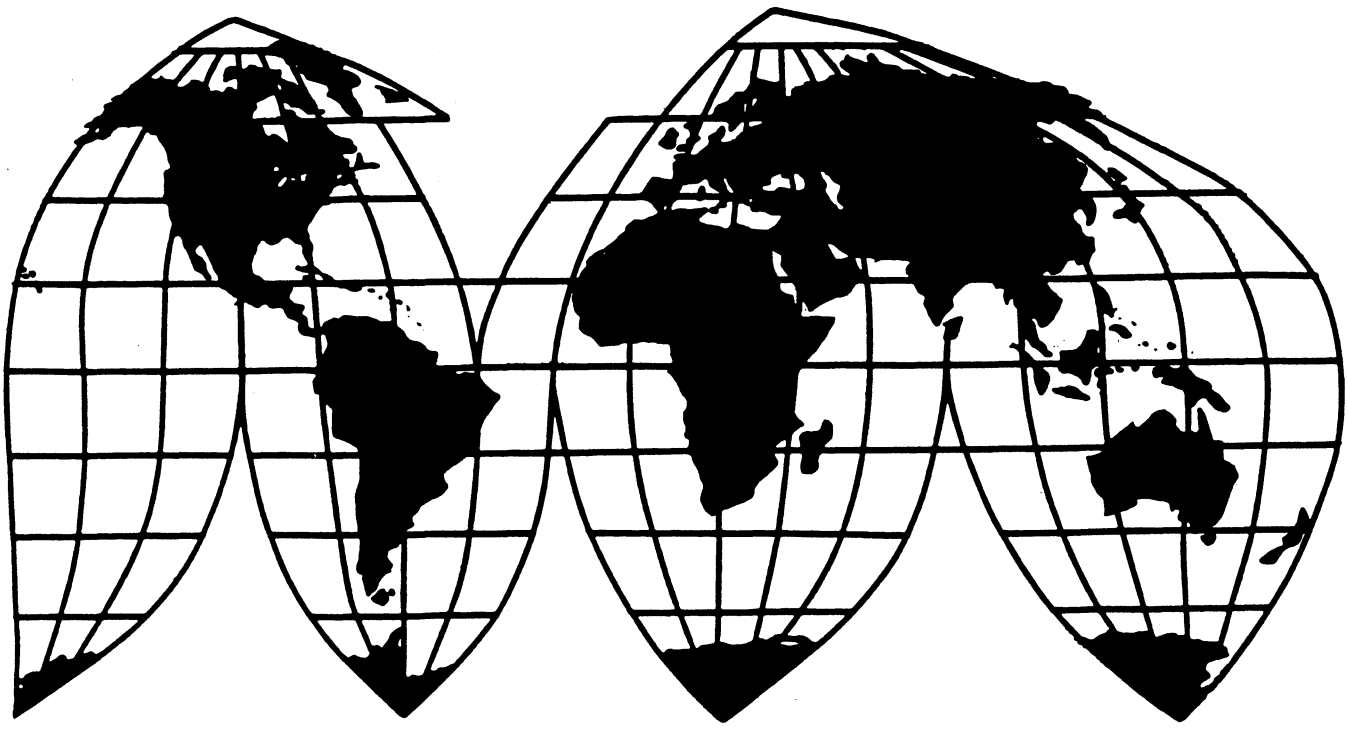
Static Random Access Memory Semiconductors From the Republic of Korea and Taiwan

Investigations Nos. 731-TA-761-762 (Preliminary)

Publication 3036 **April 1997**

U.S. International Trade Commission



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U.S. International Trade Commission

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NOTE

Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted from this report. Such deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigations Nos. 731-TA-761-762 (Preliminary)

STATIC RANDOM ACCESS MEMORY SEMICONDUCTORS FROM THE REPUBLIC OF KOREA AND TAIWAN

DETERMINATIONS

On the basis of the record[1] developed in the subject investigations, the United States International Trade Commission determines, pursuant to section 733(a) of the Tariff Act of 1930 (the Act),[2] that there is a reasonable indication that an industry in the United States is materially injured by reason of imports from the Republic of Korea (Korea)[3] and Taiwan[4] of static random access memory semiconductors (SRAMs),[5] that are alleged to be sold in the United States at less than fair value (LTFV).

Pursuant to section 207.18 of the Commission's rules, as amended,[6] the Commission also gives notice of the commencement of the final phase of its investigations. The Commission will issue a final phase notice of scheduling which will be published in the *Federal Register* as provided in section 207.21 of the Commission's rules upon notice from the Department of Commerce (Commerce) of an affirmative preliminary determination in the investigations under section 733(b) of the Act, or, if the preliminary determination is negative, upon notice of an affirmative final determination in that investigation under section 735(a) of the Act. Parties that filed entries of appearance in the preliminary phase of the investigations need not enter a separate appearance for the final phase of the investigations. Industrial users, and, if the merchandise under investigation is sold at the retail level, representative consumer organizations have the right to appear as parties in Commission antidumping and countervailing duty investigations. The Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to the investigations.

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[1]The record is defined in sec. 207.2(f) of the Commission's Rules of Practice and Procedure (19 CFR § 207.2(f)).

[2]19 U.S.C. § 1673b(a).

[3]Chairman Miller not participating.

[4]Chairman Miller and Commissioner Crawford not participating.

[5]The imported products subject to these investigations are synchronous, asynchronous, and specialty SRAMs, whether assembled or unassembled. Assembled SRAMs include all package types. Unassembled SRAMs include processed wafers or dice, uncut dice, and cut dice. Processed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country, are included in the scope; wafers produced in a third country and assembled or packaged in Korea or Taiwan are not included in the scope. The scope of the investigations also includes modules containing SRAMs. Such modules include single in-line memory modules (SIPs), single in-line memory modules (SIMMs), dual in-line memory modules (DIMMs), memory cards, or other collections of SRAMs, whether unmounted or mounted on a circuit board. The SRAMs subject to these investigations are provided for in subheadings 8542.13.80 and 8473.30.10 through 8473.30.90 of the Harmonized Tariff Schedule of the United States.

[6]61 FR 37818 (July 22, 1996).

BACKGROUND

On February 25, 1997, a petition was filed with the Commission and the Department of Commerce by Micron Technology, Inc., Boise, ID, alleging that an industry in the United States is materially injured and threatened with material injury by reason of LTFV imports of SRAMs from the Republic of Korea and Taiwan. Accordingly, effective February 25, 1997, the Commission instituted antidumping investigations Nos. 731-TA-761-762 (Preliminary).

Notice of the institution of the Commission's investigations and of a public conference to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of March 5, 1997.[7] The conference was held in Washington, DC, on March 18, 1997, and all persons who requested the opportunity were permitted to appear in person or by counsel.

[7]62 FR 10073.

VIEWS OF THE COMMISSION

Investigations Nos. 731-TA-761-762 (Preliminary)

STATIC RANDOM ACCESS MEMORY SEMICONDUCTORS FROM THE REPUBLIC OF KOREA AND TAIWAN

Based on the record in these investigations, we find that there is a reasonable indication that an industry in the United States is materially injured by reason of imports of static random access memory semiconductors ("SRAMs") from Korea and Taiwan that allegedly are sold in the United States at less than fair value ("LTFV").[1]

I. THE LEGAL STANDARD FOR PRELIMINARY DETERMINATIONS

The legal standard for preliminary antidumping duty determinations requires the Commission to determine, based upon the information available at the time of the preliminary determination, whether there is a reasonable indication that a domestic industry is materially injured, or threatened with material injury, by reason of the allegedly LTFV imports.[2] In applying this standard, the Commission weighs the evidence before it and determines whether "(1) the record as a whole contains clear and convincing evidence that there is no material injury or threat of such injury; and (2) no likelihood exists that contrary evidence will arise in a final investigation."[3] [4]

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[1] Chairman Miller did not participate in these investigations. Vice Chairman Bragg and Commissioner Newquist voted in the affirmative in both investigations. Commissioner Crawford voted in the affirmative in the investigation of allegedly LTFV imports from Korea and did not participate in the investigation of allegedly LTFV imports from Taiwan.

[2] 19 U.S.C. § 1673b(a); *see also* American Lamb Co. v. United States, 785 F.2d 994 (Fed. Cir. 1986); Calabrian Corp. v. United States, 794 F. Supp. 377, 381 (Ct. Int'l Trade 1992).

[3] American Lamb, 785 F.2d at 1001; *see also* Texas Crushed Stone Co. v. United States, 35 F.3d 1535, 1543 (Fed. Cir. 1994).

[4] Although these are the first investigations that we have conducted with respect to the industry producing SRAMs, we have conducted the following investigations involving DRAMs (dynamic random access memory semiconductors) and EPROMs (erasable programmable read only memories): DRAMs of One Megabit and Above from the Republic of Korea, 731-TA-556 (Preliminary), (Final) and (Remand), USITC Pubs. 2519, 2629, and 2997 (June 1992, May 1993 and Oct. 1996); Dynamic Random Access Memory Semiconductors of 256 Kilobits and Above from Japan, Inv. No. 731-TA-300 (Preliminary) USITC Pub. 1803 (January 1986); 64K Dynamic Random Access Memory Components from Japan, Inv. No. 731-TA-270 (Preliminary) and (Final) , USITC Pubs. 1735 and 1862 (August 1985 and July 1986); and Erasable Programmable Read Only Memories from Japan, Inv. No. 731-TA-288 (Preliminary) and (Final), USITC Pubs. 1778 and 1927 (Nov. 1985 and Dec. 1986).

II. DOMESTIC LIKE PRODUCT AND INDUSTRY

A. In General

To determine whether there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury by reason of the subject imports, the Commission first defines the "domestic like product" and the "industry."[5] Section 771(4)(A) of the Tariff Act of 1930 as amended ("the Act") defines the relevant industry as the "producers as a {w}hole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[6] In turn, the Act defines "domestic like product" as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation."[7]

Our decision regarding the appropriate domestic like product(s) in an investigation is a factual determination, and the Commission has applied the statutory standard of "like" or "most similar in characteristics and uses" on a case-by-case basis.[8] No single factor is dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.[9] The Commission looks for clear dividing lines among possible like products, and disregards minor variations.[10] Although the Commission must accept the determination of Commerce as to the scope of the imported merchandise allegedly sold at LTFV, the Commission determines what domestic product is like the imported articles Commerce has identified.[11]

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[5] 19 U.S.C. § 1677(4)(A).

[6] *Id.*

[7] *Id.* at § 1677(10).

[8] *See, e.g.,* Nippon Steel Corp. v. United States, 19 CIT __, Slip Op. 95-57 at 11 (Apr. 3, 1995). The Commission generally considers a number of factors including: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) customer and producer perceptions of the products; (5) common manufacturing facilities, production processes and production employees; and, where appropriate, (6) price. *See* Nippon Steel at 11, n.4; Timken Co. v. United States, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

[9] *See, e.g.,* S. Rep. No. 249, 96th Cong., 1st Sess. 90-91 (1979).

[10] Torrington Co. v. United States, 747 F. Supp. 744, 748-49 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991).

[11] Hosiden Corp. v. Advanced Display Manufacturers, 85 F.3d 1561 (Fed. Cir. 1996) (Commission may find a single like product corresponding to several different classes or kinds defined by Commerce); Torrington, 747 F. Supp. at 748-752 (affirming Commission determination of six like products in investigations where Commerce found five classes or kinds).

B. Product Description

In its notice of initiation, Commerce provided that the products subject to investigation are:

> *synchronous, asynchronous, and specialty SRAMs from Korea and Taiwan, whether assembled or unassembled. Assembled SRAMs include all package types. Unassembled SRAMs include processed wafers or die, uncut die, and cut die. Processed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country, are included in the scope; wafers produced in a third country and assembled or packaged in Korea or Taiwan are not included in the scope.*[12] [13]

The notice provided further that:

> *The scope of these investigations includes modules containing SRAMs. Such modules include single in-line processing modules ("SIPs"), single in-line memory modules ("SIMMs"), dual in-line memory modules ("DIMMs"), memory cards, or other collections of SRAMs, whether unmounted or mounted on a circuit board.*[14]

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[12] It is not entirely clear whether Commerce's definition of the subject merchandise includes SRAMs that are produced in Korea or Taiwan but assembled (or "packaged" or "cased") in a third country. The volume and value of imports of this type of SRAM are small compared to the volume and value of the rest of the subject imports. Confidential Report ("CR") at IV-4 to IV-5, Table IV-3; Public Report ("PR") at IV-3, Table IV-3. Thus, the inclusion or exclusion of this type of SRAM does not affect our determinations in these investigations. Nevertheless, we must determine whether to treat this type of SRAM as subject imports in our analysis. We note that the petition clearly included SRAMs produced in Korea or Taiwan but assembled in third countries. Petition at 8 ("Processed wafers fabricated in either Taiwan or Korea, but packaged, or assembled into memory modules, in a third country, are included in the scope"). No party to these investigations argued that Commerce's scope excluded this type of SRAM. The scope language includes SRAMs produced in Korea or Taiwan, but "packaged or assembled into memory modules in a third country." Although it is not clear, we believe that this language should be read to include SRAMs "packaged . . . in a third country," in addition to those "assembled into memory modules in a third country." Thus, based on the petition, the lack of contrary argument provided by the parties, and the scope definition itself, we have included SRAMs produced in Korea or Taiwan but assembled in third countries in the subject merchandise for purposes of these preliminary investigations.

[13] Commissioner Crawford notes that the scope language includes "(p)rocessed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country." Thus, unassembled SRAMs produced in Korea or Taiwan but packaged or assembled into memory modules in a third country are included in the scope language. The scope language, as written, does not include processed wafers produced in Korea or Taiwan and packaged or assembled into SRAMs in a third country that are not incorporated into SRAM memory modules. Although this is somewhat anomalous, particularly in light of the fact that the parties' arguments appear to define such imports as subject imports, the language of the scope is clear; it does not include wafers fabricated in Korea or Taiwan but assembled into SRAMs in third countries. Nonetheless, U.S. imports of such SRAMs account for less than 5 percent of all imports of assembled SRAMs made from wafers fabricated in Korea or Taiwan. CR at IV-4 to IV-5, IV-11, Tables IV-3, IV-8; PR at IV-3, IV-7 to IV-8, Tables IV-3, IV-8. Thus, given all the evidence in the record, she finds that, even without consideration of such third country imports as subject to the investigation, the domestic industry would have been materially better off, had the subject imports been fairly traded. For purposes of this preliminary investigation of Korea, she joins her colleagues' discussion of subject imports. In the final phase of these investigations, she intends to make her determination using the actual language of the scope.

[14] 62 Fed. Reg. 13596, 13597 (March 21, 1997).

SRAMs are integrated circuits containing thousands or millions of cells that allow data to be stored and retrieved at high speeds.[15] SRAMs vary by access speed (the time required to access data, measured in nanoseconds), density (the number of storage cells), and power consumption.[16] Unlike dynamic random access memory semiconductors ("DRAMs"), SRAMs do not require a periodic electrical pulse to maintain the information they contain.[17] SRAMs thus consume less power than DRAMs of comparable density.[18] An SRAM can also provide a faster access speed than a DRAM.[19] On the other hand, SRAMs are generally more complicated and expensive to produce than DRAMs.[20] For these reasons, SRAMs are used instead of DRAMs where faster access speeds or lower power consumption are required.[21]

SRAM fabrication begins with the creation of hundreds of identical circuit patterns on a silicon wafer.[22] The circuitry is created by the repetitive application of a series of photolithographic and chemical processes, which create microscopic channels on the face of the wafer that conduct or inhibit the flow of electricity.[23] While still on the wafer, these identical circuit patterns, each of which is a "die" or "chip," are tested electronically.[24] The wafer is then cut into individual dice, each of which is an unassembled (or "uncased" or "unpackaged") SRAM.[25] The dice then undergo assembly and further testing, often at a different facility or by a different company.[26] The process of fabricating the SRAM dice (referred to in the industry as "wafer fabrication") represents roughly 70-80 percent of the cost of production of an assembled SRAM, with the assembly and further testing accounting for the remainder.[27] Wafer fabrication requires heavy capital investment, in both research and development of constantly evolving product and process technology, as well as the highly sophisticated equipment required for the manufacture of these complex products.[28] The subsequent assembly and test process also requires significant capital investment, but is comparatively more labor intensive.[29]

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[15] CR at I-5; PR at I-4.

[16] CR at I-5; PR at I-4 (density); CR at I-6; PR at I-4 to I-5 (access speed); CR at I-10; PR at I-7 (power consumption).

[17] CR at I-5; PR at I-3 to I-4.

[18] CR at I-5, I-7 to I-8; PR at I-4, I-5.

[19] CR at I-5; PR at I-4.

[20] *Id.*

[21] *See id.*

[22] CR at I-8 to I-9; PR at I-6.

[23] *Id.*

[24] CR at I-9; PR at I-6.

[25] *Id.*

[26] *Id.*

[27] Transcript of March 18, 1997 conference ("Tr.") at 15 (Donnelly).

[28] CR at I-8; PR at I-6; Tr. at 16-19 (Donnelly) (regarding costs of capital investment, research and development, and manufacturing equipment).

[29] CR at I-9; PR at I-6.

C. Domestic Like Product Issue In These Investigations

At issue in these investigations is whether there should be a single domestic like product corresponding to the subject merchandise, as the petitioner argues, or whether, as the respondents argue, there should be separate domestic like products consisting, respectively, of "fast" SRAMs, defined as SRAMs with access speeds of 44 nanoseconds ("ns.") and faster, and "slow" SRAMs, defined as those with access speeds of 45 ns. and slower. As discussed below, based on the record in the preliminary phase of these investigations, we do not discern a clear dividing line between fast and slow SRAMs and thus we find a single domestic like product, consisting of all unassembled SRAMs, assembled SRAMs,[30] and SRAM memory modules.[31]

1. Physical characteristics and uses

The record establishes that physical characteristics and uses differ for SRAMs with access speeds at the extremes of the speed continuum. At the fast end of the speed continuum, 15 ns. and faster, SRAMs are used as cache memory, which is smaller but more rapidly accessible than the main memory it complements in mainframes, workstations, and newer generation personal computers.[32] SRAMs at the other end of the speed continuum, with access speeds of 70 ns. and slower, function as main memory for battery powered equipment including portable computers and hand-held cellular telephones, as well as for fax machines and modems. [33]

The record in the preliminary phase of these investigations, however, does not clearly indicate whether SRAMs closer to the center of the speed range differ in physical characteristics and uses. Because a characteristic such as access speed varies along a continuum, we do not view differences that exist at the extremes to be necessarily probative of differences closer to the center of the continuum. In fact, we would expect such differences to diminish or disappear in a comparison of two SRAMs with access speeds nearer the center of the continuum. Thus, the record lacks strong evidence of a clear dividing line between "fast" and "slow" SRAMS.

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[30] As described *infra* at n.56, we have included in the domestic industry companies that perform either wafer fabrication or assembly in the United States. Thus, the data on which we have relied regarding the domestic product consisting of "assembled" SRAMs include both U.S. fabricated dice, regardless of where assembled, and SRAMs fabricated in third countries that are assembled in the United States. *See, e.g.,* CR at III-15, Table III-9; PR at III-11, Table III-9.

[31] In the most recent DRAMs investigation, we considered (1) whether assembled and unassembled DRAMs should be separate like products; (2) whether DRAMs of different densities should be separate like products; and (3) whether DRAM memory modules constitute a separate like product. DRAMs of One Megabit and Above from the Republic of Korea, Inv. No. 731-TA-556 (Final), USITC Pub. 2629 at 6-12 (Views of the Commission) and 35-39 (Dissenting Views of Vice Chairman Watson and Commissioners Brunsdale and Crawford (May 1993). The Commission found a single domestic like product in the DRAMs investigation. *Id.* In the present investigations, despite a request from the Commission, none of the parties addressed whether there should be separate like products for any of the reasons stated above. Tr. at 53-54 (Diehl) (requesting comments). Because no party presented argument on these issues, and because the record did not indicate a basis for finding separate like products, we do not find separate domestic like products for assembled and unassembled SRAMs, SRAMs of different densities, or SRAM memory modules.

[32] CR at I-7 to I-8; PR at I-5; Tr. at 79-80 (Eminian).

[33] CR at I-7 to I-8; PR at I-5; Tr. at 79 (Eminian).

Further blurring distinctions between SRAMs above and below the proposed 44/45 ns. breakpoint is the lack of consensus within the industry regarding the meaning of "fast" and "slow." Not only do various industry sources disagree on the definition of fast and slow, but most identify a "very fast" category as well.[34] In addition, access speeds for all types of SRAMs increased during the period of investigation.[35] One industry source changed its fast/slow breakpoint from 69/70 ns. to 44/45 ns. during the period of investigation.[36] To the extent that a dividing line exists between fast and slow SRAMs, therefore, it is not only far from clearly discernible, but appears to be a moving target.

2. Interchangeability

SRAMs at the extremes of the access speed continuum are interchangeable to a limited degree.[37] Slower SRAMs (70 ns. and slower) can function in end uses that typically require faster SRAMs (15 ns. and faster), although they greatly reduce performance.[38] Conversely, faster SRAMs can function in end uses usually served by slower SRAMs, but they similarly reduce the application's performance because of their generally greater power needs.[39] Nevertheless, domestic industry representatives reported selling faster SRAMs for use in applications generally considered suitable for slower SRAMs.[40] It is unclear from the limited record information available whether interchangeability of SRAMs nearer the center of the access speed continuum is also limited.

3. Channels of distribution

The record indicates that both fast and slow SRAMs are sold to original equipment manufacturers ("OEMs") as well as to a variety of distributors.[41] Compared to slow SRAMs, a greater proportion of fast SRAMs is sold to OEMs than to distributors, but there remains a considerable overlap.[42]

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[34] CR at I-6, n.15; PR at I-4 to I-5, n.15; and Postconference Brief of Petitioner Micron Technology, Inc. (hereinafter "Petitioner's Postconference Brief") at 5-6 (citing industry sources defining the categories "fast" and "slow" differently, and also identifying a "very fast" category); Postconference Brief of Samsung Electronics Co., Ltd., Samsung Semiconductor, Inc., Hyundai Electronics Industries, Co., Ltd., Hyundai Electronics America, Inc., LG Semicon Co., Ltd. and LG Semicon America, Inc. (hereinafter "Korean respondents' Postconference Brief") at Exhibit 1 ("Buying Strategies -- How To Buy SRAMS" at 1, appearing in Electronic Buyers' News)(mentioning a category of "medium" SRAMs defined as those with access speeds of 20 ns. and above).

