Commissioners Eckes and Lodwick dissenting).

States. The issuance of both an exclusion order and cease and desist orders is also consistent with past Commission practice. 216/

BONDING

Section 337(g)(3) provides for the entry of infringing articles upon the payment of a bond during the 60-day Presidential review period. 217/ The bond is to be set at a level sufficient to "offset any competitive advantage resulting from the unfair method of competition or unfair act enjoyed by persons benefitting from the importation." 218/

TI argued that a bond in the amount of 100 percent ad valorem is necessary to offset the competitive advantage gained by the infringing imports in this investigation. Samsung argued that instead of a full value bond, the Commission should impose a "reasonable royalty" bond, in the amount of [ ] percent ad valorem for 64K DRAMs and [ ] percent ad valorem for 256K DRAMs. 219/ The IA asserted that the measurement of competitive advantage is complex, in light of the varying prices in the U.S. DRAM market, and the

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216/ Certain Airtight Cast-Iron Stoves, supra; Certain Molded-In-Sandwich Panel Inserts and Methods for Their Installation, supra; Certain Plastic Food Storage Containers, supra; Certain Compound Action Metal Cutting Snips and Components Thereof, supra; Certain Nut Jewelry and Parts Thereof, supra; Certain Miniature Hacksaws, supra.

217/ 19 U.S.C. § 1337(g)(3).

218/ S. Rep. 1298, 93d Cong., 2d Sess. 198 (1974); 19 C.F.R. 210.58(a)(3).

219/ Samsung calculated the bond amounts by taking the highest per unit royalty rate established in the licenses agreed to by former respondents in this investigation, and using that rate to calculate a percentage based on Samsung's current DRAM prices. Samsung argued that a bond amount based on the base royalty rate in the licenses entered into in settlement of this investigation establishes TI's valuation of the competitive advantage accruing to infringing respondents.

significant non-price benefits, including learning curve benefits, accruing to respondents by reason of infringing imports. Consequently, the IA also recommended a reasonable royalty bond, 220/ suggesting that the royalty amounts established between TI and settled respondents can be used as a starting point for calculating a bond amount. 221/

Competitive advantage here cannot be precisely calculated. The lack of precise price information and the relatively broad range of DRAM prices in the U.S. market preclude direct price comparisons between Samsung and TI DRAMs as the basis for the bond amount. Bonding is not to be imposed as a deterrent to importation during the Presidential review period, but rather to offset the competitive advantage enjoyed by the infringing imports. We believe that a full value bond would more than offset Samsung's advantage and would be an improper deterrent to importation.

We have determined to establish a bond based on a "reasonable royalty," as recommended by the IA and Samsung. However, we have selected an amount which is a multiple of the highest Base Rate from the TI license agreements concluded in this investigation, because of the non-price benefits gained by Samsung as a result of its unauthorized use of TI's patented technology. This amount comes to $0.22 for 64K DRAMs and $0.52 for 256K DRAMs. We also determine that, in the case of multi-DRAM units, whether SIPs, SIMs, circuit

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220/ Staff Brief at 20-23.

221/ Staff Reply Brief at 8-10. The IA suggested that the Commission use the "Base Rate" royalty amount established in those licenses. [

] and is presumably based at least in part on a calculation of the relative value of the parties' intellectual property rights cross-licensed in the agreement.

boards, downstream products, etc., the bond shall be based on the number of DRAMs in the articles, as certified by the importer.

As noted above, our understanding of the TI license agreements entered into during the investigation is that the actual royalty [ ] and presumably represents [ ] value of the patent portfolios being cross-licensed. Consequently, the Base Rate is presumably [ ] valuation of [ ] patent portfolio being licensed, in the context of an exchange of intellectual property rights. In the context of bonding, however, there is no exchange of intellectual property rights, and there has been a finding of infringement. Therefore we have concluded that an amount higher than the Base Rate royalty amount is appropriate to offset the competitive advantage gained by Samsung from its "free" use of TI's intellectual property. Although Customs generally prefers a percentage of entered value bond, Customs has stated that it can enforce a flat per DRAM bond without great problems. 222/

THE PUBLIC INTEREST 223/

Section 337(d) provides that the Commission shall issue a remedy unless, after considering the effect of such remedy upon (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) the U.S.

222/ Customs Reply at 6.