[35] CR at I-6 to I-7; PR at I-5.

[36] Petitioner's Postconference Brief at 5 and Exhibit 1 (comparing definitions used by In-Stat in May 1994 and January 1997).

[37] CR at I-10; PR at I-7.

[38] *Id.*

[39] *Id.*

[40] Tr. at 158 (Bruneau), 160 (Cloud).

[41] CR at I-12; PR at I-8.

[42] CR at I-12 to I-13; PR at I-8 to I-9.

4. Production facilities, processes, and employees

The production processes for fast and slow SRAMs are similar.[43] Both fast and slow SRAMs are produced on silicon wafers, by the repeated application of photolithographic and chemical procedures.[44] There are, however, differences in the mask sets used in the photolithographic process for fast and slow SRAMs.[45] A producer apparently can shift production between fast and slow SRAMs with relative ease, especially if it has already developed the designs for both.[46]

5. Customer or producer perceptions

Some customers do not perceive a clear dividing line between fast and slow SRAMs because they find these categories too general to be of interest.[47] Other customers, however, purchase fast or slow SRAMs only and thus do perceive fast and slow SRAMs differently.[48] Some customers view fast SRAMs as less of a commodity-type product than slow SRAMs. Despite their complexity, all SRAM products generally become commodity-like with the passage of time, although new products are developed more frequently in the faster access speeds than in the slower ones.[49]

6. Price

The record is mixed regarding whether prices differ for fast and slow SRAMs. Several industry representatives indicated that fast SRAMs are more difficult to produce and thus command up to twice the price of slow SRAMs.[50] Other representatives, however, indicated that price effects in one area of the market can affect other areas as well.[51] [52]

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[43] CR at I-9; PR at I-6.

[44] CR at I-8 to I-9; PR at I-6.

[45] CR at I-9; PR at I-6.

[46] Postconference Brief of Winbond Electronics Corporation, Integrated Silicon Solutions (Taiwan), Inc., Taiwan Semiconductor Manufacturing Corporation, U-Tron Technology, Inc., Vanguard Semiconductor Corporation, E-Tron Technology, Inc., and Mosel-Vitelic, Inc. (hereinafter "Taiwanese respondents' Postconference Brief") at 19; Tr. at 132, 135-36 (G. Fischer), 147-49 (G. Fischer & Reilly).

[47] CR at I-11; PR at I-8.

[48] *Id.*

[49] CR at I-12 to I-14; PR at I-8 to I-9 (indicating that over time SRAMs become commodity-like); Tr. at 41-42 (Love) (indicating that despite their complexity, SRAMs become commodity-like).

[50] CR at I-14; PR at I-9.

[51] *Id.*

[52] Although they speak to price differences among the subject imports rather than the domestic like product, we note that limited data on the prices of fast and slow SRAMs imported from Korea show that the price of fast SRAMs was higher than the price of slow SRAMs for most, but not all, of the period of investigation. CR at V-16; PR at V-6.

7. Conclusion

The current record does not indicate clear differences among SRAMs at a defined point along the access speed continuum. We thus do not find SRAMs with access speeds of 44 ns. and faster to be a separate like product from SRAMs with access speeds of 45 ns. and slower. Accordingly, we find, for purposes of these preliminary investigations, a single domestic like product consisting of all SRAMs, including unassembled SRAMs, assembled SRAMs, and SRAM memory modules. We intend to re-examine this issue, however, in the final phase of these investigations.[53]

D. Domestic Industry and Related Parties

1. Definition of the Industry

The Commission is directed to consider the effect of the subject imports on the domestic industry, defined as "the producers as a {w}hole of a domestic like product."[54] In defining the domestic industry, the Commission's general practice has been to include in the industry all of the domestic production of the like product, whether toll produced, captively consumed, or sold in the domestic merchant market.[55] We define the domestic industry to include all U.S. producers of the domestic like product, as defined above.[56] [57]

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[53] We will consider, for example, the argument that there is a clear dividing line between fast and slow SRAMs because there is relatively little production of SRAMs with access speeds between 15 and 70 ns. *See, e.g.* Tr. at 106-107 (Eminian). We expect that any parties with views on this issue will indicate the information that we should seek in final questionnaires regarding whether a clear dividing line exists. We also request comments regarding whether the dividing line, if any, is different for different generations of SRAMs.

[54] 19 U.S.C. § 1677(4)(A).

[55] *See* United States Steel Group v. United States, 873 F. Supp. 673, 682-83 (Ct. Int'l Trade 1994), *aff'd*, 96 F.3d 1352 (Fed. Cir. 1996); Needle Bearing Wire from Japan, Inv. No. 731-TA-766 (Preliminary) USITC Pub. 3033 at 6 (April 1997); Collated Roofing Nails from China, Korea, and Taiwan, Invs. Nos. 731-TA-757-759, USITC Pub. 3010 at 7 (Jan. 1997).

[56] For purposes of the preliminary determinations in these investigations, we have included in the domestic industry companies that perform either wafer fabrication or assembly in the United States. We requested the parties to address this issue, inviting them to contrast the present investigations with the most recent DRAMs final investigation. Tr. at 53-54 (Diehl) (inviting comment); DRAMs of One Megabit and Above from the Republic of Korea, 731-TA-556 (Final), USITC Pub. 2629 at 12-16 (Views of the Commission), 40-41 (Dissenting Views of Vice Chairman Watson and Commissioners Brunsdale and Crawford) (May 1993)(finding that companies that perform either wafer fabrication or assembly in the United States should be included in the domestic industry). Most U.S. producers perform both operations in the United States (although they often perform assembly offshore as well); a few perform only wafer fabrication in the United States, and have assembly performed offshore. CR at III-4, Table III-1; PR at III-5, Table III-3. The staff identified only one company, ***, that assembled a small quantity of SRAM dice fabricated in ***, but did not otherwise produce SRAMs in the United States. The record contains limited information for the company regarding the six factors that the Commission generally considers in determining whether a company has engaged in sufficient production-related activity to be considered part of the domestic industry. The limited information, however, indicates that *** added significant value to the product, which is one of the factors generally considered. *Compare* *** response to the Producers' questionnaire at 12 *to* its response to the Importers' questionnaire at 14. In the final phase of these investigations, we will seek additional information regarding *** assembly operations, which accounted for only *** percent of the domestic production of assembled SRAMs, and *** percent of the domestic production of both unassembled SRAMs and SRAM memory modules, and will again examine whether *** engages in sufficient production-related activity to be considered a domestic producer of the domestic like product. CR at III-4, Table III-1; PR at III-3, Table III-1.

(continued...)

2. Related Parties

We have considered whether two producers, ***, should be excluded from the domestic industry under the "related parties" provision of the statute. The statute allows the Commission to exclude certain domestic producers[58] from the domestic industry for the purposes of an injury determination, if appropriate circumstances exist.[59] Exclusion of such a producer is within the Commission's discretion based upon the facts presented in each case.[60]

***, a producer of the domestic like product, imported the subject merchandise during the period of investigation.[61] Thus, *** is a "related party," and the Commission may exclude it from the domestic industry if "appropriate circumstances" exist.[62] We do not find that appropriate circumstances exist to

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[56](...continued)
The staff also identified a company, ***, that produces SRAM memory modules, but does not otherwise produce the domestic like product. We did not, however, receive data from *** in time to integrate it into the industry data. CR at III-1, n.4; PR at III-1, n.4 (indicating late receipt of *** questionnaire response). Thus, we have not determined whether firms that produce only SRAM memory modules engage in sufficient production-related activity to be included in the domestic industry. We note that *** share of domestic production is very ***. Measured in billions of bits, *** assembly of SRAM memory modules is less than *** percent of domestic SRAM memory module production, which in turn is *** than domestic production of SRAM dice and assembled SRAMs. *Compare* CR at C-9, Table C-3; PR at C-3, Table C-3 *to* *** response to the producer's questionnaire, at 13 (regarding *** share of domestic memory module production); *and compare* CR at C-9, Table C-3; PR at C-3, Table C-3 *to* CR at III-11 to III-12, Tables III-5, III-6, PR at III-6 to III-7, Tables III-5, III-6 (regarding the volume of SRAM memory module production compared to production of SRAM dice and assembled SRAMs). We also note that we examined a similar issue in DRAMs of One Megabit and Above from the Republic of Korea, Inv. No. 731-TA-556 (Final), USITC Pub. 2629 at 14-15 (Views of the Commission) and 41 (Dissenting Views of Vice Chairman Watson and Commissioners Brunsdale and Crawford) (May 1993).

[57] Commissioner Crawford notes that it is somewhat anomalous to treat a company such as ***, which assembles but does not otherwise produce SRAMs, as a producer of the "domestic like product" while we treat all imports as originating where the wafers were produced, regardless of where they were assembled. She will re-examine this issue in the final phase of these investigations and, as before, invites the parties to present their views.

[58] A domestic producer may be excluded from the domestic industry if it is either related to the exporters or importers of the subject merchandise, or is itself an importer of the subject merchandise. Parties are considered to be related if one party directly or indirectly controls another party, or if both are controlled by a third party. Direct or indirect control exists when "the party is legally or operationally in a position to exercise restraint or direction over the other party." 19 U.S.C. § 1677(4)(B).

[59] 19 U.S.C. § 1677(4)(B).

[60] *See* Torrington Co. v. United States, 790 F. Supp. at 1168; Sandvik AB v. United States, 721 F. Supp. 1322, 1331-32 (Ct. Int'l Trade 1989), *aff'd without opinion*, 904 F.2d 46 (Fed. Cir. 1990); Empire Plow Co. v. United States, 675 F. Supp. 1348, 1352 (Ct. Int'l Trade 1987).

[61] Table 1 "Cased SRAMs: Subject U.S. imports, U.S. shipments of subject imports, U.S. shipments of 'domestic product,' U.S. assembly, and U.S. assembly (REVISED PROXY) for producers that are also importers of the subject product, by firms, 1994-96" {hereinafter "Table 1"} (Table not included in staff report but included in the record); Memorandum to the file from Michael Diehl regarding March 27, 1997 telephone conversation with ***, counsel to ***.

[62] Factors the Commission has examined in deciding whether appropriate circumstances exist to exclude a related party include the percentage of domestic production attributable to the importing producer; the reason the U.S. producer has decided to import the product subject to investigation; whether inclusion or exclusion of the related party will skew the data for the rest of the industry; the ratio of import shipments to U.S. production for related
(continued...)

exclude *** from the industry. *** interests appear to be those of a producer rather than an importer because the amount of importation appears to be modest relative to *** production.[63] Moreover, the company does not appear to be deriving any benefit from its importation of the subject merchandise such that its inclusion in the domestic industry would skew the data for the rest of the industry.[64]

*** is another domestic producer that is a "related party" because of its imports of the subject merchandise.[65] We do not find that appropriate circumstances exist to exclude *** from the domestic industry. *** interests appear to be those of a producer rather than an importer because its imports appear modest relative to its domestic production.[66] Because its imports are *** in relation to its domestic production, *** financial position does not appear to be significantly affected by its imports of the subject merchandise, and thus its inclusion in the domestic industry is not likely to skew the data for the rest of the industry.

III. CONDITION OF THE DOMESTIC INDUSTRY

In assessing whether there is a reasonable indication that the domestic industry is materially injured or threatened with material injury by reason of allegedly LTFV imports, we consider all relevant economic factors that bear on the state of the industry in the United States.[67] These factors include output, sales, inventories, capacity utilization, market share, employment, wages, productivity, profits, cash flow, return on investment, ability to raise capital, and research and development. No single factor is dispositive and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[68] [69]

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[62](...continued)
producers; and whether the primary interest of the related producer lies in domestic production or importation. *See, e.g.*, Torrington Co. v. United States, 790 F. Supp. 1161 (Ct. Int'l Trade 1992), *aff'd without opinion*, 991 F.2d 809 (Fed. Cir. 1993). *See also* Open-End Spun Rayon Singles Yarn from Austria, Inv. No. 731-TA-751 (Preliminary), USITC Pub. 2999 at 7, n.39 (Oct. 1996).

[63] The company reported that its imports of the subject merchandise were *** in relation to its production and that it imported subject SRAMs ***. Memorandum to the file from Michael Diehl regarding March 27, 1997 telephone conversation with ***, counsel to ***. Other record data, however, indicated that *** subject imports may be significant for some products. Table 1. In the final phase of these investigations, we intend to seek complete data from *** on this issue.

[64] CR at VI-6, Table VI-2; PR at VI-3, Table VI-2 (showing *** operating income (loss) as a percentage of net sales falling within the range of other members of the domestic industry).

[65] *See* Table 1; CR at IV-2, Table IV-1; PR at IV-1, Table IV-1.

[66] *See* Table 1.

[67] 19 U.S.C. § 1677(7)(C)(iii).

[68] *Id.*

[69] Commissioner Crawford joins her colleagues in these investigations in a discussion of the "condition of the industry" even though she does not make her determination based on industry trends. Rather, she views the discussion of the data collected concerning the statutory impact factors as a factual recitation.

We have considered whether the captive production provision requires us to focus our analysis on the merchant market in assessing market share and the factors affecting the financial performance of the domestic industry.[70] [71] [72] We are unable to determine the exact proportion of total domestic production that is sold in the merchant market, or the proportion that is transferred internally for further processing into downstream products. Examining production of unassembled SRAMs, assembled SRAMs, and SRAM memory modules separately, however, we determine that significant production is both sold in the merchant market and transferred internally for further processing into downstream products.[73]

Nevertheless, we find that the captive production provision is not applicable in these investigations because factor (III) is not satisfied. Factor (III) requires that the production of the domestic like product sold in the merchant market not generally be used in the production of the same

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[70] This statute provides:

> If domestic producers internally transfer significant production of the domestic like product for the production of a downstream article and sell significant production of the domestic like product in the merchant market, and the Commission finds that --
>
> > (I) the domestic like product produced that is internally transferred for processing into that downstream article does not enter the merchant market for the domestic like product,
> >
> > (II) the domestic like product is the predominant material input in the production of that downstream article, and
> >
> > (III) the production of the domestic like product sold in the merchant market is not generally used in the production of that downstream article,
>
> then the Commission, in determining market share and the factors affecting financial performance set forth in clause (iii), shall focus primarily on the merchant market for the domestic like product. 19 U.S.C. § 1677(7)(C)(iv).

[71] Commissioner Newquist takes no position on whether each of the provision's "factors" or "tests" are satisfied. He concurs, however, that in these investigations it is appropriate to assess the domestic industry as a whole.

[72] Commissioner Crawford finds that the third statutory test, whether "the production of the domestic like product sold in the merchant market is not generally used in the production of that downstream article," is not met for the reasons discussed *infra*. She does not join in her colleagues' discussion of other captive production issues.

[73] *See* CR at III-13 and III-15 to III-16, Tables III-7, III-9, III-10; PR at III-8, III-10 to III-11, Tables III-7, III-9, III-10 (showing internal transfers and domestic shipments). Domestic producers did not report whether internal transfers of the domestic like product were used to produce other forms of the domestic like product (such as using assembled SRAMs to produce SRAM memory modules) or for further processing into distinct downstream articles (such as computers and hand held cellular telephones). However, the domestic industry's internal transfers of assembled SRAMs were *** than its production of SRAM memory modules. *Compare* CR at III-15, Table III-9; PR at III-11, Table III-9 (showing internal transfers, in billions of bits, of U.S.-fabricated dice (regardless of where cased) and dice fabricated in third countries that are assembled in the United States) *to* CR at C-9, Table C-3; PR at C-3, Table C-3 (showing production, in billions of bits, of SRAM memory modules). Thus, even if all SRAM memory modules were made from internally transferred assembled SRAMs, the vast majority of internally transferred SRAMs were used for other purposes. Further, because the record indicates no end uses for SRAMs other than SRAM memory modules and distinct downstream products, we find that the internally transferred SRAMs not used for memory modules were transferred for further processing into distinct downstream products. Accordingly, we find that both the proportion of domestic production sold in the merchant market and that internally transferred for further processing into distinct downstream products are significant.

downstream article produced from internal transfers. The record does not establish that factor (III) is satisfied in these investigations, because SRAMs sold in the merchant market are used in the production of the same downstream articles for which SRAMs were internally transferred.[74]

Several conditions of competition are pertinent to our analysis of the domestic SRAM industry. First, the SRAM market is characterized by the frequent introduction of more advanced versions or generations of the domestic like product, which then tend to replace existing products.[75] The first producer to market a superior product, or to become a qualified supplier of a new product to a major purchaser, often enjoys favorable pricing for a certain period.[76] As other producers enter the market, however, prices are driven down, and the product in question changes in character from a high value-added product to a commodity-type product. Price then becomes the primary factor in purchasing decisions.[77] Also, producers advance along a "learning curve" as they ramp up production and gain experience following the introduction of a new product, meaning that they are able to reduce their production costs for that product at a rate of approximately 30-35 percent per year.[78]

Second, we note that SRAM production -- particularly wafer fabrication -- requires substantial and continuous investment to develop new products, lower production costs, and increase productive capacity. Without such investment, a producer cannot hope to be the first to market a new product.[79] Continuous investment is also necessary to increase the proportion of useable dice and the number of dice on each wafer, thereby lowering costs and allowing producers to be price-competitive.[80] Moreover, in a rapidly growing market such as that for SRAMs, failure to expand production capacity results in the loss of market share, which in turn affects a producer's ability to maintain the production volumes needed to keep driving its costs down the learning curve.[81]

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[74] CR at I-7 and II-1; PR at I-5 and II-1 (SRAMs used in the production of various downstream memory applications, with no alternative uses indicated).

[75] CR at I-13; PR at I-9.

[76] Commissioner Crawford notes that the Korean respondents in these investigations allege that Samsung was the first qualified supplier of the pipeline burst type of SRAM to Intel Corporation, a large SRAM purchaser. Tr. at 86 (Eminian); Korean respondents' Postconference Brief at 28-29. Pipeline burst SRAMs are alleged to offer slightly inferior performance than SRAMs made by more advanced processes, but at a significantly lower cost. Tr. at 101 (Eminian). The Korean respondents allege that U.S. producers inadvertently dampened demand for U.S. products by failing to develop this technology in a timely manner. Korean respondents' Postconference Brief at 29. U.S. producers reject the contention that they were slow to develop this technology, arguing that they in fact pioneered it. Tr. at 160-61 (Cloud).

[77] CR at I-11, I-13, II-4; PR at I-9, II-3. The Korean respondents argued that factors other than price, including quality and reliability, are important in purchasing decisions. CR at II-5; PR at II-3 to II-4.

[78] CR at V-1; PR at V-1 (citing Tr. at 156 (G. Kaplan) (indicating that "learning curve" represents cost reductions of approximately 30-35 percent per year); Tr. at 83 (Eminian) (using term "learning curve"), 16-20 (Donnelly) (describing investments intended to lower cost of production).

[79] Tr. at 21 (Donnelly).

[80] Tr. at 15-21 (Donnelly).

[81] Tr. at 37-38 (Love).

Finally, in part as a result of the conditions discussed above, the SRAM industry is volatile, with alternating periods of "undersupply" and "oversupply" of both individual SRAM products and SRAMs in general.[82] While demand for SRAMs increases in a more or less continuous fashion, supply increases occur in large and discrete increments as producers bring new fabrication facilities ("fabs") online.[83] Moreover, because a new fab can require up to two years (and over $1 billion in capital) to construct, SRAM producers must rely on forecasts of demand when deciding whether to increase capacity.[84] Where forecasts prove inaccurate, significant undersupply or oversupply can result.

Such periods of undersupply and oversupply occurred during the period of investigation. In early 1995, demand for SRAMs was expected to increase sharply in the near future.[85] It was widely forecast that approximately 80 percent of new personal computers using Intel's Pentium microprocessors would be sold with a cache memory provided by SRAMs.[86] SRAM producers therefore invested in new fabs to meet the expected demand.[87] Meanwhile, purchasers built up inventories in anticipation of a shortage, and drove SRAM prices sharply higher.[88] By mid-1996, however, it became apparent that only about 20 percent of new personal computers with Pentium microprocessors contained SRAM cache memory.[89] As new fabs came online and purchasers drew down or sold off large inventories, SRAM supply expanded and prices fell significantly (falling below 1994 levels in the second half of 1996).[90]

In discussing the condition of the industry, we present data separately for unassembled SRAMs, assembled SRAMs, and SRAM memory modules.[91] [92] We note that of the three types of products, assembled SRAMs accounted for the vast majority of consumption and domestic shipments, while unassembled SRAMs accounted for the vast majority of domestic production and end-of-period inventories.

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[82] Tr. at 125-31 (Reilly).

[83] Tr. at 126 (Reilly), 169 (G. Fischer). The fabs typically produce other types of integrated circuits as well as SRAMs. Tr. at 126 (Reilly).

[84] Tr. at 126 (Reilly), 169 (G. Fischer) (two years' lead time required for fab construction and producers must rely on forecasts of demand); CR at I-8; PR at I-6 (fab construction costs exceed $1 billion).

[85] CR at V-1; PR at V-1; Tr. at 127-28 (Reilly).

[86] CR at V-1; PR at V-1.

[87] Tr. at 128 (Reilly) (producers gearing up for production in 1995) and 169 (G. Fischer) (new fabs coming on line in 1996).

[88] CR at V-1; PR at V-1; Tr. at 127 (Reilly).

[89] CR at V-1; PR at V-1; Korean respondents' Postconference Brief at Exhibit 1 ("SRAM module market fading in and out?" at 1, appearing in Electronic Buyers News (June 10, 1996)).

[90] CR at V-8 to V-11, V-14 to V-15, Tables V-3 and V-4 and Figures V-4 and V-5; PR at V-4 to V-5, Tables V-3 and V-4 and Figures V-4 and V-5 (showing, for the two products on which prices were reported for the 1994-96 period, that prices were lower in the second half of 1996 than in 1994).

[91] We are unable to present the data for SRAM dice, assembled SRAMs, and SRAM memory modules together. The fabrication of SRAM dice, assembly of SRAMs, and production of SRAM memory modules often takes place at different companies and in different countries. Because the record in many cases does not allow us to trace, for example, SRAM dice in subsequent manufacturing stages, double counting would result if we combined the data. Thus, we present the data separately.