223/ Commissioner Eckes and Commissioner Rohr do not join in this section. See Dissenting Views of Commissioner Eckes and Commissioner Rohr on Remedy and Public Interest, infra.

production of articles that are like or directly competitive with those which are the subject of the investigation, and (4) U.S. consumers, it finds that a remedy should not be issued. 224/

The Commission has invoked public interest factors to deny relief to an injured domestic industry on only three occasions. Certain Automatic Crankpin Grinders, 337-TA-60, 205 U.S.P.Q. 71 (ITC 1979); Certain Inclined Field Acceleration Tubes, 337-TA-67, USITC Pub. 1119 (1980); Certain Fluidized Supporting Apparatus, Inv. No. 337-AT-182/188, USITC Pub. No. 1667 (1984). In Crankpin Grinders, relief was denied because of an overriding national policy in maintaining and increasing the supply of fuel efficient automobiles coupled with complainant's inability to adequately supply domestic demand. In Acceleration Tubes, there was an overriding public interest in continuing basic atomic research using imported acceleration tubes, which were of higher quality than the domestic product. In Fluidized Supporting Apparatus, the domestic producer could not supply demand for hospital beds for burn patients within a commercially reasonable time, and no therapeutically comparable substitute for care of burn patients was available.

We conclude that the public interest considerations set forth in the statute do not preclude the issuance in this investigation of a limited exclusion order of the scope set forth above. While there are vital national

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224/ 19 U.S.C. § 1337(d). This provision was added by the Trade Act of 1974. The legislative history makes clear that the public interest factors are to be the overriding considerations in the administration of the statute. S. Rep. No. 1298, 93rd Cong., 2d Sess. 193 (1974).

interests, including national security interests, which concern the DRAM industry, and the semiconductor industry, we do not believe that issuance of the limited exclusion order would harm those interests. DRAMs are not products which have general implications for the public health and welfare of the type at issue in the three prior section 337 cases where public interest considerations were determined to preclude issuance of a remedy. Moreover, while the domestic industry does not have adequate capacity to supply the entire domestic market, the universe of licensed foreign and domestic non-infringing suppliers, together with the domestic industry, has more than sufficient capacity. Thus, exclusion of a single producer's infringing product is not likely to have any adverse effect on the public health or welfare, competitive conditions in the U.S. economy, the production of like or directly competitive articles in the United States, or U.S. consumers. In Certain Aramid Fiber, 225/ the Commission excluded the product of the single alternate producer in the world from the U.S. market. In this case, there are numerous alternate sources of supply for U.S. purchasers of DRAMs, including the licensed former respondents.

225/ Inv. No. 337-TA-194, USITC Pub. 1824 (1986).

ADDITIONAL VIEWS OF CHAIRMAN LIEBELER
AND
VICE-CHAIRMAN BRUNSDALE

We have joined the Commission in its decision and opinion. However, we have additional views on the validity and infringement of the '764 patent and on the scope of the domestic industry.

I. The '764 Patent

We do not find that the ALJ's interpretation of the term "central region" or the ALJ's findings of fact and conclusions of law relating to validity and infringement were clearly erroneous, without governing precedent, or constitute an abuse of discretion. Accordingly, we would affirm the ALJ's findings regarding validity and infringement of the '764 patent.

II. DOMESTIC INDUSTRY

We join the Commission in its discussion of domestic industry. While the Commission included in the domestic industry certain of TI's domestic activities, it did not include general marketing, overhead, general and administrative expenses, royalties from licensees, or all TI's research, development, and design investments. These

activities are carried out in exploitation of the patents at issue and add value to TI's DRAMs. We believe these activities should also be included in the domestic industry.

As Chairman Liebeler first stated in Certain Products with Gremlins Character Depictions,[1] section 337 is a remedial statute designed to protect property rights (including intellectual property rights) from such unfair practices as patent infringement. An American patent owner should only have to show some domestic operations aimed at exploiting the patent by himself, his assignees, or his licensees.[2]

TI easily bears this burden. In addition to actually manufacturing some DRAMs in the United States, the record shows that TI did a considerable amount of research, development, and design in this country. All of these activities occurred in the

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1. Inv. No. 337-TA-201, USITC Pub. 1815, at 3 (1986) (dissenting views of Vice-Chairman Liebeler).

2. H.R. Rep. No. 571, 93rd Cong., 1st Sess. 78 (1973); Certain Double-Sided Floppy Disk Drives and Components Thereof, Inv. No. 337-TA-215, USITC Pub. 1860, at 28-29 (1986) (additional views of Vice-Chairman Liebeler).

United States, and all were aimed at exploiting TI's patents. Thus, TI argued, all should be considered in deciding whether a domestic industry exists.