[92] Several domestic producers provided less than complete responses to Commission questionnaires in the preliminary phase of these investigations. While we are cognizant of the difficulties some producers encountered in providing information in the form requested, in the final phase of these investigations, we expect timely and complete responses from all interested parties receiving questionnaires.

For unassembled SRAMs, apparent U.S. consumption fluctuated, but fell during the period of investigation, whether measured by quantity or value.[93] [94] For assembled SRAMs, apparent U.S. consumption rose from 1994 to 1995 in both quantity and value terms.[95] From 1995 to 1996, apparent U.S. consumption of assembled SRAMs continued to rise in terms of quantity (in bits), but fell in value, due to falling prices.[96] For SRAM memory modules, apparent consumption rose from 1994 to 1995, and again from 1995 to 1996, by quantity and by value.[97]

U.S. producers' shipments of unassembled SRAMs, measured in bits, fluctuated during the period of review, rising from 1994 to 1995 but then falling in 1996 to a level below that of 1994. By value, U.S. producers' shipments of unassembled SRAMs followed the same pattern, but fell more steeply overall from 1994 to 1996.[98] For assembled SRAMs, the quantity of U.S. shipments measured in bits rose from 1994 to 1995, and again from 1995 to 1996.[99] By value, however, U.S. shipments of assembled SRAMs rose from 1994 to 1995, but declined from 1995 to 1996 to a level above the 1994 level.[100] For SRAM memory modules, measured in bits, U.S. shipments rose from 1994 to 1995, and from 1995 to 1996.[101] By value, U.S. shipments of memory modules rose from 1994 to 1995, then fell in 1996 to a level above that in 1994.[102]

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[93] Much of the information described here is business confidential. Accordingly, such information is bracketed and appears only in the confidential version of this opinion. For 1994, 1995, and 1996, U.S. apparent consumption of unassembled SRAMs, measured in billions of bits, was *** respectively. By value, in thousands of dollars, apparent consumption was *** for the same years. Measured by thousands of units, apparent consumption was ***. CR at IV-15, Table IV-11; PR at IV-10, Table IV-11.

[94] As the density of SRAMs increases on average from year to year, it is possible for the number of bits to climb for a given measure at the same time that the number of units falls. For example, four 256K SRAMs consumed in 1994 are greater in units but less in bits than two 1Meg SRAMs consumed in 1995. In considering quantities, we have generally focused more on bits than on units. Because a given unit can represent a varying amount of memory, we believe using bits we are better able to compare across different product types and years.

[95] Measured in billions of bits, apparent U.S. consumption of assembled SRAMs was *** for 1994, *** for 1995, and *** for 1996. By value, in thousands of dollars, apparent consumption was *** for 1994, *** for 1995, and *** for 1996. In thousands of units, apparent consumption was *** for 1994, *** for 1995, and *** for 1996. CR at IV-16, Table IV-12; PR at IV-11, Table IV-12. *See* CR at V-4 to V-15 (regarding falling prices).

[96] *Id.*

[97] In billions of bits, apparent U.S. consumption of SRAM memory modules was *** in 1994, *** in 1995, and *** in 1996. By value, in thousands of dollars, apparent consumption was *** in 1994, *** in 1995, and *** in 1996. CR at IV-18, Table IV-13; PR at IV-13, Table IV-13.

[98] In billions of bits, U.S. shipments of unassembled SRAMs were *** for 1994, *** for 1995, and *** for 1996. By value in thousands of dollars, shipments were *** for 1994, *** for 1995, and *** for 1996. In thousands of units, shipments were *** for 1994, *** for 1995, and *** for 1996. CR at III-13, Table III-7; PR at III-9, Table III-7.

[99] U.S. shipments of assembled SRAMs, in billions of bits, were *** for 1994, *** for 1995, and *** for 1996. In thousands of units, shipments were *** for 1994, *** for 1995, and *** for 1996. CR at III-15, Table III-9; PR at III-11, Table III-9.

[100] By value, in thousands of dollars, U.S. shipments of assembled SRAMs were *** for 1994, *** for 1995, and *** for 1996. *Id.*

[101] Measured in billions of bits, U.S. shipments of SRAM memory modules were *** for 1994, *** for 1995, and *** for 1996. CR at III-16, Table III-10; PR at III-12, Table III-10.

[102] Measured in thousands of dollars, shipments were *** for 1994, *** for 1995, and *** for 1996. CR at III-16, Table III-10; PR at III-12, Table III-10.

Production of unassembled SRAMs increased both from 1994 to 1995, and from 1995 to 1996.[103] Assembly of SRAMs rose from 1994 to 1995, but fell in 1996 to a level lower than that of 1994, when measured in bits.[104] Production of SRAM memory modules rose from 1994 to 1995, and again from 1995 to 1996.[105] Production capacity rose from 1994 to 1995, and again from 1995 to 1996 for both unassembled and assembled SRAMs.[106] Capacity utilization, however, fell for both products, both from 1994 to 1995, and from 1995 to 1996.[107]

End-of-period inventories of unassembled SRAMs, measured in bits, rose from 1994 to 1995, and again from 1995 to 1996.[108] For assembled SRAMs, end-of-period inventories rose from 1994 to 1995, and fell by a smaller amount from 1995 to 1996.[109] For SRAM memory modules, end-of-period inventories, measured in bits, rose from 1994 to 1995, and again from 1995 to 1996.[110]

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[103] Production of unassembled SRAMs, measured in billions of bits, was *** for 1994, *** for 1995, and *** for 1996. In thousands of units, production was *** for 1994, *** for 1995, and *** for 1996. CR at III-11, Table III-5; PR at III-7, Table III-5.

[104] The number of SRAMs assembled in the United States, measured in billions of bits, was *** in 1994, *** in 1995, and *** in 1996. Measured in thousands of units, U.S.- assembled units totaled *** for 1994, *** for 1995, and *** for 1996. CR at III-12, Table III-6; PR at III-8, Table III-6. Unlike the definition of assembled SRAMS used above for purposes of U.S. shipments, "assembly" for purposes of production includes U.S. assembly operations only: It does not include U.S. fabricated dice that are assembled in third countries.

[105] Production of SRAM memory modules, measured in millions of bits, was *** in 1994, *** in 1995, and *** in 1996. CR at C-9, Table C-3; PR at C-3, Table C-3.

[106] Capacity for SRAM memory modules was not reported. Capacity for unassembled SRAMs, in thousands of wafers, was *** in 1994, *** in 1995, and *** in 1996. CR at III-10, Table III-3; PR at III-8, Table III-3. For assembled SRAMs, capacity, in thousands of units, was *** in 1994, *** in 1995, and *** in 1996. CR at III-10, Table III-4; PR at III-7, Table III-4. U.S. capacity to produce unassembled SRAMs is significantly larger than the capacity to assemble SRAMs. *See* CR at IV-11, Table IV-8; PR at IV-7 to IV-8, Table IV-8 (showing the quantity and value of U.S.-fabricated dice (which are assembled in the United States, Korea, Taiwan, and third countries) to be larger than U.S. assembly of dice (regardless of where produced).

[107] Capacity utilization for unassembled SRAMs was *** percent for 1994, *** percent for 1995, and *** percent for 1996. CR at III-10, Table III-3; PR at III-6, Table III-3. Capacity utilization for assembled SRAMs was *** percent for 1994, *** percent for 1995, and *** percent for 1996. CR at III-10, Table III-3; PR at III-6, Table III-4.

[108] End-of-period inventories of unassembled SRAMs, measured in billions of bits, were *** for 1994, *** for 1995, and *** for 1996. Measured in thousands of units, end-of-period inventories were *** for 1994, *** for 1995, and *** for 1996. As a percentage of total shipments on the basis of bits, end-of-period inventories were *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at III-17, Table III-11, PR at III-12, Table III-11.

[109] End-of-period inventories of assembled SRAMs, measured in billions of bits, were *** in 1994, *** in 1995, and *** in 1996. Measured in thousands of units, end-of-period inventories were *** in 1994, *** in 1995, and *** in 1996. As a percentage of total shipments, end-of-period inventories were *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at III-18, Table III-12; PR at III-12, Table III-12.

[110] End-of-period inventories of SRAM memory modules, measured in billions of bits, were *** in 1994, *** in 1995, and *** in 1996. As a percentage of total shipments, end-of-period inventories were *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at III-19, Table III-13; PR at III-12, Table III-13.

The domestic industry's share of apparent consumption of unassembled SRAMs rose from 1994 to 1995, but fell in 1996 to a level slightly below that of 1994, measured in bits.[111] Measured by value, the domestic industry's share of apparent consumption of unassembled SRAMs held even in 1994 and 1995, and then fell in 1996.[112] For assembled SRAMs, the U.S. producers' share of apparent consumption fell from 1994 to 1995, but rose in 1996 to levels higher than in 1994, whether measured by quantity or by value.[113] For SRAM memory modules, U.S. producers held nearly the entire market in 1994 and 1995, but lost market share in 1996.[114]

From 1994 to 1996, the number of production and related workers (PRWs), hours worked, wages, and productivity (measured in millions of bits per hour) all rose for the production of unassembled SRAMs, and fell for the assembly of both SRAMs and SRAM memory modules.[115]

Sales revenues of U.S. producers for their SRAM operations rose from 1994 to 1995, then fell in 1996 to a level above that of 1994.[116] The domestic industry experienced rising operating income from 1994 to 1995, then operating losses in 1996.[117] The ratio of the cost of goods sold to net sales value fell from 1994 to 1995, but increased in 1996 to a level higher than in 1994.[118] The ratio of selling, general

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[111] U.S. producers' share of U.S. consumption of unassembled SRAMs, measured in bits, was *** percent in 1994, *** percent in 1995, and *** percent in 1996. Measured in units, the U.S. producers' share was *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at IV-15, Table IV-11; PR at IV-10, Table IV-11.

[112] Measured by value, the U.S. producers' share was *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at IV-15, Table IV-11; PR at IV-10, Table IV-11.

[113] Measured in bits, the U.S. producers' share of the consumption of assembled SRAMs was *** percent in 1994, *** percent in 1995, and *** percent in 1996. Measured in dollars, the U.S. producers' share was *** percent in 1994, *** percent in 1995, and *** percent in 1996. Measured in units, the U.S. producers' share was *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at IV-16 to IV-17, Table IV-12; PR at IV-11, Table IV-12.

[114] By quantity, the U.S. producers' share of the SRAM memory module market was *** percent in 1994, *** percent in 1995, and *** percent in 1996. By value, the U.S. producers' share was *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at IV-18, Table IV-13; PR at IV-13, Table IV-13.

[115] For unassembled SRAMs, the number of production and related workers was *** in 1994, *** in 1995, and *** in 1996. Hours worked, in thousands, were *** in 1994, *** in 1995, and *** in 1996. Wages paid, in thousands of dollars, were *** in 1994, *** in 1995, and *** in 1996. Productivity, in millions of bits per hour, was *** for 1994, *** for 1995, and *** for 1996. CR at III-20, Table III-14; PR at III-13, Table III-14.

For assembled SRAMs, the number of production and related workers was *** in 1994, *** in 1995, and *** in 1996. Hours worked, in thousands, were *** in 1994, *** in 1995, and *** in 1996. Wages paid, in thousands of dollars, were *** in 1994, *** in 1995, and *** in 1996. Productivity, in millions of bits per hour, was *** in 1994, *** in 1995, and *** in 1996. CR at III-21, Table III-15; PR at III-14, Table III-15.

For SRAM memory modules, the number of production and related workers was *** in 1994, *** in 1995, and *** in 1996. Hours worked, in thousands, were *** in 1994, *** in 1995, and *** in 1996. Wages paid, in thousands of dollars, were *** in 1994, *** in 1995, and *** in 1996. Productivity, in millions of bits per hour, was *** in 1994, *** in 1995, and *** in 1996. CR at III-22, Table III-16; PR at III-14, Table III-16.

[116] Net sales were, in thousands of dollars, *** for 1994, *** for 1995, and *** for 1996. CR at VI-2, Table VI-1; PR at VI-2, Table VI-1.

[117] In thousands of dollars, the domestic industry had *** in operating income in 1994, *** in operating income in 1995, and *** in operating losses in 1996. CR at VI-2, Table VI-1; PR at VI-2, Table VI-1.

[118] The ratio of the COGS to net sales value was *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at VI-2, Table VI-1; PR at VI-2, Table VI-1.

and administrative expenses to net sales also fell from 1994 to 1995, but rose above 1994 levels in 1996.[119]

Both capital expenditures and expenditures on research and development rose from 1994 to 1995, but rose by a smaller amount from 1995 to 1996.[120] [121]

IV. CUMULATION

Section 771(7)(G)(I) requires the Commission to cumulate imports from all countries as to which petitions were filed and/or investigations self-initiated by Commerce on the same day, if such imports compete with each other and with domestic like products in the United States market.[122] There is no dispute that the petitions on Taiwan and Korea were filed on the same day. The only cumulation issue is whether the subject imports compete with each other and with the domestic like product. In assessing whether imports compete with each other and with the domestic like product,[123] the Commission has generally considered four factors, including:

> *(1) the degree of fungibility between the imports from different countries and between imports and the domestic like product, including consideration of specific customer requirements and other quality related questions;*[124] [125]

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[119] The ratio of SG&A to net sales value was *** percent in 1994, *** percent in 1995, and *** percent in 1996. CR at VI-2, Table VI-1; PR at VI-2, Table VI-1.

[120] Capital expenditures were, in thousands of dollars, *** in 1994, *** in 1995, and *** in 1996. Expenditures on research and development were, in thousands of dollars, *** in 1994, *** in 1995, and *** in 1996. CR at VI-7, Table VI-3; PR at VI-3, Table VI-3.

[121] Based on the foregoing, Commissioner Newquist determines that there is a reasonable indication that the domestic industry is experiencing material injury.

[122] 19 U.S.C. § 1677(7)(G)(I). There are four exceptions to the cumulation provision, none of which applies to these investigations. *See id.* at 1677(7)(G)(ii).

[123] The Statement of Administrative Action submitted to Congress in connection with the Uruguay Round Agreements Act (P.L. 103-465, approved Dec. 8, 1994) expressly states that "the new section will not affect current Commission practice under which the statutory requirement is satisfied if there is a reasonable overlap of competition." Uruguay Round Agreements Act, Statement of Administrative Action, H.R. Doc. 316, Vol. 1, 103d Cong., 2d Sess. (1994)("SAA") at 848 *citing* Fundicao Tupy, S.A. v. United States, 678 F. Supp. 898, 902 (Ct. Int'l Trade 1988), *aff'd* 859 F.2d 915 (Fed. Cir. 1988).

[124] Commissioner Newquist notes that, in his view, once a like product determination is made, that determination establishes an inherent level of fungibility within that like product. Only in exceptional circumstances could Commissioner Newquist find products to be "like" and then turn around and find that, for purposes of cumulation, there is no "reasonable overlap of competition" based on some roving standard of substitutability. *See* Additional and Dissenting Views of Chairman Newquist in Flat-Rolled Carbon Steel Products, USITC Pub. 2664 (August 1993).

[125] Commissioner Crawford finds that substitutability, not fungibility, is a more accurate reflection of the statute. In these investigations, she finds there is sufficient substitutability to conclude there is a reasonable overlap of competition between subject imports and domestic like product. Therefore, she concurs with her colleagues that subject imports from Korea and Taiwan should be cumulatively assessed. See Dissenting Views of Commissioner Carol T. Crawford in Stainless Steel Bar from Brazil, India, Japan and Spain, Invs. Nos. 731-TA-678, 679, 681, and 682 (Final), for a description of her views on cumulation.

(2) the presence of sales or offers to sell in the same geographical markets of imports from different countries and the domestic like product;

(3) the existence of common or similar channels of distribution for imports from different countries and the domestic like product; and

(4) whether the imports are simultaneously present in the market.[126]

While no single factor is determinative, and the list of factors is not exclusive, these factors are intended to provide the Commission with a framework for determining whether the imports compete with each other and with the domestic like product.[127] Only a "reasonable overlap" of competition is required.[128]

We find a significant degree of fungibility between Korean and Taiwanese subject imports, and between the subject imports and the domestic like product. SRAMs with the same access speed, density, and other characteristics are largely interchangeable.[129] One large SRAM purchaser reported that ***.[130] All domestic producers agreed that the domestic product and subject imports are used interchangeably.[131] Most importers of subject merchandise from Taiwan reported that SRAMs generally are used interchangeably.[132] Two importers of Korean subject merchandise argued that the interchangeability of Korean with Taiwanese and U.S. product was limited because the Korean product consisted primarily of slow SRAMs, whereas the Taiwanese and U.S. product were predominantly fast SRAMs.[133] The record in these preliminary investigations indicates, however, that the subject imports from both Korea and Taiwan, as well as the domestic like product, include both fast and slow SRAMs.[134] [135] We also find that common channels of distribution exist for the subject imports from Korea and Taiwan and the domestic like product,[136] and that the subject merchandise from both subject countries and the domestic like

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[126] *See* Certain Cast-Iron Pipe Fittings from Brazil, the Republic of Korea, and Taiwan, Invs. Nos. 731-TA-278-280 (Final), USITC Pub. 1845 (May 1986), *aff'd*, Fundicao Tupy, S.A. v. United States, 678 F. Supp. 898 (Ct. Int'l Trade), aff'd, 859 F.2d 915 (Fed. Cir. 1988).

[127] *See, e.g.*, Wieland Werke, AG v. United States, 718 F. Supp. 50 (Ct. Int'l Trade 1989).

[128] *See* Wieland Werke, 718 F. Supp. at 52 ("Completely overlapping markets are not required."); United States Steel Group v. United States, 873 F. Supp. 673, 685-86 (Ct. Int'l Trade 1994), *aff'd*, 96 F.3d 1352 (Fed. Cir. 1996).

[129] CR at I-11, I-13 and II-4; PR at I-8, I-9, II-3.

[130] CR at II-4; PR at II-3.

[131] CR at II-4; PR at II-3.

[132] CR at II-5; PR at II-3.

[133] CR at II-5; PR at II-3.

[134] Tr. at 150 (Chiang)(Taiwan produces slow SRAMs), 163 (Griffith) (Korean exporter Samsung participates in both the fast and slow SRAM markets), 158 (Bruneau)(United States produces slow SRAMs).

[135] Commissioner Crawford notes that in the final phase of the investigation regarding the allegedly LTFV imports from Korea, she intends to examine further the argument advanced by several parties that substitutability between the Korean and Taiwanese subject imports, and between the subject imports and the domestic like product, is limited because, it is argued, the Korean subject imports are predominantly slow SRAMs, whereas the Taiwanese subject imports and the domestic like product are predominantly fast SRAMs. She also intends to further examine the extent to which Korean exporters became qualified suppliers to large customers earlier than did Taiwanese exporters, and whether such earlier qualification limited substitutability between the subject imports from Korea and Taiwan.

[136] CR at I-12 to I-13; PR at I-8 to I-9; Tr. at 159 (Bruneau).

product apparently competed in the same geographic markets and during the same time period.[137] Accordingly, we find a reasonable overlap of competition between the subject imports from Taiwan and Korea, and between the subject imports and the domestic like product.[138]

V. REASONABLE INDICATION OF MATERIAL INJURY BY REASON OF ALLEGEDLY LTFV IMPORTS

In these preliminary antidumping investigations, the Commission determines whether there is a reasonable indication that an industry in the United States is materially injured by reason of the allegedly LTFV imports under investigation.[139] The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant."[140] In making this determination, the Commission must consider the volume of imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product, but only in the context of U.S. production operations.[141]

Although the Commission may consider causes of injury to the industry other than the allegedly LTFV imports,[142] it is not to weigh causes.[143] [144] [145]

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[137] Tr. at 56 (G. Kaplan) (subject imports from Taiwan and Korea present in the same geographic markets); CR IV-3 to IV-5, Tables IV-2 to IV-3; PR at IV-2 to IV-3, Tables IV-2 to IV-3 (showing ***); CR at V-12 to V-15, Figures V-2 to V-5; PR at V-5, Figures V-2 to V-5 (showing ***).

[138] Accordingly, Commissioner Crawford considers the price and volume effects of the subject imports on a cumulated basis, even though she is not participating in the investigation of the subject imports from Taiwan.

[139] 19 U.S.C. § 1673b(a).

[140] 19 U.S.C. § 1677(7)(A).

[141] 19 U.S.C. § 1677(7)(B)(I). The Commission "may consider such other economic factors as are relevant to the determination," but shall "identify each {such} factor . . . and explain in full its relevance to the determination." 19 U.S.C. § 1677(7)(B).

[142] Alternative causes may include the following:

> {T}he volume and prices of imports sold at fair value, contraction in demand or changes in patterns of consumption, trade, restrictive practices of and competition between the foreign and domestic producers, developments in technology, and the export performance and productivity of the domestic industry.

S. Rep. No. 249, 96th Cong., 1st Sess. 74 (1979). Similar language is contained in the House Report. H.R. Rep. No. 317, 96th Cong., 1st Sess. 46-47 (1979).

[143] *See, e.g.,* Gerald Metals, Inc. v. United States, Slip Op. 96-142 at 12 (Ct. Int'l Trade, Aug. 21, 1996); Citrosuco Paulista, S.A. v. United States, 704 F. Supp. 1075, 1101 (Ct. Int'l Trade 1988).

[144] Commissioner Newquist further notes that the Commission need not determine that imports are "the principal, a substantial, or a significant cause of material injury." S. Rep. No. 249, at 57, 74. Rather, a finding that imports are a cause of material injury is sufficient. *See, e.g.*, Metallverken Nederland B.V. v. United States, 728 F. Supp. 730, 741 (Ct. Int'l Trade 1989); Citrosuco Paulista, 704 F. Supp. at 1101.

[145] For a detailed description of Commissioner Crawford's analytical framework, *see* Polyvinyl Alcohol from China, Japan, and Taiwan, Invs. Nos. 731-TA-726, 727, and 729 (Final), USITC Pub. 2960 at 25-26 (May 1996). Both the Court of International Trade and the United States Court of Appeals for the Federal Circuit have held that the "statutory language fits very well" with Commissioner Crawford's mode of analysis, expressly holding that her mode of analysis comports with the statutory requirements for reaching a determination of material injury by reason of the subject imports. United States Steel Group v. United States, 96 F.3d 1352, 1361 (Fed. Cir. 1996), *aff'g* 873 F.

(continued...)

For the reasons discussed below, we determine that there is a reasonable indication that the domestic SRAM industry is materially injured by reason of allegedly LTFV imports from Korea and Taiwan.

A. Volume of Subject Imports[146]

The quantity and value of the subject imports were significant, and increased sharply during the period of investigation. By quantity, subject imports of unassembled SRAMs rose over *** from 1994 to 1996, measured in bits.[147] Measured by value, the increase in the subject imports was almost ***.[148] The market share held by the subject unassembled SRAMs, whether measured in bits or value, showed similar increases.[149]

For subject imports of assembled SRAMs, which were far larger than the subject imports of unassembled SRAMs, increases were also significant. Measured in bits, imports of subject assembled SRAMs, which started from a much higher base than imports of subject unassembled SRAMs, more than

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[145](...continued)
Supp. 673, 694-95 (Ct. Int'l Trade 1994). Commissioner Crawford notes that the statute requires that the Commission determine whether a domestic industry is "materially injured by reason of" the allegedly LTFV imports. She finds that the clear meaning of the statute is to require a determination of whether the domestic industry is materially injured by reason of LTFV imports, not by reason of the LTFV imports among other things. Many, if not most, domestic industries are subject to injury from more than one economic factor. Of these factors, there may be more than one that independently are causing material injury to the domestic industry. It is assumed in the legislative history that the "ITC will consider information which indicates that harm is caused by factors other than less-than-fair-value imports." S. Rep. No. 249, 96th Cong., 1st Sess. 75 (1979). However, the legislative history makes it clear that the Commission is not to weigh or prioritize the factors that are independently causing material injury. *Id.* at 74; H.R. Rep. No. 317, 96th Cong., 1st Sess. 46-47 (1979). The Commission is not to determine if the LTFV imports are "the principal, a substantial or a significant cause of material injury." S. Rep. No. 96-249 at 74 (1979). Rather, it is to determine whether any injury "by reason of" the LTFV imports is material. That is, the Commission must determine if the subject imports are causing material injury to the domestic industry. "When determining the effect of imports on the domestic industry, the Commission must consider all relevant factors that can demonstrate if unfairly traded imports are materially injuring the domestic industry." S. Rep. No. 71, 100th Cong., 1st Sess. 116 (1987) (emphasis added).

[146] Commissioner Crawford joins only in the factual, numerical discussion of the volume of imports. She does not rely on any analysis of trends in the market share of subject imports or other factors in her determination of material injury by reason of dumped imports. She makes her finding of the significance of volume in the context of the price effects and impact of these imports. For the reasons discussed below, she finds that the volume of subject imports is significant in this investigation.

[147] The quantity of subject unassembled SRAMs, measured in billions of bits, rose from *** in 1994, to *** in 1995, and *** in 1996. Measured in thousands of units, the subject imports increased from *** in 1994 to *** in 1995, and fell to *** in 1996. As indicated previously, changes in the number of bits and units may diverge as newer SRAMs contain more bits per unit. CR at IV-10, Table IV-7; PR at IV-6, Table IV-7.

[148] The value of the subject imports of unassembled SRAMs, measured in thousands of dollars, was *** in 1994, *** in 1995, and *** in 1996. CR at IV-10, Table IV-7; PR at IV-6, Table IV-7.

[149] In terms of bits, the share held by the subject unassembled SRAMs rose from *** percent in 1994, to *** percent in 1995, and *** percent in 1996. By value, subject imports' market share increased from *** percent in 1994, to *** percent in 1995, to *** percent in 1996. CR at IV-15, Table IV-11; PR at IV-10, Table IV-11.

*** from 1994 to 1996.[150] By value, imports of subject assembled SRAMs also increased, although by a smaller amount.[151] The market share held by the subject assembled SRAMs was substantial throughout the period of investigation.[152]

For the smaller proportion of subject imports in the form of SRAM memory modules, the increases measured by both quantity and value were even more pronounced than for unassembled or assembled SRAMs.[153] The market share held by the subject SRAM memory modules was very low in 1994 and 1995, but was substantial in 1996.[154]

Based on the foregoing, we find that both the volume of subject imports and the increase in that volume over the period of investigation are significant.

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[150] Subject imports of assembled SRAMs, measured in billions of bits, were *** in 1994, *** in 1995, and *** in 1996. Measured in thousands of units, subject imports of assembled SRAMs increased from *** in 1994 to *** in 1995, then fell slightly to *** in 1996. CR at IV-11, Table IV-8; PR at IV-7 to IV-8, Table IV-8.

[151] The value of subject assembled SRAMs, measured in thousands of dollars, increased from *** in 1994, to *** in 1995, and then fell to *** in 1996. CR at IV-12, Table IV-8, PR at IV-7 to IV-8, Table IV-8.

[152] Measured in bits, the subject assembled SRAMs held a market share of *** percent in 1994, *** percent in 1995, and *** percent in 1996. Measured in units, the market share of the subject imports was *** percent in 1994, *** percent in 1995, and *** percent in 1996. By value, the market shares for the three years were *** percent respectively. CR at IV-16 to IV-17, Table IV-12; PR at IV-11 to IV-12, Table IV-12.

[153] Measured in billions of bits, the imports of the subject SRAM memory modules increased from *** in 1995, to *** in 1996 (data are not available for 1994). By value, measured in thousands of dollars, imports the subject SRAM memory modules fell from *** in 1994 to *** in 1995, and then rose significantly to *** in 1996. CR at IV-3, Table IV-9; PR at IV-9, Table IV-9.

[154] The market share held by the subject SRAM memory modules was less than *** percent in 1995, yet was *** percent in 1996, measured by value and quantity (bits) respectively. CR at IV-18, Table IV-13; PR at IV-13, Table IV-13.

B. Price Effects of Subject Imports[155]

The record establishes that price is a critical factor in purchasing decisions.[156] As previously noted, newly introduced types of SRAMs rapidly become fungible products, competing largely on the basis of price.[157] In such a market, significant underselling by large volumes of subject imports can have a dramatic effect on prices for the domestic like product.[158] The record in these investigations demonstrates that the large and increasing volume of allegedly LTFV imports undersold the domestic like product in *** out of *** comparisons, by margins that averaged *** percent for Korea and *** percent for Taiwan.[159] We find such consistent and substantial underselling to be significant, especially for this commodity-type product.

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[155] To evaluate the effects of the dumping on domestic prices, Commissioner Crawford asks a different question. She compares domestic prices that existed when the imports were dumped with what domestic prices would have been if the imports had been fairly traded. In most cases, if the subject imports had not been traded unfairly, their prices in the U.S. market would have increased significantly. In this investigation, the alleged dumping margins for subject imports from Korea and Taiwan are large (55.36 percent, and 93.54 to 113.85 percent, respectively), so that subject imports likely would have been priced significantly higher had they been fairly traded. Since subject imports held a significant market share in 1996, as described *supra*, the shift in demand away from higher priced subject imports likely would have been significant. Although there appear to be some differences in access speed and other characteristics of SRAMs from the U.S., subject sources and nonsubject sources, the record in this preliminary investigation suggests that they are fairly good substitutes. She notes that the information regarding nonsubject imports is limited, and she intends to pursue additional information regarding the substitutability of such imports in the final phase of the investigation. Given the available information on substitutability, she finds that a significant portion of the demand for subject imports likely would have shifted to domestic and nonsubject SRAMs had subject imports been fairly traded. The extent to which such demand would have been captured by the domestic industry depends on demand and supply conditions. In this investigation, the elasticity of demand appears to be moderate. Although there are no good substitutes for SRAMs, they appear to a relatively small portion of the cost of the downstream product in which they are used. Such demand conditions suggest that overall domestic demand for SRAMs might have been substantially smaller had subject imports been sold at higher, fair prices. On the supply side, any attempt by an individual supplier in the domestic industry to increase its prices in response to the shift in demand would have been challenged by competitors. There are a significant number of SRAM producers in the U.S. market that compete directly with each other. The domestic industry has significant available production capacity and some inventories such that domestic producers would have competed among themselves for sales, had demand shifted away from subject imports. The significant presence of nonsubject imports in the domestic market also contributes to the competitive environment. Under such supply and demand conditions, any effort by a domestic supplier to raise its prices significantly would have been beaten back by its competitors. Therefore, while there might have been some price effects had subject imports been fairly traded, Commissioner Crawford does not find that significant effects on domestic prices can be attributed to the unfair pricing of subject imports. Consequently, Commissioner Crawford finds that subject imports from Korea and Taiwan are not having significant effects on prices for domestic SRAMs.

[156] CR at II-4; PR at II-3 (***); CR at V-19; PR at V-7 (***).

[157] CR at I-13; PR at I-9.

[158] *See* CR at V-4; PR at V-3 (subject imports consistently undersold domestic product and by substantial average margins); Tr. at 39-43 (Love) (testifying that subject imports have had a substantial effect on prices in the U.S. market, and that markets for commodity-type products are very price sensitive); 30-31 (Taylor) (testifying that customers asked domestic producer to lower prices to meet competition from imports from Taiwan and Korea); Tr. at 27-28 (Cloud) (indicating that, for a particular type of SRAM, subject imports entered the U.S. market at a price one sixth that of the price at which the same product was being offered by domestic producers, with the effect of reducing prices for the domestic product so low that Micron Technology had to forego sales); CR at V-17 to V-19; PR at V-7 (***).

[159] CR at V-4; PR at V-3.

The record also establishes that prices for SRAMs increased from 1994 through the first half of 1995, then fell sharply during the remainder of the period of investigation.[160] Although inaccurate forecasts of demand growth may have played a role in the price declines during the latter part of the period of investigation, we find that the large volumes of lower-priced allegedly LTFV imports exerted further downward pressure on prices, exacerbating the 1996 price collapse. In this regard, we note both that prices for the subject merchandise and the domestic like product fell in tandem, and that the subject merchandise consistently undersold the domestic like product, facts which, in a price-sensitive market, suggest that the subject imports depressed prices in the domestic industry to a significant degree. We further note that the industry was unable to stem the fall of prices or enact price increases despite strong increases in apparent U.S. consumption from 1995 to 1996.[161]

Accordingly, in light of the importance of price to purchasers, the evidence that subject imports compete with the domestic like product largely on the basis of price, the dramatic decline in prices for both the domestic like product and subject imports in 1996 in the face of significant underselling by the subject imports, and the domestic industry's inability to stem those price declines or increase prices despite rising demand, we find a reasonable indication that the substantial volumes of allegedly LTFV imports from Korea and Taiwan that entered the United States during the period of investigation depressed prices for the domestic like product to a significant degree.

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[160] CR at V-4; PR at V-3.

[161] CR at IV-19, Table IV-14; PR at IV-13, Table IV-14 (showing a *** percent increase in U.S. apparent consumption of assembled SRAMs and SRAM modules for 1995 to 1996, measured in bits).

C. Impact of Subject Imports[162] [163] [164] [165]

As previously discussed, the domestic SRAM industry must make substantial ongoing investments in the research and development of new products and process technologies, and the upgrading of fabrication equipment and facilities, in order to maintain competitiveness. A producer's failure to finance any phase of the life cycle of a current product -- research, development, production, etc. -- handicaps its competitiveness in subsequent phases of the product cycle and in future generation

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[162] As part of its consideration of the impact of imports, the statute as amended by the Uruguay Round Agreements Act (URAA) specifies that the Commission is to consider "the magnitude of the margin of dumping." 19 U.S.C. § 1677(7)(C)(iii)(V). The SAA indicates that the amendment "does not alter the requirement in current law that none of the factors which the Commission considers is necessarily dispositive in the Commission's material injury analysis." SAA at 850. New section 771(35)(C), 19 U.S.C. § 1677(35)(C), defines the "margin of dumping" to be used by the Commission in a preliminary determination as the margin or margins published by Commerce in its notice of initiation. The estimated dumping margins identified by Commerce in its notice of initiation of these investigations is 55.36 percent for Korea, and 93.54 to 113.85 percent for Taiwan, ad valorem. 62 Fed. Reg. 13596, 13598 (March 21, 1997).

[163] Vice Chairman Bragg notes that she does not ordinarily consider the margin of dumping to be of particular significance in evaluating the effects of subject imports on domestic producers. *See* Separate and Dissenting views of Commissioner Lynn M. Bragg in Bicycles from China, Inv. No. 731-TA-731(Final), USITC Pub. 2968 (June 1996).

[164] Commissioner Newquist notes that, in his analytical framework, "evaluation of the magnitude of the margin of dumping" is not generally helpful in answering the questions posed by the statute: whether there is a reasonable indication that the domestic industry is materially injured; and, if so, whether such material injury is by reason of the subject imports.

[165] As previously stated, Commissioner Crawford does not evaluate impact based on trends in statutory impact factors. In her analysis of material injury by reason of dumped imports, Commissioner Crawford evaluates the impact of subject imports on the domestic industry by comparing the state of the industry when the imports were dumped with what the state of the industry would have been had the imports been fairly traded. In assessing the impact of the subject imports on the domestic industry, she considers, among other relevant factors, output, sales, inventories, capacity utilization, market share, employment, wages, productivity, profits, cash flow, return on investment, ability to raise capital, research and development and other relevant factors as required by 19 U.S.C. § 1677(7)(C)(iii). These factors together either encompass or reflect the volume and price effects of the dumped imports, and so she gauges the impact of the dumping through those effects. In this regard, the impact on the domestic industry's prices, sales and overall revenues is critical, because the impact on the other industry indicators (*e.g.*, employment, wages, etc.) is derived from this impact. As noted above, the domestic industry would not have been able to increase its prices significantly if subject imports had been sold at fairly traded prices. Therefore, any impact of the allegedly dumped imports from Korea and Taiwan on the domestic industry would have been on the domestic industry's output and sales. Had subject imports not been dumped, demand conditions suggest the domestic industry could have captured a substantial portion of the demand satisfied by subject imports; SRAM purchasers appear to be only moderately sensitive to prices and therefore would have reduced their consumption only somewhat in response to higher prices overall. Although supply conditions indicate significant competition from nonsubject imports (*see* CR at II-6; PR at II-4), the evidence in this preliminary investigation suggests that a significant amount of demand would have been captured by domestic producers of SRAMs. Domestic suppliers could have increased their production and sales to satisfy the significant increase in demand. Accordingly, the domestic industry likely would have captured enough of the demand for subject imports that its output and sales, and therefore its revenues, would have increased significantly had subject imports not been dumped. Consequently, the domestic industry likely would have been materially better off if the subject imports had been fairly traded. Therefore, Commissioner Crawford determines that there is a reasonable indication that the domestic industry producing SRAMs is materially injured by reason of allegedly LTFV imports of SRAMs from Korea and Taiwan.

product cycles.[166] In addition, the failure to expand production facilities portends lost market share, which can lead to an inability to participate in economies of scale to the same extent as larger competitors.[167]

The large volumes of allegedly LTFV imports during the period of investigation adversely affected the domestic industry's ability to make such investments. To maintain investment, the domestic industry must generate income. Weak financial operating results limit producers' ability to fund the continued investments needed to maintain competitiveness in this rapidly evolving industry.[168]

The allegedly LTFV imports adversely affected domestic producers' operating results to a significant degree, and thus its ability to maintain needed investment. The allegedly LTFV imports, which were substantial and increasing, consistently undersold the domestic like product by substantial margins.[169] This underselling exacerbated the dramatic decline in prices of the subject imports and domestic like product that occurred during the latter half of the period of investigation. This price decline resulted in operating losses for the domestic industry in 1996, which in turn adversely affected its ability to maintain investment. As a result, the domestic industry canceled or postponed capital investments that were planned or in some cases already underway.[170]

CONCLUSION

For the foregoing reasons, we determine that there is a reasonable indication that the domestic industry producing SRAMs is materially injured by reason of allegedly LTFV imports from Korea and Taiwan.

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[166] Tr. at 11-12 (G. Kaplan) (investment needed at each generation of product), 16-21 (Donnelly) (describing steps in the product cycle and indicating that continuous investment is required because products, processes, and technology rapidly become obsolete).

[167] *See* CR at V-18 to V-19; PR at V-7 (***); Tr. at 168 (Reilly) (testifying that a small domestic producer went out of the SRAM business because it was too small to generate sufficient capital to invest in a new production facility).

[168] CR at I-13; PR at I-9 (SRAM industry highly cyclical, with short product life cycles); Tr. at 21-22 (Donnelly) (domestic producer's capital investments funded out of cash flow; dumped imports from Taiwan and Korea "dry up {domestic producer's} capital, {and} ability to generate capital"), 30 (Taylor) (heavy operating losses having a "severe impact" on domestic producer's capital investment plans).

[169] CR at V-4; PR at V-3 (price comparisons).

[170] Tr. at 18-22 (Donnelly) (indicating that a new fab, already under construction, was postponed indefinitely due to poor market conditions; that capital investments are funded out of cash flow; and that dumped imports from Taiwan and Korea "dry up our capital, {and} ability to generate capital"), 30 (Taylor) (planned capital investments canceled due to low SRAM prices caused by imports from Taiwan and Korea).

PART I: INTRODUCTION

BACKGROUND

These investigations result from a petition filed by Micron Technology, Boise, ID, on February 25, 1997, alleging that an industry in the United States is materially injured and threatened with material injury by reason of less-than-fair-value (LTFV) imports of static random access memory semiconductors (SRAMs)[1] from the Republic of Korea (Korea) and Taiwan. Information relating to the background of the investigations is provided below.[2]

Date	Action	*Federal Register* Citation
Feb. 25, 1997	Petition filed with Commission; Commission institutes investigations	62 FR 10073
Mar. 18, 1997	Commission's conference	
Mar. 21, 1997	Initiation of investigations by Commerce	62 FR 13596
Apr. 11, 1997	Commission's briefing and vote	
Apr. 11, 1997	Commission's determinations to Commerce	
Apr. 18, 1997	Commission's views to Commerce	
Aug. 4, 1997	Scheduled date for Commerce's preliminary determinations	

ORGANIZATION OF THIS REPORT AND SUMMARY OF DATA PRESENTED

This report is divided into seven parts, plus appendices. Part I contains information on the background of these investigations, the organization of the report, the nature and extent of sales at LTFV, and the products covered in the investigations. Part II discusses conditions of competition in the U.S. market. Part III discusses U.S. producers and the condition of the U.S. industry, and presents data on basic indicators such as production, shipments, inventories, and employment, but not financial operations or pricing. Part IV discusses U.S. importers, U.S. imports, apparent U.S. consumption, and market shares. Part V discusses pricing and related data. Part VI discusses the financial experience of U.S. producers. Part VII discusses considerations relating to any threat of material injury to the U.S. industry.

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[1] The products covered by these investigations are synchronous, asynchronous, and specialty SRAMs, whether assembled or unassembled. Assembled SRAMs include all package types. Unassembled SRAMs include processed wafers or dice, uncut dice, and cut dice. Processed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country, are included in the scope; wafers produced in a third country and assembled or packaged in Korea or Taiwan are not included in the scope. The scope of the investigations also includes modules containing SRAMs. The full text of Commerce's "scope of investigations" from its institution notice is included in app. A and "The Product" section of this report; the tariff treatment accorded such merchandise is shown in the "Tariff Rates" section of the report.

[2] *Federal Register* notices cited in the tabulation are presented in app. A. A calendar of the Commission's conference held on Mar. 18, 1997, is presented in app. B.

A summary of data collected in the investigations is presented in appendix C. Except as noted, U.S. industry data are based on questionnaire responses of eight firms accounting for the great bulk of domestic production of uncased and cased SRAMs during 1994-96, the period for which data were gathered in these investigations. U.S. imports of subject SRAMs are based on questionnaire responses of 17 firms, including all of the major importers of subject merchandise from Korea and Taiwan.

PREVIOUS INVESTIGATIONS

Prior to the current investigations, the Commission has not conducted an investigation concerning SRAMs. The Commission has, however, conducted several previous Title VII and unfair trade practices investigations concerning dynamic random access memory semiconductors (DRAMs).[3]

THE NATURE AND EXTENT OF ALLEGED SALES AT LTFV

On March 21, 1997, Commerce published in the *Federal Register* its notice of initiation of antidumping investigations concerning imports of SRAMs from Korea and Taiwan.[4] A copy of Commerce's notice is presented in appendix A. Commerce is scheduled to make its preliminary determinations on or before August 4, 1997.

Based on comparisons of export prices (EP) to normal value (NV), petitioner's alleged dumping margins, as revised by Commerce, are 55.36 percent ad valorem for imports from Korea and 93.54 to 113.85 percent ad valorem for imports from Taiwan.

TARIFF RATES

The U.S. Customs Service (Customs) has determined that, for tariff and marking purposes, the country of origin of imported SRAMs is the location of assembly rather than the location of wafer fabrication.[5] Mounting (also referred to as packaging) of IC (integrated circuit) chips is still considered to be a substantial transformation for both country-of-origin and marking purposes.

Imports of SRAM wafers and uncut and cut dice are currently classified in subheading 8542.13.80 of the *Harmonized Tariff Schedule of the United States* (HTS), and shipments are reported under statistical reporting number 8542.13.8005.[6] Imports of assembled or cased SRAMs fall into the same subheading but are reported under statistical categories numbered 8542.13.8037 through

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[3] *See*, U.S. International Trade Commission, *DRAMs of One Megabit and Above From the Republic of Korea* (Inv. No. 731-TA-556), USITC Pub. 2629, May 1993; *64K Dynamic Random Access Memory Components From Japan* (Inv. No. 731-TA-270), USITC Pub. 1862, June 1986; and *Dynamic Random Access Memory Semiconductors of 256 Kilobits and Above From Japan* (Inv. No. 731-TA-300). Also, see U.S. International Trade Commission, Invs. Nos. 337-TA-242, 337-TA-312, and 337-TA-345.

[4] 62 FR 13596.

[5] As indicated previously, however, Commerce's scope language states that processed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country, are included in the scope, but wafers produced in a third country and assembled or packaged in Korea or Taiwan are not.

[6] Prior to 1996, SRAM wafers and uncut and cut dice were classified under subheading 8542.11.80 (statistical: 8542.11.8001) of the HTS.

8542.13.8049.[7] Imports of SRAM modules are classified under subheadings 8473.30.10 through 8473.30.90 of the HTS. The most-favored-nation (MFN) tariff rate, applicable to imports from Korea and Taiwan, for all HTS subheadings identified is free.