The Commission partly agrees with TI, but it reasons that when Congress said "industry. . . in the United States,"[3] it meant production and production-related activities. Thus the Commission reasoned that only such research, development, and design as are coupled with "ongoing manufacturing activity in the United States" may be counted as a production-related activity.

While we agree with the Commission that production and production-related activities should be included in the domestic industry, we do not believe that section 337 or Commission precedent requires domestic production or production-related activities in order to find a domestic industry.[4] We think that all TI's American research,

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3. See 19 U.S.C. §1337(a).

4. See Certain Cube Puzzles, Inv. No. 337-TA-112, USITC Pub. 1334 (1983); Certain Airtight Cast Iron-Stoves, Inv. No. 337-TA-69, USITC Pub. 1126 (1981); Certain Airless Paint Spray Pumps and Components Thereof, Inv. No. 337-TA-90, USITC Pub. 1199 (1981); cited with approval in Schaper Mfg. Co. v. ITC, 717 F.2d 1368, 1373 (1983).

development, and design should be a part of the domestic industry. Equating domestic industry with domestic manufacturing or manufacturing related activities does not give as much protection to American patent owners as section 337 could and should provide.

We believe that all domestic activities associated with exploitation of a domestic patent should be included within the domestic industry. Patent holders do not make investment decisions based on whether activities are related to production. In the real world, inventors and investors don't think that way. They just recognize that they will have to spend money to exploit a patent. If they have, a "domestic industry" has begun. That is all that should be required.

With the growth of patent law to include software, plants and biotechnology, and the increasing importance of service industries, we should be wary that we do not import into a statute as important as section 337 an overly narrow view of the scope of protected domestic activities. If we do, we may cause unnecessary harm in the future, even if we do not today.

The Commission declined to include in the domestic industry certain of TI's upstream and downstream domestic activities supporting its overseas wafer fabrication operations. In this case, we would have included in the domestic industry TI's domestic activities (encapsulation, service, and sales, as well as some of TI's research and development and design) supporting TI's DRAMs for which wafers fabrication occurred abroad. Similar upstream and downstream activities were found to be a domestic industry in Cube Puzzles, Cast-Iron Stoves, and Spray Pumps and we would include them in the domestic industry here.

We join with the Commission in including in the domestic industry TI's 256K dram production facility in Texas, DMOS IV. We would have included it in the domestic industry whether or not it had begun operating. Likewise, we would also include the unused capacity of Motorola, a domestic producer which could have recommenced production at the time the complaint was filed, and was continuing to do research, repair, and marketing. There is no basis in the statute for requiring actual commercial production before extending the protection of section

337. Such an interpretation might have a significant deterrent effect on investment in intellectual property.[5]

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5. See Gremlins at 5-6 (dissenting views of Vice-Chairman Liebeler).

Dissenting Views of Commissioners Eckes and Rohr
Concerning Remedy and Public Interest

We concur with our colleagues that the appropriate remedy for the violation of section 337 found to exist in this investigation is a limited exclusion order. We nevertheless disagree most strongly with the scope of the exclusion order which our colleagues have submitted to the President for his approval. We find there is no justification for including, as our colleagues propose, downstream products, such as circuit boards containing any Samsung DRAMs, 1/ computers, facsimile equipment, telecommunication equipment, or printers, within the scope of such an order. We therefore respectfully dissent from the Commission's majority opinion.

In several recent investigations the Commission has considered the appropriateness of including downstream products within the scope of an exclusion order issued under the authority of section 337. In Aramid Fibers, 2/ the Commission specifically excluded downstream products from the ambit of its exclusion order and set forth the considerations which led it to that decision. The Commission found:

> For the Commission to issue an exclusion order, complainant must establish that each of the products to be excluded, individually or collectively, can have the effect or tendency to substantially injure or destroy the domestic industry. 3/

Further, the Commission also stated:

1/ Circuit boards containing only infringing Samsung DRAMs should certainly be excludable as attempts to circumvent a properly drafted Commission order. However, the proposed order contains no such limitation or justification.

2/ Certain Aramid Fibers, Inv. No. 337-TA-194, USITC Pub. 1824 (March 1986).

3/ Id. at 11.

> Consideration of the public interest factors also leads us to the conclusion that issuance of the broader exclusion order [sought by complainant] would not be in the public interest. 4/

More recently, in the context of a Commission proceeding to modify the exclusion order issued in Amorphous Metals, 5/ three members of this Commission determined to include downstream products in the exclusion order. They did so without explanation. In this investigation, a majority of the Commission has again determined to include downstream products within the scope of the order.