THE PRODUCT

Commerce has defined the products subject to the scope of its investigations as--

> *synchronous, asynchronous, and specialty SRAMs from Korea and Taiwan, whether assembled or unassembled. Assembled SRAMs include all package types. Unassembled SRAMs include processed wafers or die (sic), uncut die, and cut die. Processed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country, are included in the scope; wafers produced in a third country and assembled or packaged in Korea or Taiwan are not included in the scope.*
>
> *The scope of these investigations includes modules containing SRAMs. Such modules include single in-line processing modules ("SIPs"), single in-line memory modules ("SIMMs"), dual in-line memory modules ("DIMMs"), memory cards, or other collections of SRAMs, whether unmounted or mounted on a circuit board.*

This section presents information on both imported and domestically produced SRAMs and modules incorporating SRAMs, as well as information related to the Commission's "like product" determination.[8]

The petitioner has argued that all SRAMs should be considered as a single "like product," regardless of speed, configuration, density, or application, and that there is some degree of interchangeability among the various types of SRAMs.[9] The respondents contend that there are two distinct "like products" delineated on the basis of speed, "fast" SRAMs and "slow" SRAMs.[10] The respondents argue that fast and slow SRAMs have different physical characteristics, are not interchangeable, use different channels of distribution and manufacturing equipment, and have differing customer perceptions and prices.

Physical Characteristics and Uses

SRAM is a class of volatile semiconductor memory that allows data to be both read from and written into the device's storage locations. It is a related but separate product from DRAM, the subject of prior Commission investigations. SRAMs are integrated circuits capable of retaining their information at very low power, without the need for periodic electrical "refresh." Once information is loaded into an SRAM, it will remain indefinitely until it is intentionally changed or power to the memory circuit is shut off. In contrast, DRAMs typically store information in a manner that requires electrical

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[7] Prior to 1996, assembled or cased SRAMs were classified under subheading 8542.11.80 (statistical: 8542.11.8037 through 8542.11.8049) of the HTS.

[8] The Commission's decision regarding the appropriate domestic products that are "like" the subject imported products is based on a number of factors, including (1) physical characteristics and uses; (2) common manufacturing facilities and production employees; (3) interchangeability (4) customer and producer perceptions; (5) channels of distribution; and where appropriate, (6) price.

[9] Petitioner's post-conference brief, pp. 3-7.

[10] Korean respondents' post-conference brief, p. 1.

"refresh" on a regular basis (milliseconds). SRAMs are far more complex than DRAMs and require almost four times the area to achieve the same storage capacity. Because of the increased design complexity, SRAMs are more difficult and expensive to manufacture than DRAMs.[11] However, because of design differences and the fact that SRAMs do not require electrical refresh, SRAMs typically have much faster access speeds than DRAMs. The speed at which the individual memory cells within a circuit can be accessed is expressed in nanoseconds (ns), or one-billionths of a second. The fastest SRAMs have access speeds of under 10ns. Conventional DRAM access speeds typically begin at around 25-40ns. In addition, SRAMs differ from DRAMs in the amount of power that they consume. Because SRAMs do not require the continual electrical refresh of DRAMs, they consume less electricity and are better suited for battery-powered applications.[12]

SRAMs come in a variety of sizes, process technologies, classifications, designs, and access speeds. SRAM size is measured in terms of density, the number of storage cells or bits contained in a single chip. New generations of SRAMs typically, but not always, increase in density by factors of 4. Current prevalent SRAM densities include 256 kilobits (K), 1 megabit (Meg), and 4 Meg.[13]

The two chief process technologies utilized to fabricate SRAMs are CMOS (complimentary metal oxide semiconductor) and BiCMOS (a combination of bipolar technology and CMOS). In general, BiCMOS technology can offer increases in access speed over CMOS technology, but often results in greater energy consumption and heat build-up in the circuit. BiCMOS technology is most often used in the production of SRAMs with the fastest access speeds, while CMOS technology is used to manufacture SRAMs of multiple speeds.[14]

SRAMs can be classified as synchronous or asynchronous. Synchronous means that the SRAM's clock signal or frequency is synchronized with the clock speed of a controlling circuit, usually a microprocessor. By synchronizing the clock speeds, the SRAM and microprocessor are able to operate in lockstep, which improves overall performance. An asynchronous SRAM does not require a clock signal to validate its control signals, and therefore its operating frequency is not synchronized with the clock signal of a microprocessor. Synchronous SRAMs are typically slightly higher in price and maintain higher access speeds than asynchronous SRAMs of similar density.

SRAMs are constructed with a variety of access speeds. The fastest current access speeds for SRAMs range from 2ns to 10ns, while the slowest SRAM access speeds are in excess of 100ns. Some market research firms, as well as the petitioner, refer to "very fast," "fast," and "slow" SRAMs, whereas the respondents and some other market research firms refer to only two categories, "fast" and "slow." In any event, there does not appear to be any universally accepted delineation between speed categories.[15]

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[11] Unlike SRAMs, DRAMs require extra control circuitry in order for them to function. In a situation where small amounts of memory are required, the extra circuitry can account for a significant portion of the overall semiconductor memory cost. In such a situation, SRAMs could be cost competitive with the normally less expensive DRAMs. Information provided by the petitioner, telephone interview by Commission staff, Apr. 3, 1997.

[12] McGraw-Hill Inc., "Semiconductor Memories," *McGraw-Hill CD-ROM Encyclopedia of Science and Technology* (U.S.A.: McGraw-Hill, 1995), p. 2.

[13] A single K is equivalent to 1,024 bits; a single Meg is equivalent to 1,048,576 bits.

[14] *Mid-Term 1996*, ed. Bill McLean (Scottsdale, AZ: Integrated Circuit Engineering Corp., 1996), pp. 5-17.

[15] In petitioner's post-conference brief (at pp. 5-6), it referred to the market research firm In-Stat's description of very fast SRAMs as having access speeds of under 16ns, fast SRAMs as having access speeds of 16ns to 44ns, and slow SRAMs as having access speeds of over 45ns. Another firm, Integrated Circuit Engineering Corp., describes very fast SRAMs as having access times faster than 10ns, fast SRAMs as those in the 10ns to 30ns range, and slow

Furthermore, access speeds are continually being improved to meet the system demands of the electronic products in which they are included. As a result, delineation lines between speeds are also moving. One major market research firm reported that in 1996 approximately 45 percent of the value of SRAM sales were in speeds of 15ns and faster, 6 percent in speeds of between 16ns and 44ns, and 49 percent in speeds of 45ns and slower.[16]

SRAMs are constructed with a variety of designs and configurations. The design or cell structure of an SRAM refers to the number and type of transistors used per cell. Current cell types include four transistors, six transistors, and thin-film transistor. SRAM configuration refers to the number of bits available in a single access of the chip (die).

Included in the petition are all specialty SRAMs and modules incorporating SRAMs. Specialty SRAMs mentioned by the petitioner include cache tag and multiport. These types of SRAMs are often used in specific applications. Included in a cache tag SRAM is a method of signaling the microprocessor to indicate whether requested information is available in cache memory. Multiport SRAMs are constructed to allow data to be accessed concurrently by two or four separate ports, or pathways.[17] Memory modules and memory cards are narrow printed-circuit boards that contain several memory chips.

SRAMs basically have two uses: main memory in applications requiring low power usage, and intermediate storage, or "cache" memory, between fast microprocessors and the relatively slower DRAM main memory. The end use often dictates the access speed required of the SRAM, as well as the degree of power consumption.

SRAMs are used as main memory in such products as hand-held cellular phones, portable computers, personal digital assistants, portable test equipment, fax copiers, and modems. SRAMs with slower access speeds are often chosen for these applications because they offer lower power usage than SRAMs with faster access speeds, as well as lower cost. In addition, slower SRAMs offer significantly lower power usage than DRAMs of similar density and access speeds, which can be essential in battery-powered applications.

SRAMs are used as cache memory in computer systems where speed is critical, such as mainframes, workstations, and newer generation personal computers. Cache memory is a special high-speed memory that acts as an intermediary between a microprocessor and the main memory (DRAMs). Cache is designed to store the most frequently requested instructions and data, which it in turn supplies to the microprocessor. Instructions and data located in cache memory can be accessed as much as four times faster than instructions and data located in main memory. The more instructions and data the microprocessor can access directly from cache memory, the faster the computer or other equipment operates as a whole. By necessity, SRAMs with faster access speeds are used as cache memory. Although both synchronous and asynchronous SRAMs can be used as cache memory, increasingly, synchronous SRAMs are required in order to meet the accelerating clock speeds of microprocessors.[18]

SRAMs as those with access times slower than 30ns. A third organization, the World Semiconductor Trade Statistics, uses a 30ns or slower rating to separate data on the SRAM market. *Electronic Buyers News*, "perhaps the leading industry trade journal," has used several definitions of "fast" or "slow" within the period of investigation. Yet another market research firm, Dataquest, divides SRAMs into two speed categories, fast and slow, with the dividing point at 70ns.

[16] Information provided via e-mail by In-Stat, Mar. 27, 1997.

[17] Petition, pp. 7-8.

[18] Petition, pp. 6-7 and 16.

Manufacturing Facilities and Production Employees

The manufacture of SRAMs is a highly capital-intensive and automated process that can be divided into three stages: design, fabrication, and assembly and test.[19] The design of the circuit layout for an SRAM often requires highly-skilled technical employees, computer hardware, and computer-aided design software. The fabrication process is very automated and extremely capital intensive, with the cost of a new fabrication facility (and equipment) currently estimated at over $1 billion.

SRAMs are produced on a single wafer of highly-purified silicon, usually 6 to 8 inches in diameter.[20] The process of fabricating SRAMs on the silicon wafer entails the use of a mask set to form the circuit design, the repeated use of photolithographic steps, and introductions of chemical impurities (dopants) into the silicon. The introduction of dopants forms conducting and non-conducting regions on the wafer by changing the electrical characteristics of certain areas. Metal connections between selected regions of each die are formed and a final protective coating is applied to the wafer. It is in the wafer fabrication stage that the electrical and technical characteristics of the SRAM are developed. While still incorporated on the wafer, the individual SRAMs are referred to as dice (or chips). Depending on the diameter of the wafer and the size of the individual die, hundreds of identical SRAMs may be produced simultaneously. At the close of the fabrication stage, a wafer-probe test is performed, electrically testing each die on the wafer and marking defective dice for rejection.

After the fabrication stage, chips are tested and assembled. Assembly includes the separation of the wafer into individual chips, encapsulating the chips in either plastic or ceramic, and wire bonding metal leads to the chips. After assembly, the assembled chips are marked for identification purposes and given final tests to ensure quality and reliability. Although test and assembly is quite automated, it is relatively labor intensive compared to fabrication and is often conducted in low-labor-cost countries in East Asia.[21] Great effort is required to maximize wafer yield (number of working chips per wafer), especially in commodity products, because it determines to some extent the price that a company must charge for its product. The higher the wafer yield, the lower the price that the company can feasibly charge.

The manufacturing processes for different speeds, configurations, and cell structures of SRAMs are similar. Producing different types of SRAMs requires the use of a different mask set during wafer fabrication. Most SRAM manufacturers employ their fabrication facilities and personnel in the production of both SRAMs and other semiconductor products such as DRAMs and logic devices.[22]

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[19] This description of semiconductor manufacturing draws upon material from Motorola Corp., "The Making of a Semiconductor" (faxed to Commission staff on July 29, 1996), and Harris Semiconductor, *How Semiconductors are Made*, http:www.semi.harris.com/docs/lexicon/manufacture.html, Jan. 6, 1997.

[20] Most SRAM fabricators purchase their silicon wafers from third parties.

[21] This delineation of the manufacturing process is referred to as production sharing. For a more detailed explanation of production sharing in semiconductors, *see* U.S. International Trade Commission, *Production Sharing: Use of U.S. Components and Materials in Foreign Assembly Operations, 1991-1994* (Inv. No. 332-237), USITC Pub. 2966, May 1996, pp. 4-9.

[22] Questionnaire responses.

Interchangeability

SRAMs have individual design and functional characteristics that optimize their utility for certain applications. As stated above, SRAMs designed for use as cache memory are designed and constructed to maximize access speeds, with less emphasis being placed on energy conservation. In addition, cache SRAM is often designed to operate with a specific microprocessor. In contrast, SRAMs used as main memory, especially in portable applications, are designed to minimize energy consumption with less emphasis placed on access speed.[23]

Within most specific applications, domestically produced and imported SRAMs of similar density, speed, and power consumption can be interchangeable.[24] However, interchangeability across SRAMs with different access speeds can be problematic. Slower SRAMs technically may function in an application suitable for faster SRAMs, but the intended level of performance (i.e., clock speed or access speed) within the overall electronic system would not be met, as the slower SRAM could not keep pace with the faster system microprocessor.[25]

The substitutability of SRAMs with faster access speeds into applications that typically employ slower SRAMs is also limited.[26] SRAMs with faster access speeds can, in certain circumstances, be substituted for slower SRAMs in applications where low power consumption is not required.[27] However, the greater power consumption of faster SRAMs would limit their utility in applications (especially portable) suited to the lower power-consumption capabilities of slower SRAMs.

Customer and Producer Perceptions

The petitioner's and respondents' perception of the product differs. As stated earlier, the petitioner wishes all SRAMs to be included as a single "like product," arguing that any division based upon access speed would be artificial.[28] The petitioner contends that interchangeability exists among the various SRAM products, and that similarities exist in channels of distribution, production, and technology.[29] In contrast, the respondents contend that SRAMs should be divided into two "like products," slow and fast. Respondents cite differing end uses, distribution channels, physical characteristics, and lack of interchangeability based upon access speed.[30]

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[23] ***

[24] Responses in a number of questionnaires have pointed out the necessity to "qualify" an SRAM product with end users. The qualification process generally takes the form of providing the customer with samples to use as test devices in their equipment. Without qualification, the ability to quickly substitute one producer's SRAM for another producer's would be hampered.

[25] Petitioner's post-conference brief, pp. 4-5. Questionnaire response of ***

[26] Representative of ***, telephone interview by Commission staff, Mar. 26, 1997.

[27] Conference transcript (TR), pp. 147-148.

[28] Petitioner's post-conference brief, pp. 3-6.

[29] TR, p. 49.

[30] Korean respondents' post-conference brief, pp. 3-13.

The customer perception of SRAMs in regard to access speed seems to vary. Many SRAM customers appear to perceive SRAMs in terms of their access speed, either as "fast" or "slow."[31] These customers often view SRAMs in this fashion because they only purchase SRAMs from one of the two speed categories. Other customers recognize the groupings of "fast" and "slow," but their companies' requirements lead them to view SRAMs in an even more detailed fashion.[32] The groupings of "fast" and "slow" are not exact enough for these companies, as their products require very specific SRAM speed types to optimize functionality. All of the customers contacted perceived SRAMs as being somewhat application specific, and specific types of SRAMs were purchased for specific applications.

According to industry representatives, most types of SRAMs are considered to be commodity items and compete primarily on the basis of price. SRAMs manufactured by U.S. producers and those manufactured by Korean and Taiwan producers which share identical speed, density, and physical characteristics are largely substitutable. Differences in the level of quality and technology between domestically produced SRAMs and subject imports are often minimal and vary depending on SRAM type. Differences in the level of quality and technology are as likely to occur between SRAMs of domestic producers as between domestic SRAMs and subject imports.

Channels of Distribution

Both U.S.-produced and subject imported SRAMs are sold to a variety of customers, including original equipment manufacturers (OEMs), distributors, and value-added resellers. The petitioner has stated that the channels of distribution are essentially the same but that different distributors may be used by different producers.[33] The petitioner has argued that for all SRAM products, fast and slow, major OEMs are the dominant purchasers, and that a distribution network exists that serves the thousands of smaller OEMs in the U.S. market. The petitioner added that, although the use of direct sales to OEMs versus sales through distributors may vary slightly depending on the speed of the SRAMs , the channels of distribution do not differ markedly.[34]

The respondents contend that there is a difference in the channels of distribution based on the access speed of the SRAM. They stated that sales of SRAMs with faster access speeds are made directly to OEM computer manufacturers and require substantial engineering support. On the other hand, sales of SRAMs with slower access speeds are more often made through distributors and are more likely to be "plug and play," standardized product that would not require engineering support.[35]

No clear answer was available in regard to differences in distribution channels for "fast" and "slow" SRAMs. Industry representatives stated that both "fast" and "slow" SRAMs can be purchased directly from manufacturers as well as through distributors.[36] When an SRAM product begins its life cycle, and there are few manufacturers that can supply the product, there is a higher likelihood of direct sale from the manufacturer to the OEM purchaser, because the purchasers are competing for a scarce

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[31] Representatives from *** and Integrated Circuit Engineering Corp., telephone interviews by Commission staff, Mar. 25, 1997, to Apr. 2, 1997, and information provided via e-mail by In-Stat, Mar. 27, 1997.

[32] Representatives from ***, telephone interviews by Commission staff, Mar. 26-27, 1997.

[33] TR, p. 56.

[34] TR, p. 159.

[35] TR, p. 80.

[36] Representatives from ***, telephone interviews by Commission staff, Mar. 31, and Apr. 1, 1997.

product. In addition, engineering support by the producer may be required because of the relatively untried state of the product. As more producers enter the market and the product becomes more widely available, distributors are more likely to enter into the distribution system for the product and distributor sales are likely to comprise increasingly higher percentages of SRAM sales. This is the case regardless of access speed.[37] Because "slow" SRAMs typically use somewhat older technology, and because they usually have relatively longer life cycles than "fast" SRAMs, distributor sales may represent a higher percentage of overall "slow" SRAM sales than overall "fast" SRAM sales.

Price

SRAMs are largely commodity products and compete primarily on the basis of price. Within specific SRAM types, a number of producers offer similar products, with similar quality and performance.[38] The SRAM industry is highly cyclical, with short product life cycles. SRAMs begin their life cycle as a value-added product but are quickly transformed into a commodity product as increased numbers of suppliers join the market and production volume and manufacturing experience build up.[39] As a result, SRAM prices historically show a pattern of steep price declines as the products move along market and production life cycles.[40]

The respondents contend that within the SRAM product family, prices differ substantially based upon access-speed categories. They have stated that faster SRAMs typically attract higher prices than slower SRAMs, and that in 1996 average selling prices of faster SRAMs were nearly twice those of slower SRAMs of similar density.[41] In contrast, the petitioner has stated that there is only a trivial difference between the prices of SRAMs with differing access speeds.[42]

According to industry representatives, there typically is a price gap between "fast" and "slow" SRAMs.[43] "Fast" SRAMs are somewhat more difficult to manufacture, have shorter product life cycles, and usually command as much as twice the price of "slow" SRAMs.[44] However, according to the market research firm In-Stat, a "trickle down effect" can occur where price reductions in one area of a market can impact another area. This effect can occur across product family lines. When customers perceive a price reduction in one area of the product market, they may immediately press producers for similar price reductions in other areas.[45]

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[37] Representative from ***, telephone interview by Commission staff, Mar. 31, 1997.

[38] TR, p. 13.

[39] TR, p. 125.

[40] TR, p. 82.

[41] TR, p. 81. In a telephone interview by Commission staff on Mar. 26, 1997, a representative of Integrated Circuit Engineering Corp. stated that SRAMs with faster access speeds typically sell for up to twice the price of slower SRAMs of similar density. As a result, customers would not customarily substitute a more expensive, faster SRAM in an application where a slower SRAM will meet system requirements.

[42] TR, p. 59.

[43] Representatives from Integrated Circuit Engineering Corp. and ***, telephone interviews by Commission staff, Mar. 26, 1997, to Apr. 1, 1997, and information provided via e-mail by In-Stat, Apr. 1, 1997.

[44] Representatives from Integrated Circuit Engineering Corp. and ***, telephone interviews by Commission staff, Mar. 26, 1997, to Apr. 1, 1997.

[45] Information provided via e-mail by In-Stat, Apr. 1, 1997.

PART II: CONDITIONS OF COMPETITION IN THE U.S. MARKET

BUSINESS CYCLES

The SRAM industry is highly cyclical.[1] As stated by Micron, "the semiconductor memory market is characterized by rapid technological change, relatively short product life cycles, frequent product introductions and enhancements, difficult product transitions, and volatile market conditions."[2]

MARKET SEGMENTS

Estimates of SRAM demand by end use are as follows: ***.[3] An estimated 60 percent of all SRAMs are produced for the personal computer (PC) market.[4] Asynchronous SRAMs account for over one-half of all product revenue for the "very fast" speed segment (15 ns or less), where SRAMs are used in PC and workstation applications.[5] However, PC manufacturers are increasingly using synchronous SRAMs instead of asynchronous SRAMs. The PC market uses only "fast" SRAMs.[6] "Fast" SRAMs are also used in workstations[7] and servers.[8]

"Fast" SRAMs are used mainly for cache memory, while "slower" SRAMs are most often used as main memory, in applications including cellular phones, pagers, modems, and portable data terminals.[9] However, as stated earlier, there does not appear to be a clear delineation between "fast" and "slow" SRAMs.

SUPPLY AND DEMAND CONSIDERATIONS

U.S. Supply

The ability of U.S. producers of SRAMs to respond to price changes with changes in the quantity shipped to the U.S. market depends on several factors. These include the amount of excess capacity, production alternatives for SRAMs, the quantity of inventories, and the availability of alternate markets. These factors are discussed in part III of this report.

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[1] TR, p. 90.

[2] Micron SEC 10-K, 1996, p. 20.

[3] In-Stat Preliminary Estimates, provided in Micron's Mar. 25, 1997, submission to the Commission.

[4] Integrated Circuit Engineering Corp. estimate, petitioner's post-conference brief, app. 1.

[5] In-Stat report, Jan. 1997, petitioner's post-conference brief, app. 1.

[6] TR, p. 98.

[7] Workstations are similar in appearance to PCs and are often attached to networks but have greater technical analysis and computing capabilities than PCs. *See*, U.S. International Trade Commission, *Industry and Trade Summary: Computers, Peripherals, and Computer Components* ,USITC Pub. 2821, p. B-5.

[8] A server is one of the central computers in a network that distributes information to and from hundreds of users, many times acting as a "traffic cop" by directing information from one user to another. Ibid, p. B-5.

[9] TR, pp. 79-80.

U.S. Demand

Demand Characteristics

On a megabit basis, overall demand for SRAMs in the United States increased during 1994-96. Factors affecting demand include lower prices for SRAMs, increased internal clock speed of the Intel Pentium microprocessor, and new end uses for SRAMs. Respondents stated that estimated growth in the "slow" SRAM market is less than 10 percent per year while growth in the "fast' SRAM market is 20 percent per year.[10] A two-fold increase in the internal clock speed of the Intel Pentium[11] from 1995 to 1996 has spurred growth in "fast" SRAM demand.

Based on the available information regarding substitute products and the percentage of the cost of the final end-use products accounted for by SRAMs, demand for SRAMs may change somewhat with changes in the price level of SRAMs.

Substitute Products

U.S. producers and importers agree that there are few substitute products for SRAMs. For cache memory applications, other memory products cannot achieve the access times that SRAMs can achieve. In applications that use slower SRAMs, such as cellular phones, other memory products cannot be substituted because these applications require low power consumption.

Cost Share

The cost of SRAMs accounts for a small percentage of the total cost of PCs and other end products. Micron stated that low prices for SRAMs have caused customers to design higher quantities of SRAMs into their systems. However, it stated that if prices were to rise, demand would probably not fall because of the increased speed of microprocessors using cache memory.[12]

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[10] TR, p. 99.

[11] The Pentium microprocessor was introduced in 1993 and is currently the dominant processor for use in desktop computers.

[12] TR, pp. 61-62.

SUBSTITUTABILITY ISSUES

The qualification process for SRAMs is "often a collaborative effort among suppliers and a particular OEM."[13] It can vary greatly from customer to customer. For the most demanding end users qualification can take months and involve extensive testing, but for other end users it may take just a few days.[14] One importer, Samsung, reported that the average qualification time for its customers is 3 months.[15]

* * * * * * *.[16]

* * * * * * *.[17]

Comparison of Domestic Products and Subject Imports

All U.S. producers agreed that U.S., subject, and nonsubject SRAMs are used interchangeably. However, some stated that several factors were significant in their sales of SRAMs. ***.[18]

Importers of Taiwan product, with the exception of ***, stated that SRAMs are generally used interchangeably. *** stated that designs from each SRAM company can differ. Only one of the four importers of SRAMs from Taiwan stated that non-price differences were a significant factor in its sales of SRAMs. Specifically, ***.

Importers of Korean product disagreed that SRAMs are generally used interchangeably. Hyundai and LG Semicon stated that they import only "slow" SRAMs which are not used interchangeably with "fast" SRAMs from U.S. and Taiwan producers.[19] Samsung stated that "it is uncommon for SRAMs to be interchangeable in a customer's system" and that they can only be used interchangeably if the customer has performed the necessary qualifications and designed its system to permit interchangeability. Samsung's stated its advantages include a broad product base, high quality, reliability, and technical and sales support.[20]

In addition, Samsung stated that earlier introduction of a new product was an advantage. Specifically, Samsung stated that it was the first to qualify its pipeline burst SRAM with Intel in late 1994. Japanese suppliers qualified in early 1995 but U.S. suppliers did not qualify until late 1995.[21]

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[13] Petitioner's post-conference brief, p. 11.

[14] TR, p. 63.

[15] TR, p. 116.

[16] Fax from ***, dated April 3, 1997.

[17] ***.

[18] ***.

[19] Hyundai does produce "fast" SRAMs. Petitioner's post-conference brief, app. 3.

[20] TR, p. 77.

[21] ***.

Samsung stated that a major customer will only qualify a few suppliers and if a supplier is not qualified it will lose access to that account for the life of the end-use product.[22]

Korean respondents cited several other factors that limit substitutability between U.S.-produced SRAMs and subject imported SRAMs. First, Korean and Taiwan suppliers do not sell to the workstation and mainframe markets, which represent 10 to 15 percent of the entire SRAM market. These markets are supplied only by U.S. and Japanese suppliers. Second, U.S. producers do not sell significant quantities of "slow" SRAMs, which account for 40 percent of the SRAM market. Finally, importers do not sell products for military contracts.[23]

Comparison of Imports from Korea and Imports from Taiwan

Korean respondents argue that Korean and Taiwan SRAMs are differentiated because of several factors. First, they state that Taiwan does not generally supply significant volumes of "slow" SRAMs to the U.S. market. Second, they state that within "fast" SRAMs, Taiwan does not supply a full product line including 256K, 1 Meg, 4 Meg BiCMOS SRAMs, and 4 Meg "fast" CMOS SRAMs. Third, they state that Samsung qualified early on while Taiwan suppliers did not qualify until later. Finally, they argue that Samsung's quality and technical support exceed those of Taiwan suppliers.[24]

Comparison of Domestic Products and Subject Imports to Nonsubject Imports

Imports from nonsubject countries, particularly Japan, account for a large share of the U.S. market for SRAMs. Japanese suppliers reportedly supply a broad product line of SRAMs, including "fast" and "slow" SRAMS, and very "fast" SRAMs for the workstation market.

[22] TR, pp. 85-86.

[23] Korean respondents' post-conference brief, p. 24.

[24] Ibid., p. 38.

PART III: CONDITION OF THE U.S. INDUSTRY

Section 771(7)(B) of the Act[1] provides that in making its determination in this investigation the Commission--

> *shall consider (I) the volume of imports of the subject merchandise, (II) the effect of imports of that merchandise on prices in the United States for domestic like products, and (III) the impact of imports of such merchandise on domestic producers of domestic like products, but only in the context of production operations within the United States; and*
>
> *may consider such other economic factors as are relevant to the determination regarding whether there is material injury by reason of imports.*

Section 771(7)(C) of the Act[1] further provides that--

> *In evaluating the volume of imports of merchandise, the Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States is significant.*
>
> *In evaluating the effect of imports of such merchandise on prices, the Commission shall consider whether (I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.*
>
> *In examining the impact required to be considered under subparagraph (B)(III), the Commission shall evaluate (within the context of the business cycle and conditions of competition that are distinctive to the affected industry) all relevant economic factors which have a bearing on the state of the industry in the United States, including, but not limited to, (I) actual and potential decline in output, sales, market share, profits, productivity, return on investments, and utilization of capacity, (II) factors affecting domestic prices, (III) actual and potential negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment, (IV) actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and (V) in an antidumping investigation, the magnitude of the margin of dumping.*

[1] 19 U.S.C. § 1677(7)(B); 19 U.S.C. § 1677(7)(C).

Information on the alleged margins of dumping was presented earlier in this report and information on the volume and pricing of imports of the subject merchandise is presented in parts IV and V. Information on the other factors specified is presented in this section and/or part VI and (except as noted) is based on the questionnaire responses of eight firms that are believed to have accounted for the great bulk of U.S. fabrication of uncased SRAMs and assembly of cased SRAMs during 1994-96.

For the purpose of presentation in this report, unless otherwise noted, "domestic" SRAMs include all uncased and cased SRAMs that contain U.S.-fabricated dice, regardless of where any final assembly or casing was performed.[2] In addition, SRAMs assembled or cased in the United States from third-country-sourced dice (i.e., dice not fabricated in the United States, Korea, or Taiwan) are also included as "domestic" product.[3]

Data in this section are presented for uncased SRAMs, cased SRAMs, and SRAM modules.[4] Additional data on SRAM shipments by source of dice and location of assembly are presented in appendix D.

U.S. PRODUCERS

Overview of Industry

The Commission sent producers' questionnaires to all firms identified as producers in the petition and to additional firms identified as participants in the U.S. SRAM market by industrial directories. According to questionnaire responses, nine companies produced SRAMs and/or SRAM modules during the period 1994-96.[5] Eight of the firms performed wafer fabrication in the United States; six performed SRAM assembly;[6] and *** assembled SRAM modules. Responding producers are believed to account for about 80 percent of U.S. SRAM wafer fabrication[7] and approximately 75 percent of U.S. SRAM assembly,[8] but only a small fraction of SRAM module assembly in the United States. Twenty-three firms responded that they did not produce SRAMs or SRAM modules during this period.[9]

---

[2] Therefore, unless otherwise noted, U.S.-produced dice cased in Korea, Taiwan, or any third country are included as "domestic product" throughout this report.

[3] ***.

[4] The Commission sent producer and importer questionnaires to assemblers of SRAM memory modules. However, it received data from only one company, ***, whose data were received too late for incorporation into this report. Therefore, data presented on SRAM module production were collected only from companies that also cased SRAMs and are understated.

[5] Nine companies indicated that they produced SRAMs during this period--***. However, only seven firms provided the Commission with reasonably complete data; two firms, ***, provided incomplete or unusable data. No data for *** are included in the tables of the report, and *** provided only production and employment data.

[6] *** do not perform SRAM assembly in the United States.

[7] ***. *** did not respond to the Commission's request for information, and *** did not provide the Commission with complete data.

[8] There were several SRAM assembly "houses" that did not respond to the Commission's request for information.

[9] Four companies, ***, indicated that they did not produce SRAMs during the period 1994-96, even though these firms were identified as producing DRAMs during the Commission's earlier investigations on DRAMs.

The Commission had great difficulty in collecting accurate data in these investigations, partly because of the complexity of the production process and partly because a majority of U.S.-fabricated SRAM dice are sent to affiliates or subcontractors abroad for final assembly.[10] Several U.S. producers, ***, perform virtually all of their SRAM assembly outside the United States.[11] One company, ***.

Table III-1 presents a list of U.S. producers, with each company's position on the petition, U.S. production activities, production locations, and the share of reported 1996 U.S. production of uncased and cased SRAMs.

Table III-1
SRAMs: U.S. producers, positions on the petition, shares of reported 1996 U.S. production of uncased and cased SRAMs, U.S. production activities, and U.S. production locations

* * * * * * *

Overview of Companies

Micron Technology

Micron Technology, Inc. (Micron), Boise, ID, the petitioner, performs SRAM wafer fabrication and assembly of SRAMs and modules at its headquarters in Boise, ID. It is the ***. Micron has one production facility that houses four fabrication plants with full assembly and testing capabilities.[12] Micron sells a portion of its production to a related company, Micron Electronics, Inc. (MEI), a personal computer manufacturer.

[10] Some of the U.S.-fabricated dice assembled abroad never return to the United States; rather they are sold globally from the location of assembly. This fact made it difficult for Commission staff to reconcile uncased and cased SRAM production and shipments. Likewise, most U.S. producers and importers maintain assembly, transfer, and sales records on a global rather than national basis, making it difficult for them to provide data on U.S. production, assembly, shipments, and imports.

[11] *** perform some SRAM assembly of their U.S.-fabricated dice in Korea and Taiwan.

[12] In 1995, Micron broke ground on a fabrication and assembly facility in Lehi, UT. In February 1996, the company announced that it was postponing indefinitely the completion of the Lehi facility. Micron also indicated that it put the planned expansion of its Boise fabrication facility on hold indefinitely, along with completion of its new administration building.

Motorola Semiconductor Products

Motorola Semiconductor Products, Fast Static RAM Division, (Motorola), Austin, TX, is a division of Motorola, Inc., Schaumburg, IL. Motorola has three wafer fabrication facilities and one assembly facility the United States.[13] A significant share of Motorola's U.S.-fabricated dice are assembled in Malaysia.[14] Motorola consumes some of its production internally and also sells on the merchant market.

Cypress Semiconductor

Cypress Semiconductor Corp. (Cypress), San Jose, CA, has three wafer fabrication plants in the United States and an assembly operation in the Philippines.[15] Cypress assembles all of its U.S.-fabricated dice offshore at ***, and at its subsidiary in the Philippines.

Integrated Device Technology

Integrated Device Technology, Inc., (IDT) Santa Clara, CA, has three wafer fabrication facilities in the United States. Almost all of IDT's U.S.-fabricated dice are assembled offshore in ***. IDT opened an assembly and testing facility in Manila in 1996.

Paradigm Technology

Paradigm Technology, Inc. (Paradigm), Milpitas, CA, a producer throughout the period 1994-96, had one U.S. fabrication facility, which it sold to Orbit Semiconductor, Inc., in November 1996. All of the company's assembly work was performed offshore in Taiwan, Korea, Malaysia, and the Philippines.[16]

International Business Machines

International Business Machines Corp. (IBM), Armonk, NY, has an SRAM wafer fabrication facility located in Essex Junction, VT, and wafer or assembly facilities located in Canada, Japan, Germany, France, and Italy. ***. IBM consumes some of its production internally and also sells on the merchant market.

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[13] Motorola also has a wafer fabrication facility in Glasgow, Scotland, and an assembly facility in Sekangor, Malaysia.

[14] ***.

[15] Cypress Semiconductor Philippines, Inc. (CSPI), which started operations ***.

[16] ***.

Hitachi Semiconductor America

Hitachi Semiconductor (America), Inc. (Hitachi), Irving, TX, is a wholly owned subsidiary of Hitachi America, Ltd., Tarrytown, NY, which in turn is a subsidiary of Hitachi, Ltd., Tokyo, Japan. The parent, Hitachi, Ltd., has SRAM wafer fabrication facilities in Japan and the United States and assembly operations in Japan, the United States, and Malaysia. In the United States, ***.[17]

Mitsubishi Semiconductor America

Mitsubishi Semiconductor America, Inc., (Mitsubishi), Durham, NC, ***.

Intel

Intel Corp., (Intel) Santa Clara, CA, has three wafer fabrication plants in the United States. It performs virtually all of its assembly work at its two *** subsidiaries in Penang, Malaysia, and Manila, the Philippines. ***.

Overview of Industry as Presented in the Petition

According to the petition, nine firms fabricate SRAM dice in the United States. Appendix 2 of the petition also presented data, obtained from Dataquest, showing production of SRAMs by density and speed ("fast" or "slow") for eight of the nine firms (excluding IBM). As indicated, the great bulk of U.S. fabrication of "slow" SRAMs is apparently done by U.S. subsidiaries of Japanese firms. ***. On the basis of the data in table III-2 below, it is estimated that, on a megabit basis, "slow" SRAMs accounted for about 14.5 percent of the aggregate U.S. production of SRAMs by the eight firms shown in the petition.

Table III-2
SRAMs: Dataquest's data on U.S. production, by firms and by speed, 1995

* * * * * * *

[17] ***.

U.S. PRODUCTION, CAPACITY, AND CAPACITY UTILIZATION

U.S. producers' capacity, production, and capacity utilization data for uncased and cased SRAMs are presented in tables III-3 and III-4, respectively. U.S. production, by firms, of uncased SRAMs is presented in table III-5. U.S. assembly of cased SRAMs is presented in table III-6.

Table III-3
Uncased SRAMs: U.S. capacity,[1] wafer starts,[2] and capacity utilization, 1994-96[3]

Item	1994	1995	1996
Capacity (*1,000 wafers*)	534	742	784
Wafer starts (*1,000 wafers*)	525	662	663
Capacity utilization (*percent*)	98.3	89.2	81.0

[1] U.S. producers reported wafer capacity data on the basis of 144- to 168-hour work weeks, operating 51 to 52 weeks per year.

[2] Wafer starts represent the number of raw silicon wafers introduced into the SRAM wafer fabrication process and do not account for yield loss; they were collected in these investigations in order to calculate the capacity utilization of U.S. SRAM wafer fabrication facilities. Wafer yield reported by U.S. producers of uncased SRAMs ranged from 65 to 95 percent during the period for which data were requested. During the period 1994-96, most companies reported converting from 5-inch to 6-inch wafers; ***.

[3] Capacity and wafer-starts data were provided by ***; *** provided usable wafer-start data for 1996 only; and *** did not provide the Commission with usable data. *** reported that it did not produce uncased SRAMs in the United States.

Note.--Capacity utilization is calculated using data of firms providing both capacity and production information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table III-4
Cased SRAMs: U.S. capacity, assembly, and capacity utilization, 1994-96

* * * * * * *

Table III-5
Uncased SRAMs: U.S. production, [1] by firms, 1994-96

Item	1994	1995	1996
	Production (*1,000 units*)		
Micron	***	***	***
IDT	***	***	***
Cypress	***	***	***
Hitachi	***	***	***
Paradigm	***	***	***
IBM	***	***	***
Motorola	***	***	***
Total	149,506	267,457	272,185
	Production (*billion bits*)		
Micron	***	***	***
IDT	***	***	***
Cypress	***	***	***
Hitachi	***	***	***
Paradigm	***	***	***
IBM	***	***	***
Motorola	***	***	***
Total	39,826	64,439	103,308

[1] Production data presented for uncased SRAMs are intended to represent the successful fabrication of uncased SRAM dice. Production data may not reconcile with shipment and inventory data. Firms cited "yield loss, scrap, samples, returns, and theft" as reasons for the discrepancies. *** did not provide the Commission with usable data.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table III-6
Cased SRAMs: U.S. assembly, by firms, 1994-96

* * * * * * *

U.S. PRODUCERS' SHIPMENTS

Data on U.S. producers' shipments of uncased SRAMs, by types, are presented in table III-7. Tables III-8 and III-9 present shipment data for cased SRAMs. Shipment data for SRAM modules are presented in table III-10.

Table III-7
Uncased SRAMs: Shipments by U.S. producers, by types, 1994-96

Item	1994	1995	1996
	Quantity (*1,000 units*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	***	***	***
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	***	***	***
All shipments	132,673	212,599	217,446
	Quantity (*billion bits*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	***	***	***
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	***	***	***
All shipments	34,918	59,161	88,661
	Value (*1,000 dollars*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	***	***	***
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	***	***	***
All shipments	245,868	403,886	347,121
	Unit value (*per million bits*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	***	***	***
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	***	***	***
All shipments	$7.04	$6.83	$3.92

[1] Less than 0.5 billion bits.

Note.--Because of rounding, bit figures may not add to the totals shown. Unit values are calculated using data of firms supplying both quantity and value information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table III-8
Cased SRAMs: Shipments of product cased by U.S. producers, by types, 1994-96

* * * * * * *

Table III-9
Cased SRAMs: Shipments of "domestic" product [1] by U.S. producers and importers, by types, 1994-96

Item	1994	1995	1996
	Quantity (*1,000 units*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	90,443	137,379	132,434
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	17,879	16,808	10,746
All shipments	108,322	154,187	143,180
	Quantity (*billion bits*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	25,394	41,578	54,451
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	6,431	8,731	7,467
All shipments	31,826	50,309	61,918
	Value (*1,000 dollars*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	492,515	795,434	782,511
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	79,308	122,512	53,337
All shipments	571,823	917,946	835,848
	Unit value (*per million bits*)		
U.S. company transfers	***	***	***
Domestic shipments	***	***	***
U.S. shipments	$19.39	$19.13	$14.41
Affiliate exports	***	***	***
Unrelated exports	***	***	***
All exports	12.33	14.03	7.14
All shipments	17.97	18.25	13.53

[1] Includes all U.S.-fabricated dice, regardless of where cased, plus dice fabricated in 3rd sources but cased in the United States.

Note.--Because of rounding, bit figures may not add to the totals shown. Unit values are calculated using data of firms supplying both quantity and value information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table III-10
SRAM modules: Shipments by U.S. producers, by types, 1994-96

* * * * * * *

U.S. PRODUCERS' INVENTORIES

Data on U.S. producers' inventories of uncased SRAMs are presented in table III-11. Table III-12 presents inventory data for cased SRAMs. Inventory data on SRAM modules are presented in table III-13.

Table III-11
Uncased SRAMs: End-of-period inventories of U.S. producers, 1994-96

* * * * * * *

Table III-12
Cased SRAMs: End-of-period inventories of "domestic" product, by origin of dice, 1994-96

* * * * * * *

Table III-13
SRAM modules: End-of-period inventories of U.S. producers, 1994-96

* * * * * * *

U.S. EMPLOYMENT, WAGES, AND PRODUCTIVITY

U.S. producers' employment data for uncased SRAMs, cased SRAMs, and SRAM modules are presented in tables III-14 through III-16, respectively.

Table III-14
Uncased SRAMs: Average number of U.S. production and related workers, hours worked, [1] wages and total compensation paid to such employees, and hourly wages, productivity, and unit production costs,[2] 1994-96

Item	1994	1995	1996
Production and related workers (PRWs)	1,253	1,563	1,561
Hours worked by PRWs (*1,000 hours*)	2,510	3,134	3,169
Wages paid to PRWs (*1,000 dollars*)	41,569	53,204	59,492
Total compensation paid to PRWs (*1,000 dollars*)	57,974	78,373	75,046
Hourly wages paid to PRWs	$16.56	$16.97	$18.77
Hourly total compensation paid to PRWs	$23.09	$25.00	$23.68
Productivity (*million bits per hour*)	15.9	20.0	31.3
Unit labor costs (*per million bits*)	$1.46	$1.25	$0.76

[1] Includes hours worked plus hours of paid leave time.
[2] On the basis of total compensation paid.

Note.--Ratios are calculated from the unrounded figures using data of firms supplying both numerator and denominator information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table III-15
Cased SRAMs: Average number of U.S. production and related workers, hours worked, [1] wages and total compensation paid to such employees, and hourly wages, productivity, and unit production costs,[2] 1994-96

Item	1994	1995	1996
Production and related workers (PRWs)	201	256	130
Hours worked by PRWs *(1,000 hours)*	375	468	257
Wages paid to PRWs *(1,000 dollars)*	6,106	7,621	4,206
Total compensation paid to PRWs *(1,000 dollars)*	10,342	***	5,890
Hourly wages paid to PRWs	$16.27	$16.29	$16.39
Hourly total compensation paid to PRWs	$27.56	***	$22.96
Productivity *(million bits per hour)*	22.8	20.9	22.2
Unit labor costs *(per million bits)*	$1.21	$1.46	$1.04

[1] Includes hours worked plus hours of paid leave time.
[2] On the basis of total compensation paid.

Note.--Ratios are calculated from the unrounded figures using data of firms supplying both numerator and denominator information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table III-16
SRAM modules: Average number of U.S. production and related workers, hours worked, wages and total compensation paid to such employees, and hourly wages, productivity, and unit production costs, 1994-96

* * * * * * *

PART IV: U.S. IMPORTS, APPARENT CONSUMPTION, AND MARKET SHARES

U.S. IMPORTERS

The Commission sent importer questionnaires to over 100 U.S. companies that were believed to fabricate, assemble, import, or distribute SRAMs or SRAM modules. Seventeen companies provided the Commission with data on U.S. imports for the period 1994-96. Twelve companies indicated that they did not import SRAMs or SRAM modules during this same period.

U.S. IMPORTS

For purposes of presentation in this report, imports of products containing U.S.-fabricated dice, regardless of the source of assembly or export, are considered "domestic" product and not imports. For example, several U.S. fabricators, ***, ship U.S.-fabricated uncased dice to Taiwan or Korea for assembly, with most of the assembled product being shipped back to the United States. For the purposes of this report, these shipments are not classified as "imports."