Complainant has not established in this proceeding that any downstream products, which incorporate Samsung DRAMs, have the effect or tendency to substantially injure or destroy the domestic industry. Further, the same public interest considerations that led the Commission to reject the inclusion of downstream products in the Aramid Fibers order are present in this investigation.

Section 337 prohibits only unfair methods of competition or unfair acts in the importation or sale of articles which substantially injure or destroy domestic industries. The plain meaning of the statute is that unless articles injure the domestic industry there is no basis in the statute for their prohibition. The Court of Appeals for the Federal Circuit has recognized that a smaller quantum of injury may justify an affirmative decision in a patent based section 337 investigation. 6/ However, there has never been a suggestion that articles may be excluded unless they have been shown to have the effect or tendency to substantially injure of destroy a domestic industry.

4/ Id. at 14.

5/ Certain Amorphous Metal and Amorphous Articles, Inv. No. 337-TA-143 (Modification of Exclusion Order Proceeding).

6/ Textron, Inc. v. USITC, 753 F.2d 1019, 1028 (1985); Corning Glassworks v. USITC, 799 F2d 1559, 1567 (Fed. Cir. 1986).

There are only two statements made by the ALJ in the ID that have any conceivable relationship to Samsung and downstream products. First, the ALJ stated, "Samsung's exports of downstream products contained DRAMS manufactured by Fujitsu." 7/ Then, the ALJ stated:

> Imports of downstream products containing accused DRAMs affect the sales of competitive downstream products of TI's customers and therefore adversely affect the demand for the U.S. industry's DRAMs. 8/

The only fact specific statement in the ID with regard to Samsung and downstream products is that Samsung's own downstream products contain DRAMs manufactured by a noninfringing producer rather than its own DRAMS (DRAMs from the only producer found to be infringing the patents at issue). This fact does not even remotely support a finding that downstream products containing Samsung DRAMs are injurious and thus entitled to be within the scope of an exclusion order.

The ALJ's second statement is a broad-based conclusion and presumably rests on a general reference to the transcript of the hearing. This reference contains certain estimates of DRAM consumption broken out to indicate the portion of total DRAM consumption represented by downstream products. 9/ A witness stated that measure of DRAM consumption would be inclusive of downstream products containing Samsung DRAMS. 10/ The only other reference to Samsung and downstream products in the transcript is an answer by TI's witness under cross examination that he had no

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7/ ID at 816.

8/ ID at 817.

9/ Tr. at 14874.

10/ Tr. at 14876.

knowledge about importation of downstream products containing Samsung DRAMs. 11/ Neither of these references establishes that downstream products containing Samsung DRAMs have injured the domestic industry. 12/

There is, in short, no evidence that any downstream products incorporating Samsung DRAMs have ever been imported into the United States. The lack of any such information precludes our finding that imports of downstream products containing infringing Samsung DRAMs have the effect of injuring the industry.

With regard to whether any downstream imports containing Samsung DRAMs might have the tendency to injure the domestic industry, there is no evidence that Samsung, or anyone else, intends to export any such products to the United States. There was no evidence that Samsung could or would switch from using Fujitsu noninfringing imports in those products it does export to the United States. There is therefore no evidence to support the contention that the general statement made by the ALJ has any applicability to Samsung.

With regard to the public interest, the Commission noted in Aramid Fibers, that at least two of the factors we must consider before determining to include downstream products within the scope of an exclusion order are whether such an order would be unduly burdensome on legitimate trade and whether the order contemplated is enforceable.

The order as drafted by the majority prohibits the import of any of the downstream products if they contain as much as a single prohibited DRAM. The

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11/ Tr. at 14970-71.

12/ The ALJ made certain findings with respect to downstream products incorporating DRAMs of other respondents. Specifically, the ALJ notes that accused DRAMS from Hitachi and NEC (whose DRAMS are not covered by this exclusion order) are found in certain downstream products imported into the United States. These findings, however, have no bearing on an exclusion order that is based on Samsung DRAMs.

products, themselves, might be valued at many thousands of dollars. In such situations, the Commission has, heretofore, consistently found that such products should not be prohibited entry.

The sweeping prohibition proposed by the majority could not be enforced short of opening every single piece of high technology equipment imported into the United States from any source to determine if any of the DRAMS are infringing Samsung DRAMs. Surely, such draconian measures are not contemplated by the statute. It is the Commission's responsibility to ensure that its order is, in the first instance, enforceable as written. In the present case, the order contemplated by the majority would burden a substantial amount of legitimate trade and would be impossible to enforce. The order would not, therefore, be in the public interest.