U.S. import data presented in the body of the report are based on data compiled from questionnaires of the Commission, unless otherwise noted. U.S. imports based on official statistics of the U.S. Department of Commerce are presented in appendix E. Official statistics are not being used in the body of the report because Customs has determined that the country of origin of imported SRAMs is the location of assembly rather than the location of wafer fabrication. This differs from Commerce's scope language, which states that the origin of imports from Korea and Taiwan should be determined by the source of dice fabrication regardless of where final assembly takes place.

Table IV-1 presents a list of U.S. importers. Table IV-2 presents U.S. imports of uncased SRAMs. Table IV-3 presents U.S. imports of cased SRAMs. Table IV-4 presents U.S. imports of SRAM modules. Table IV-5 presents subject imports of SRAMs and SRAM modules by products and by sources.

Table IV-1
SRAMs: U.S. importers, abbreviation, source of imports, and SRAM products imported, 1994-96

* * * * * * *

Table IV-2
Uncased SRAMs: U.S. imports, by sources, 1994-96

Item	1994	1995	1996
	Quantity (*1,000 units*)		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	2,134	1,862	885
	Quantity (*billion bits*)		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	833	908	1,259
	Value (*1,000 dollars*)		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	9,185	13,432	12,725
	Unit value (*per million bits*)		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Average	$10.92	$14.79	$10.12

Note.--Because of rounding, bit figures may not add to the totals shown. Unit values are calculated using data of firms supplying both quantity and value information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table IV-3
Cased SRAMs: U.S. imports, by sources and by origin of dice, 1994-96

Item	1994	1995	1996
	Quantity (*1,000 units*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	57,673	100,822	71,649
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	54,385	95,392	75,320
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	95,538	157,871	143,635
Total, all imports	207,596	354,085	290,604
	Quantity (*billion bits*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	17,031	39,376	38,437
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	13,144	26,458	28,682
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	29,880	55,055	70,832
Total, all imports	60,056	120,889	137,950

See footnotes at end of table.

Table IV-3--*Continued*
Cased SRAMs: U.S. imports, by sources and by origin of dice, 1994-96

Item	1994	1995	1996
	Value (*1,000 dollars*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	195,227	427,605	270,998
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	95,363	203,047	151,515
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	260,361	475,707	483,046
Total, all imports	550,951	1,106,359	905,559
	Unit value (*per million bits*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Average	$11.46	$10.86	$7.05
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Average	7.25	7.67	5.28
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Average	8.71	8.64	6.82
Average, all imports	9.17	9.15	6.56

[1] Not available.
[2] Not applicable.

Note.--Because of rounding, bit figures may not add to the totals shown. Unit values are calculated using data of firms supplying both quantity and value information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table IV-4
SRAM modules: U.S. imports, by sources, 1994-96

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Table IV-5
SRAMs and SRAM modules: Subject imports, by products and by "sources," 1994-96

* * * * * * *

U.S. PRODUCERS' IMPORTS OF SUBJECT MERCHANDISE

Table IV-6 presents data on U.S. producers' imports of subject merchandise.

Table IV-6
SRAMs and SRAM modules: U.S. producers' subject imports, by products and by "sources," 1994-96

* * * * * * *

APPARENT U.S. CONSUMPTION

Table IV-7 presents data on apparent U.S. consumption of uncased SRAMs for the period 1994-96. Table IV-8 presents apparent U.S. consumption of cased SRAMs. Table IV-9 present apparent U.S. consumption of SRAM modules, and table IV-10 presents combined apparent U.S. consumption for SRAMs and SRAM modules.

U.S. MARKET SHARES

Data on market shares of uncased SRAMs are presented in table IV-11. Data on market shares of cased SRAMs are presented in table IV-12. Data on market shares of SRAM modules are presented in table IV-13. Table IV-14 shows combined data on cased SRAMs and SRAM modules.

Table IV-7
Uncased SRAMs: U.S. shipments of domestic product, U.S. shipments of imported product, and apparent U.S. consumption, 1994-96

Item	1994	1995	1996
	Quantity (*billion bits*)		
Producers' U.S. shipments	8,959	9,857	8,535
Importers' U.S. shipments:			
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	879	774	939
Apparent consumption	9,838	10,631	9,474
	Quantity (*1,000 units*)		
Producers' U.S. shipments	14,923	13,244	8,142
Importers' U.S. shipments:			
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	2,617	1,812	489
Apparent consumption	17,540	15,056	8,631
	Value (*1,000 dollars*)		
Producers' U.S. shipments	137,262	179,235	62,966
Importers' U.S. shipments:			
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	8,378	11,204	12,333
Apparent consumption	145,640	190,439	75,299

Note.--Because of rounding, bits may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table IV-8
Cased SRAMs: U.S. shipments of "domestic"[1] product, U.S. shipments of "imported"[2] product, and apparent U.S. consumption, 1994-96

Item	1994	1995	1996
	Quantity (*billion bits*)		
U.S. shipments of "domestic" product:			
SRAMs made from U.S. dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
SRAMs made from 3rd-source dice cased in United States	***	***	***
Total	25,394	41,578	54,451
U.S. shipments of "imported" product:			
Alleged LTFV SRAMs made from--			
Korean dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	12,093	27,465	***
Taiwan dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	7,514	11,328	13,896
SRAMs made from 3rd-source dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	9,197	19,697	***
Total, all imports	28,804	58,490	60,557
Apparent consumption	54,199	100,067	115,007
	Quantity (*1,000 units*)		
U.S. shipments of "domestic" product:			
SRAMs made from U.S. dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
SRAMs made from 3rd-source dice cased in United States	***	***	***
Total	90,443	137,379	132,434
U.S. shipments of "imported" product:			
Alleged LTFV SRAMs made from--			
Korean dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	40,223	64,029	50,277
Taiwan dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	32,783	39,921	40,435
SRAMs made from 3rd-source dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	19,278	43,571	28,364
Total, all imports	92,284	147,521	119,076
Apparent consumption	182,727	284,900	251,510

See footnotes at end of table.

Table IV-8--*Continued*
Cased SRAMs: U.S. shipments of "domestic"[1] product, U.S. shipments of "imported"[2] product, and apparent U.S. consumption, 1994-96

Item	1994	1995	1996
	Value (*1,000 dollars*)		
U.S. shipments of "domestic" product:			
SRAMs made from U.S. dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
SRAMs made from 3rd-source dice cased in United States	***	***	***
Total	492,515	795,434	782,511
U.S. shipments of "imported" product:			
Alleged LTFV SRAMs made from--			
Korean dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
Taiwan dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	73,578	130,801	71,408
SRAMs made from 3rd-source dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
Total, all imports	346,953	737,183	423,228
Apparent consumption	839,468	1,532,617	1,205,739

[1] "Domestic" product includes U.S.-fabricated uncased SRAMs (regardless of cased SRAM assembly location) and U.S.-assembled cased SRAMs made from uncased SRAMs that are fabricated in countries other than the United States, Korea, and Taiwan. Shipment data do not reconcile with inventory and production data. Firms cited "yield loss, scrap, samples, returns, and theft" as the reasons for the discrepancies.
[2] "Imported" product includes Korean and Taiwan-fabricated dice (regardless of assembly location) and 3rd-source-fabricated dice assembled outside the United States. Shipment data do not reconcile with inventory and import data. Firms cited "scrap, samples, returns, and theft" as the reasons for the discrepancies.
[3] Not available.

Note.--The term "3rd source" refers to countries other than Korea, Taiwan, and the United States. Because of rounding, bits may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table IV-9
SRAM modules: U.S. shipments of domestic product, U.S. shipments of imported product, and apparent U.S. consumption, 1994-96

* * * * * * *

Table IV-10
Cased SRAMs and SRAM modules: U.S. shipments of "domestic" product, U.S. shipments of "imported" product, and apparent U.S. consumption, 1994-96[1]

* * * * * * *

Table IV-11
Uncased SRAMs: Apparent U.S. consumption and market shares, 1994-96

Item	1994	1995	1996
	Apparent consumption		
Quantity (*billion bits*)	9,838	10,631	9,474
Quantity (*1,000 units*)	17,540	15,056	8,631
Value (*1,000 dollars*)	145,640	190,439	75,299
	Share of the quantity of U.S. consumption, on the basis of bits (*percent*)		
Producers' U.S. shipments	91.1	92.7	90.1
Importers' U.S. shipments:			
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	8.9	7.3	9.9
	Share of the quantity of U.S. consumption, on the basis of units (*percent*)		
Producers' U.S. shipments	85.1	88.0	94.3
U.S. imports from--			
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	14.9	12.0	5.7
	Share of the value of U.S. consumption (*percent*)		
Producers' U.S. shipments	94.2	94.1	83.6
Importers' U.S. shipments:			
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	5.8	5.9	16.4

[1] Less than 0.05 percent.

Note.--Because of rounding, shares may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table IV-12
Cased SRAMs: Apparent U.S. consumption and market shares, 1994-96[1] [2]

Item	1994	1995	1996
	Apparent consumption		
Quantity (*billion bits*)	54,199	100,067	115,007
Quantity (*1,000 units*)	182,727	284,900	251,510
Value (*1,000 dollars*)	839,468	1,532,617	1,205,739
	Share of the quantity of U.S. consumption, on the basis of bits (*percent*)		
U.S. shipments of "domestic" product:			
SRAMs made from U.S. dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
SRAMs made from 3rd-source dice cased in United States	***	***	***
Total	46.9	41.5	47.3
U.S. shipments of "imported" product:			
Alleged LTFV SRAMs made from--			
Korean dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	22.3	27.4	23.6
Taiwan dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	13.9	11.3	12.1
SRAMs made from 3rd-source dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	17.0	19.7	17.0
Total, all imports	53.1	58.5	52.7
	Share of the quantity of U.S. consumption, on the basis of units (*percent*)		
U.S. shipments of "domestic" product:			
SRAMs made from U.S. dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
SRAMs made from 3rd-source dice cased in United States	***	***	***
Total	49.5	48.2	52.7

See footnotes at end of table.

Table IV-12--*Continued*
Cased SRAMs: Apparent U.S. consumption and market shares, 1994-96[1] [2]

Item	1994	1995	1996
	Share of the quantity of U.S. consumption, on the basis of units (*percent*)		
U.S. shipments of "imported" product:			
Alleged LTFV SRAMs made from--			
Korean dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	22.0	22.5	20.0
Taiwan dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	17.9	14.0	16.1
SRAMs made from 3rd-source dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	10.6	15.3	11.3
Total, all imports	50.5	51.8	47.3
	Share of the value of U.S. consumption (*percent*)		
U.S. shipments of "domestic" product:			
SRAMs made from U.S. dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	***	***	***
SRAMs made from 3rd-source dice cased in United States	***	***	***
Total	58.7	51.9	64.9
U.S. shipments of "imported" product:			
Alleged LTFV SRAMs made from--			
Korean dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	18.4	23.6	17.0
Taiwan dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in United States	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	8.8	8.5	5.9
SRAMs made from 3rd-source dice--			
Cased in Korea	***	***	***
Cased in Taiwan	***	***	***
Cased in 3rd sources	***	***	***
Subtotal	14.2	16.0	12.2
Total, all imports	41.3	48.1	35.1

[1] "Domestic" product includes U.S.-fabricated uncased SRAMs (regardless of cased SRAM assembly location) and U.S.-assembled cased SRAMs made from uncased SRAMs that are fabricated in countries other than the United States, Korea, and Taiwan. Shipment data do not reconcile with inventory and production data. Firms cited "yield loss, scrap, samples, returns, and theft" as the reasons for the discrepancies.
[2] "Imported" product includes Korean and Taiwan-fabricated dice (regardless of assembly location) and 3rd-source-fabricated dice assembled outside the United States. Shipment data do not reconcile with inventory and import data. Firms cited "scrap, samples, returns, and theft" as the reasons for the discrepancies.
[3] Not available.
[4] Less than 0.05 percent.

Note.--The term "3rd source" refers to countries other than Korea, Taiwan, and the United States. Because of rounding, shares may not add to the totals shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table IV-13
SRAM modules: Apparent U.S. consumption and market shares, 1994-96

* * * * * * *

Table IV-14
Cased SRAMs and SRAM modules: Apparent U.S. consumption and market shares, 1994-96[1]

* * * * * * *

PART V: PRICING AND RELATED DATA

FACTORS AFFECTING PRICING

U.S. Inland Transportation Costs

Most U.S. producers and importers reported that U.S. inland transportation costs account for 2 percent or less of the total delivered price of SRAMs.

Exchange Rates

Quarterly exchange rates reported by the International Monetary Fund for Korea and Taiwan during the period January 1994-December 1996 are shown in figure V-1.

PRICING PRACTICES

Prices of SRAMs, like those of other semiconductors, tend to follow a learning curve for each new SRAM product that is introduced. The cost of producing SRAMs falls as more are produced and as costs decline, prices decline. Petitioner stated that the normal learning curve price drop is 30 to 35 percent a year.[1]

Prices peaked in 1995 as SRAMs were in short supply but then declined significantly in the first half of 1996. An important cause of this was mis-forecast demand for SRAMs in personal computers (PCs). It was forecast that up to 80 percent of PCs would use cache memory. To meet the forecasted demand SRAM companies added capacity. However, many low-end machines did not use cache as was forecasted; only about 20 percent of Pentium systems were shipped with cache SRAM.[2] PC producers that had over-purchased SRAMs and accumulated large inventories sold off their inventories at low prices or forced their vendors to take returns.[3] In-Stat reported that "the biggest price erosion has occurred in the commodity-type level 2 or external (L2) cache products, but price reductions have occurred across the board."[4]

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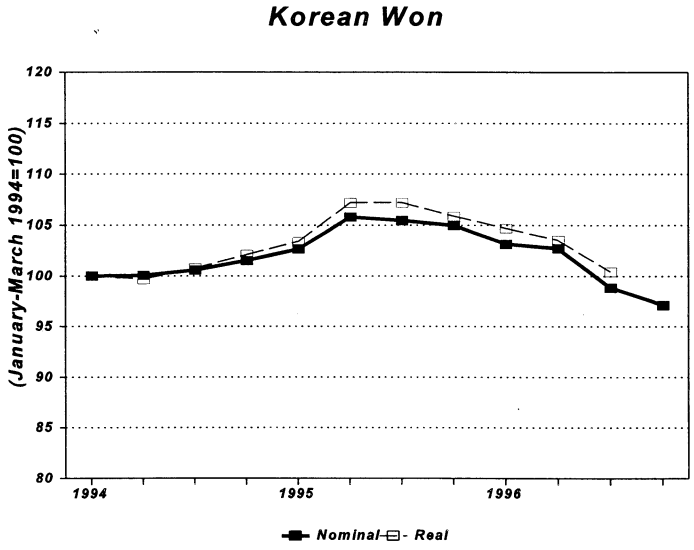
[1] TR, p. 156.

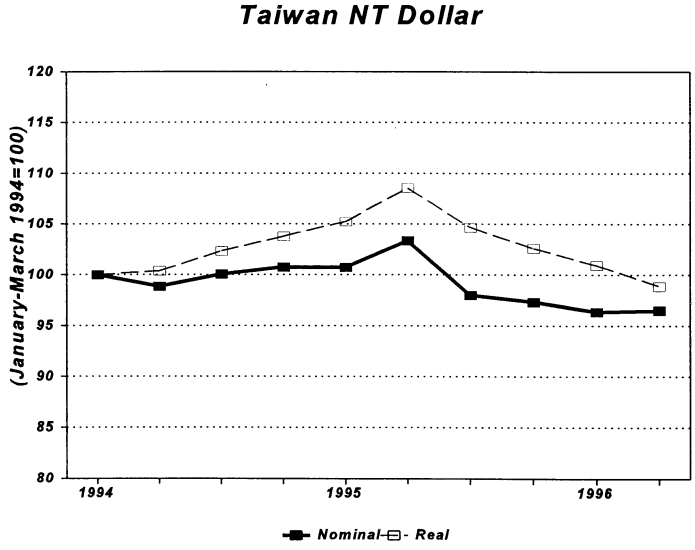
[2] Integrated Circuit Engineering Corp., *MOS Memory Market Trends*, p. 29, July 1996.

[3] TR, p. 128.

[4] In-Stat *Electronic News*, Mar. 10, 1997.

Figure V-1
Exchange rates: Index of nominal exchange rates of the Korean won and Taiwan NT dollar relative to the U.S. dollar, by quarters, Jan. 1994-Dec. 1996





Source: International Monetary Fund, *International Financial Statistics*, March 1997.

Prices for slower speed SRAMs did not decline as much.[5] At the conference, Dick Bruneau of Cypress stated there is no price difference between "fast" and "slow" asynchronous SRAMs, specifically of 32Kx8 and 128Kx8 configurations.[6] Jerry Taylor of IDT stated that in the past, "slow" SRAMs tended to be priced lower than "fast" SRAMs, but in the last year pricing has been almost the same.[7] However, Bob Eminian of Samsung testified that a "fast" SRAM may sell for two to three times the price of a "slow" SRAM of the same density and configuration. He also stated that "slow" SRAMs track DRAM prices while "fast" SRAMs track market dynamics.[8]

Price competition in the SRAM market occurs between products of similar specifications and among products of differing specifications. For example, Micron reported that it approached Intel with the idea of a 32Kx32 SRAM in January 1994 and initially quoted a price of $35.00 each. However, Intel asked for a price of $21.00 based on the price of four asynchronous 32Kx8 SRAMs.[9]

U.S. producers sell primarily on a contract basis. In most cases prices are renegotiated monthly or quarterly. Four importers sell almost solely on a spot basis, while three sell primarily on a contract basis. Two of the latter three importers reported that contracts range from 1 to 3 months, while the other reported that contracts are typically from 3 to 12 months.

PRICE DATA

The Commission requested U.S. producers and importers to provide monthly quantity and value data between January 1994 and February 1997 for the following five products:

Product 1.--32K x 32, 1 Meg synchronous SRAM
Product 2.--32K x 36, 1.1 Meg synchronous SRAM
Product 3.--64K x 32, 2 Meg synchronous SRAM
Product 4.--128K x 8, 1 Meg asynchronous SRAM
Product 5.--32K x 8, 256K asynchronous SRAM

Five U.S. producers,[10] four importers of SRAMs from Korea, and five importers of SRAMs from Taiwan reported pricing data for products 1-5. Pricing data for products 1, 3, 4, and 5 are presented in tables V-1 to V-4 and figures V-2 to V-5. Pricing data for product 2 are not shown as there were no reported sales of Taiwan product and sales of Korean product were reported in only one month.

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[5] Tony Carbone of Hitachi stated that prices for medium speed SRAMs (greater than 20 ns) have not eroded as significantly as prices for higher speed SRAMs because they are used in applications other than PCs. *Electronic Buyers News*, Dec. 2, 1996.

[6] TR, p. 59.

[7] TR, p. 60.

[8] TR, p. 81.

[9] In his testimony, Gene Cloud of Micron further described how prices for the 32Kx32 SRAM fell due to pricing from Korea and Taiwan. TR, pp. 24-27.

[10] Data submitted by *** were not included since these firms sell only to related companies.

Table V-1
Product 1: Weighted-average net f.o.b. prices and quantities for sales to U.S. customers reported by U.S. producers and importers, and margins of under/(over)selling, by months, Jan. 1994-Feb. 1997

* * * * * * *

Table V-2
Product 3: Weighted-average net f.o.b. prices and quantities for sales to U.S. customers reported by U.S. producers and importers, and margins of under/(over)selling, by months, Jan. 1996-Feb. 1997

* * * * * * *

Table V-3
Product 4: Weighted-average net f.o.b. prices and quantities for sales to U.S. customers reported by U.S. producers and importers, and margins of under/(over)selling, by months, Jan. 1994-Feb. 1997

* * * * * * *

Table V-4
Product 5: Weighted-average net f.o.b. prices and quantities for sales to U.S. customers reported by U.S. producers and importers, and margins of under/(over)selling, by months, Jan. 1994-Feb. 1997

* * * * * * *

Figure V-2
Product 1: Weighted-average net f.o.b. prices reported by U.S. producers and importers, Jan. 1994-Feb. 1997

* * * * * * *

Figure V-3
Product 3: Weighted-average net f.o.b. prices reported by U.S. producers and importers, Jan. 1994-Feb. 1997

* * * * * * *

Figure V-4
Product 4: Weighted-average net f.o.b. prices reported by U.S. producers and importers, Jan. 1994-Feb. 1997

* * * * * * *

Figure V-5
Product 5: Weighted-average net f.o.b. prices reported by U.S. producers and importers, Jan. 1994-Feb. 1997

* * * * * * *

Overall, prices increased during the first half of 1995 and then declined sharply beginning in late 1995 and continuing throughout 1996. Prices of synchronous SRAMs (products 1-3) declined more sharply than those for asynchronous SRAMs (products 4-5).

Prices of imports from Korea and Taiwan were consistently lower than prices reported for U.S.-produced SRAMs. Korean imports were priced lower than U.S.-produced SRAMs in 92 of 100 possible comparisons. Margins of underselling ranged from 0.8 to 81.3 percent. The average margin was 35.5 percent. Taiwan imports were priced lower than U.S.-produced SRAMs in 99 of 101 possible comparisons. Margins of underselling ranged from 1.3 to 85.6 percent The average margin was 33.6 percent.

For products 4 and 5, Korean importers reported pricing data separately for their sales of "slow" and "fast" SRAMs. The distinction is only relevant to products 4 and 5, as all synchronous products are "fast" SRAMs. These data show that for much of the period, "fast" Korean SRAMs were priced much higher than "slow" Korean SRAMs, but during the second half of 1996 and the first two months of 1997, prices for "slow" SRAMs were near and in some cases above those for "fast" SRAMs. Prices reported by Korean suppliers for "fast" and "slow" SRAMs are shown in appendix F. If prices of "slow" SRAMs imported from Korea are excluded for products 4 and 5, product 4 shows underselling in 22 of 38 months while product 5 shows overselling in 23 of 38 months.

LOST SALES AND LOST REVENUES

The following producers reported specific instances of lost sales and lost revenues:[11] ***,[12] ***.[13] Thirty-eight purchasers were named in the allegations; however customer information was provided by producers for only 12 of these firms. The total quantity and value of allegations, by country, are shown in the tabulation below.[14]

	Quantity *(1,000 units)*	Value *($1,000)*
Lost revenues:		
Korea	24,443	$46,076
Taiwan	12,857	3,845
Both	21,135	3,867
Total	58,435	53,788
Lost sales:		
Korea	9,882	$36,497
Taiwan	4,921	7,051
Both	2,048	9,536
Total	16,851	53,084

[11] ***.

[12] *** did not provide the Commission with contact names, phone numbers, or addresses of the purchasers as required in the questionnaire.

[13] ***.

[14] These totals only reflect those allegations which included complete quantity and value information.

Staff telephoned and/or sent a brief survey to all purchasers for which it had timely contact information. These specific allegations and purchaser comments on these allegations are presented below.

*	*	*	*	*	*	*[15]
*	*	*	*	*	*	*[16]
*	*	*	*	*	*	*[17]
*	*	*	*	*	*	*[18]
*	*	*	*	*	*	*[19]
*	*	*	*	*	*	*[20]

[15] Telephone conversation with *** on Mar. 25, 1997.

[16] Telephone conversation with ***, on Mar. 25, 1997.

[17] Fax from ***, Apr. 3, 1997.

[18] Telephone conversation with *** on Apr. 2, 1997.

[19] Telephone conversation with *** on Apr. 13, 1997.

[20] Telephone conversation with *** on Mar. 28, 1997.

PART VI: FINANCIAL CONDITION OF THE U.S. INDUSTRY

BACKGROUND

Six U.S. producers[1] reported income-and-loss data on their operations producing SRAMs.[2]

OPERATIONS ON SRAMS

The income-and-loss data shown in table VI-1 and summary table C-4 include all reported U.S.-produced SRAMs (uncased, cased, and modules).[3] The total sales value increased substantially in 1995, compared to 1994, but then decreased in 1996. The reporting companies realized an increasing operating income margin in 1995 compared to 1994, but then incurred an operating loss in 1996. Research and development is a large expense in this ever-changing industry, increasing each year, even with operating losses in 1996. Selected financial data for the individual producers are shown in table VI-2. ***[4] had increasing sales in 1995 compared to 1994, but then *** had decreased sales in 1996. All of the companies (except ***) realized operating income in 1994 and 1995, but *** companies incurred operating losses in 1996.

---

[1] The producers and their fiscal year ends are ***. The producers were requested to, and did, provide data for the calendar years 1994-96. ***.

[2] Three other producers provided questionnaires but stated that they were unable to complete the financial data for the following reasons: ***. ***.

[3] The income-and-loss data include domestic and export sales of SRAM products produced from wafers and dice fabricated in the United States, regardless of assembly location. The data also include U.S.-assembled cased SRAMs from 3rd-source-fabricated dice. The revenue includes only the final sales or transfer values of U.S.-produced cased SRAMs and the final sales or transfer values of U.S.-produced uncased SRAMs that are not used as captive consumption in the assembly of U.S.-produced cased SRAMs. For this reason, the aggregate financial data do not track the shipment data, which separately present uncased and cased SRAM shipments.

[4] ***.

Table VI-1
Income-and-loss experience of U.S. producers on their operations producing SRAMs, calendar years 1994-96

Item	1994	1995	1996
	Value (*$1,000*)		
Net sales:			
Trade	***	***	***
Company transfers	***	***	***
Total sales	817,426	1,396,081	1,025,615
Cost of goods sold	505,755	750,240	730,055
Gross profit	311,671	645,841	295,560
SG&A expenses	94,301	131,332	132,075
Research and development	87,275	141,173	173,449
Operating income or (loss)	130,095	373,336	(9,964)
Interest expense	***	***	***
Other expense[1]	***	***	***
Other income items	***	***	***
Net income or (loss)	145,080	385,723	(17,689)
Depreciation/amortization	57,325	84,808	96,996
Cash flow	202,405	470,531	79,307
	Ratio to net sales (*percent*)		
Cost of goods sold	61.9	53.7	71.2
Gross profit	38.1	46.3	28.8
SG&A expenses	11.5	9.4	12.9
Research and development	10.7	10.1	16.9
Operating income or (loss)	15.9	26.7	-1.0
Net income or (loss)	17.7	27.6	-1.7
	Number of firms reporting		
Operating losses	***	***	***
Net losses	***	***	***
Data	6	6	6

[1] ***.
Source: Compiled from data submitted in response to Commission questionnaires.

Table VI-2
Income-and-loss experience of U.S. producers (by firm) on their operations producing SRAMs, calendar years 1994-96

* * * * * * *

CAPITAL EXPENDITURES, RESEARCH AND DEVELOPMENT EXPENSES, AND INVESTMENT IN PRODUCTIVE FACILITIES

Capital expenditures, research and development expenses, and the original cost and book value of property, plant, and equipment used in the production of SRAMs are shown in table VI-3. Capital expenditures more than doubled in 1995 compared to 1994 and increased further in 1996. The increasing research and development expenses mirror the separate line item included in the income-and-loss tables. The original cost and book value of fixed assets increased each year for the reporting companies, reflecting their continued investment in new equipment and facilities.

Table VI-3
Value of assets, capital expenditures, and research and development expenses of U.S. producers of SRAMs, calendar years 1994-96

Item	1994	1995	1996
	Value (*$1,000*)		
Capital expenditures[1]	196,088	489,466	504,424
R&D expenses[2]	87,275	141,173	173,449
Fixed assets:[3]			
Original cost	642,167	1,109,833	1,280,284
Book value	354,485	555,251	777,128

[1] The producers are ***.
[2] The producers are ***.
[3] The producers are ***.

Source: Compiled from data submitted in response to Commission questionnaires.

CAPITAL AND INVESTMENT

The producers' comments regarding any actual or potential negative effects of imports of SRAMs from Korea and Taiwan on their firms' growth, investment, ability to raise capital, and/or development and production efforts (including efforts to develop a derivative or more advanced version of the product) are presented in appendix G.

PART VII: THREAT CONSIDERATIONS

Section 771(7)(F)(I) of the Act (19 U.S.C. § 1677(7)(F)(I)) provides that--

> *In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of the subject merchandise, the Commission shall consider, among other relevant economic factors*[1]*--*
>
> *(I) if a countervailable subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the countervailable subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement), and whether imports of the subject merchandise are likely to increase,*
>
> *(II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,*
>
> *(III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,*
>
> *(IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices, and are likely to increase demand for further imports,*
>
> *(V) inventories of the subject merchandise,*
>
> *(VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,*
>
> *(VII) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both),*

[1] Section 771(7)(F)(ii) of the Act (19 U.S.C. § 1677(7)(F)(ii)) provides that "The Commission shall consider [these factors] . . . as a whole in making a determination of whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted under this title. The presence or absence of any factor which the Commission is required to consider . . . shall not necessarily give decisive guidance with respect to the determination. Such a determination may not be made on the basis of mere conjecture or supposition."

> *(VIII) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and*
>
> *(IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).*[2]

Information on the nature of the alleged LTFV margins was presented earlier in part I of this report; information on the volume and pricing of imports of the subject merchandise is presented in parts IV and V; and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts is presented in part VI. Information on inventories of the subject merchandise; foreign producers' operations, including the potential for "product-shifting;" any other threat indicators, if applicable; and any dumping in third-country markets, follows.

The Commission sent foreign producer's questionnaires to counsel representing all Korean and Taiwan SRAM producers cited in the petition. Responses were received from all three Korean producers and from the major producers in Taiwan. In addition, information on SRAM operations in both countries was requested through the U.S. Department of State, and the American Institute in Taiwan submitted some very helpful information. No information has been received during the course of these investigations that would suggest that SRAMs have been the subject of any other import relief investigations in the United States or elsewhere.

THE INDUSTRY IN KOREA

According to the petitioner, there are three producers of SRAMs in Korea: Samsung Electronics Co., Ltd. (Samsung); Hyundai Electronics Industries Co., Ltd. (Hyundai); and LG Semicon.[3] All three Korean firms are large, integrated producers, and industry trade publications now list Samsung as the world's largest producer of SRAMs.[4] Data contained in the petition showing the three Korean producers' worldwide shipments of SRAMs and their corresponding world market shares in 1994 and 1995, as reported by In-Stat, are shown in the following tabulation:

* * * * * * *

[2] Section 771(7)(F)(iii) of the Act (19 U.S.C. § 1677(7)(F)(iii)) further provides that, in antidumping investigations, ". . . the Commission shall consider whether dumping in the markets of foreign countries (as evidenced by dumping findings or antidumping remedies in other WTO member markets against the same class or kind of merchandise manufactured or exported by the same party as under investigation) suggests a threat of material injury to the domestic industry."

[3] ***.

[4] According to their foreign producers' questionnaires, SRAMs accounted for less than *** percent of each firm's total sales in 1996.

Data on the three Korean firms' production and shipments of uncased SRAMs, cased SRAMs, and SRAM memory modules were provided by counsel in response to the Commission's foreign producer questionnaires and are presented in tables VII-1 through VII-3, respectively.

Table VII-1
Uncased SRAMs: Korean capacity, production, inventories, capacity utilization, and shipments, 1994-96 and 1997-98 (projected)

* * * * * * *

Table VII-2
Cased SRAMs (regardless of where the dice were fabricated): Korean capacity, production, inventories, capacity utilization, and shipments, 1994-96 and 1997-98 (projected)

* * * * * * *

Table VII-3
SRAM modules: Korean production, inventories, capacity utilization, and shipments, 1994-96 and 1997-98 (projected)

* * * * * * *

THE INDUSTRY IN TAIWAN

According to the petitioner, there are five major producers/exporters of SRAMs in Taiwan: Winbond Electronics Corp. (Winbond); Alliance Semiconductor Corp. (Alliance--whose production is fabricated in Taiwan by United Microelectronics Corp.); Integrated Silicon Solutions, Inc. (ISSI--whose production is fabricated by Taiwan Semiconductor Manufacturing Corp.); United Microelectronics Corp. (UMC); and Taiwan Semiconductor Manufacturing Corp. (TSMC). The petitioner also listed five other SRAM producers in Taiwan, as well as seven additional firms that produce, or may produce, SRAMs. Counsel for the Taiwan respondents provided in their post-conference brief a list of 15 firms in Taiwan that fabricate SRAMs and 25 firms that package (assemble) and/or test SRAMs. Data contained in the petition showing the largest Taiwan producers' worldwide shipments of SRAMs and their corresponding world market shares in 1994 and 1995, as reported by In-Stat, are shown in the following tabulation:

* * * * * * *

The following information was obtained from the American Institute in Taiwan in a telegram dated March 26, 1997. The Institute noted that integrated circuit (IC) development and production is an area in which Taiwan believes it has a comparative advantage. Both government and industry have concentrated efforts in this area. Taiwan's IC industry, which was established in the early 1980s, has expanded rapidly since 1993. Among the types of products produced by the firms are memory ICs (including SRAMs, DRAMs, and ROMs), communication ICs, information product ICs, and consumer electronic ICs. Since 1991, memory ICs have been the main product line of Taiwan's IC industry. In 1996, memory ICs accounted for 60 percent of total IC output.

Currently Taiwan has 15 major IC manufacturers. In 1996, these 15 firms (including manufacturers and foundry[5] service companies) had a combined capacity of 5.26 million pieces in terms of 6-inch wafers, up 38 percent from 3.812 million pieces in 1995. In 1996, the 15 firms produced $4.8 billion worth of ICs, an increase of 7.3 percent from the previous year's total. In 1996, Taiwan exported 61.1 percent of its total IC output, mainly to the United States (24 percent), Southeast Asia (15 percent), Hong Kong (14 percent), and Japan (12 percent).

Taiwan's production of memory ICs is projected to continue to grow as the number of 8-inch silicon wafer factories increases from the current number to 22. According to ERSO (Electronics Research and Service Organization, of the Industrial Technology Research Institute) projections, Taiwan is expected to have an IC output of $7.5 billion by 2000 (about 5 percent of projected world output in that year), up substantially from output in 1996.

Taiwan's IC chip manufacturers have been affected by the sluggish world semiconductor market. Yet construction of the 22 new 8-inch wafer fabrication plants (9 of which are completed and running) by the year 2000, after a brief slowdown, continues. The average investment per plant is about $1 billion. Taiwan's IC manufacturers have budgeted nearly $24 billion for plant construction from 1990 to 2000. Taiwan's exports of SRAMs have not been limited by tariffs or other barriers such as antidumping findings or other restraint agreements.

[5] As explained at the conference, a foundry is a company whose primary business is to make wafers and sell them to anyone who comes with a set of masks, and not offer a product. In other words, it offers wafers, but no products. See TR, p. 69.

On April 8, 1997, the Commission received a telegram from the U.S. Embassy in Taipei regarding Taiwan's production capacity, production, capacity, capacity utilization, and exports. Table VII-4 presents Taiwan's IC average monthly productive capacity, output, and capacity utilization, by wafer size, for 1990-95. Table VII-5 presents the value of Taiwan's exports of SRAMs, by country of destination, for 1994 and 1995.

Table VII-4
Taiwan's integrated circuit production capacity and output, by wafer size, 1990-95

Year	4-inch	5-inch	6-inch	8-inch
	Average monthly capacity *(1,000 units)*			
1990	62	50	37	0
1991	69	70	79	0
1992	69	71	85	0
1993	69	78	105	0
1994	69	80	189	2
1995	60	97	249	90
	Average monthly production *(1,000 units)*			
1990	55	40	35	0
1991	60	58	45	0
1992	60	60	69	0
1993	60	69	95	0
1994	60	72	187	2
1995	60	69	234	32
	Average capacity utilization *(percent)*			
1990	88.7	80.0	94.6	-
1991	87.0	82.9	57.0	-
1992	87.0	84.5	81.2	-
1993	87.0	88.5	90.5	-
1994	87.0	90.0	98.9	100.0
1995	100.0	71.1	93.9	35.6

Source: U.S. Department of State telegram 1530 from the American Institute in Taiwan, Apr. 8, 1997.

Table VII-5
SRAMs: Taiwan's exports, by country of destination, 1994 and 1995

Destination	1994	1995
	Value *($1,000 U.S.)*	
United States	8,441	135,297
Hong Kong	12,086	58,126
Japan	877	6,174
Singapore	2,095	50,738
Thailand	1,626	4,730
All other	8,219	42,594
Total	[1] 33,344	297,659
	Share of total *(percent)*	
United States	25.3	45.5
Hong Kong	36.2	19.5
Japan	2.6	2.1
Singapore	6.3	17.0
Thailand	4.9	1.6
All other	24.6	14.3
Total	100.0	100.0

[1] Although the total of the column is 33,344, the telegram listed 73,344.

Source: Statistical Department, Directorate General of Customs (as reproduced in U.S. Department of State telegram 1530 from the American Institute in Taiwan, Apr. 8, 1997).

Following are more specific details on some of Taiwan's SRAM producers. This information was obtained from sources other than the American Institute in Taiwan. According to the petitioner (petition, p. 34 and exhibit 12), Winbond--

> *"has also commenced construction of two additional Fabs, with an estimated aggregate cost of NT$50 billion (US$1.83 billion). Fab 3, which is expected to commence operation in the first quarter of 1997, is being designed primarily to manufacture SRAM memory products using 0.35 micron to 0.25 micron CMOS process. Plans for Fab 3 include a floor area of approximately 63,600 square meters and a capacity to process 25,000 eight-inch wafers pre (sic) month. This fab expansion will more than double Winbond's capacity to produce SRAMs."*[6]

Petitioner also cites Alliance's Form 10-K submitted to the Securities and Exchange Commission for the fiscal year ended March 30, 1996 (see petition, exhibit 13), as follows:

> *"In July 1995, the Company entered into an agreement with UMC and S3 Incorporated ("S3") to form a separate Taiwanese company, United Semiconductor Corporation, for the purpose of building and managing an 8-inch semiconductor manufacturing facility in Taiwan. The facility is expected to commence production in late 1996. It is presently contemplated that the manufacturing facility will, over time, require $1 billion to complete its construction and finance operations. . . ."*

> *"In October 1995, the Company entered into an agreement with UMC and other parties to form a separate Taiwanese company, United Silicon Inc., for the purpose of building and managing an 8-inch semiconductor manufacturing facility in Taiwan. The facility is expected to commence production in late 1997. It is presently contemplated that the manufacturing facility will, over time, require $1 billion to complete its construction and finance operations."*

[6] The Taiwan respondents state in their post-conference brief (p. 21) that Winbond's Fab 3 "was heavily damaged by a fire in October 1996." The relevant article cited in their brief (see exhibit 3) adds that "contrary to earlier reports from within the company, *** should have little or no effect on Winbond's ability to meet customer demand. . . . The company has not yet disclosed repair estimates, but said some equipment in its class 1 cleanroom will have to be replaced. . . . Production levels at the company's five-and six-inch wafer fabs were unaffected by the fire . . .

Petitioner, citing a Lehman Brothers report,[7] states that TSMC, "the largest producer of semiconductors in Taiwan," is also building two new large fabs.[8] Petitioner further stated that:

> *"TSMC works as a foundry[9] for sales of SRAMs and other semiconductors through other companies, including Integrated Silicon Solutions Inc. ("ISSI"). TSMC's Fab IV was expected to begin commercial production by the end of 1996.[10] Another fab, TSMC Fab V, is also under construction.[11] ISSI's rapidly expanding sales of Taiwanese SRAMs in the United States will increase as a result of these significant expansions of its Taiwanese foundry partner, TSMC. . . ."*

Data obtained in response to the Commission's foreign producer questionnaires are presented in tables VII-6 and VII-7.

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[7] *Chips Down, Longer Term Prospects Remain Promising; Taiwan Semiconductor Industry Review and Outlook*, Sept. 4, 1996. See petition, exhibit 14.

[8] "Currently, TSMC manufacturers (sic) over 110,000 top-quality, high yield 6-inch wafers per month in its Fab I and Fab II facilities, and 8-inch wafers in Fab III. In 1994, TSMC produced nearly 20% of the world's IC foundry market, making TSMC the number one foundry in the world. The company is continuing to be aggressive in addressing worldwide demand for semiconductor manufacturing capacity. In 1995, TSMC invested several billion dollars in is (sic) state-of-the-art Fab IV and Fab V which together will have a potential monthly output of 60,000 8-inch wafers in 1997. All these will ensure TSMC's continued leadership position in the global foundry business." http://www.tsmc.com.tw/Image/statueng.html, Apr. 4, 1997.

[9] TSMC is a joint venture between the government of Taiwan, Philips Electronics, N.V., and other private investors. TSMC's charter prevents it from designing or making its own brand-name IC end products. "For this reason, TSMC is a partner, and not a competitor, for other semiconductor companies." *See*, http://www.tsmc.com.tw/image/introeng.html.

[10] Fab IV began volume production in February 1997. "Fab IV has gone through a series of pilot productions during the past three months, and has achieved a high yield rate of over 90%. . . . From the outset, Fab IV will utilize state-of-the art 0.45um and 0.35um process technology in the manufacture of **16M DRAM and various kinds of logic products** [emphasis added] for customers, and the new fab will upgrade to 0.25um technology next year. Moreover, production at Fab IV will quickly expand to full capacity. The company expects to reach production output of 22,000 8-inch wafers per month by the end of this year, and to reach full capacity of 30,000 wafers per month by the end of 1998." See http://www.tsmc.com/tw/News/ne970129.html.

[11] "Fab V, TSMC's third 8-inch fab, is scheduled to begin ramping-up in October 1997, with a projected total monthly output of 30,000 8-inch wafers. . . . To keep pace with market demand and to gain market share, TSMC says it is doing everything possible to expand the capacity of Fab I, II and II and to expedite construction of Fab IV and V. . . . In addition, plans are underway for a sixth and seventh fab. 'With these expansion plans, TSMC will increase its capacity by some 30% a year in order to maintain our position as the world's leading pure foundry,' said Donald Brooks, TSMC president." TSMC press release issued Nov. 1, 1995.

TSMC is also engaged in a joint venture with Altera Corp., Analog Devices, Inc., and ISSI in building a new wafer fabrication facility in the United States--in Camas, WA. The new $1.2 billion facility will operate as an independent company named WaferTech. Groundbreaking took place in July 1996 and production is expected to begin in the second quarter of 1998. The fab is intended to use 0.35 micron technology initially, shifting to 0.25 micron, and eventually to 0.18 micron. By the end of 1998, WaferTech is scheduled to produce 10,000 8-inch wafers per month. At full production, by the end of 1999, it will reach a monthly output of 30,000 8-inch wafers.

Table VII-6
Uncased SRAMs: Taiwan capacity, production, inventories, capacity utilization, and shipments, 1994-96 and 1997-98 (projected)

* * * * * * *

Table VII-7
Cased SRAMs (regardless of where the dice were fabricated): Taiwan capacity, production, inventories, capacity utilization, and shipments, 1994-96 and 1997-98 (projected)

* * * * * * *

U.S. IMPORTERS' INVENTORIES

End-of-period inventories held by U.S. importers of uncased SRAMs, cased SRAMs, and SRAM memory modules are shown in tables VII-8 through VII-10, respectively. Combined inventories of SRAMs and SRAM modules, on a bit basis, from Korea and Taiwan more than quadrupled from 1994 to 1996, rising from 4.4 trillion bits to 18.2 trillion bits (table VII-11). The ratio of inventories of allegedly LTFV imports to total shipments of such imports rose from 16.5 percent in 1994 to 34.0 percent in 1996.

Table VII-8
Uncased SRAMs: End-of-period inventories held by U.S. importers, by sources, 1994-96

Item	1994	1995	1996
	Quantity (*1,000 units*)		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	411	235	220
	Quantity (*billion bits*)		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Total	193	257	271
	Ratio to total shipments, on the basis of bits (*percent*))		
Korea	***	***	***
Taiwan	***	***	***
Subtotal	***	***	***
Other sources	***	***	***
Average	21.2	30.0	.7

[1] Less than 0.05 percent.

Note.--Because of rounding, bit figures may not add to the totals shown. Ratios are calculated using data of firms supplying both quantity and value information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table VII-9
Cased SRAMs: End-of-period inventories held by U.S. importers, by sources, 1994-96

Item	1994	1995	1996
	Quantity (*1,000 units*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
Total, all imports	19,648	47,497	56,740
	Quantity (*billion bits*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
Total, all imports	7,970	18,341	29,764
	Ratio to total shipments of imports, on the basis of bits (*percent*)		
Korea:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
Taiwan:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Subtotal	***	***	***
3rd sources:			
Korean dice	***	***	***
Taiwan dice	***	***	***
U.S. dice	***	***	***
3rd-source dice	***	***	***
Average	***	***	***
Average, all imports	16.0	18.8	27.0

[1] Not available.

Note.--Because of rounding, bit figures may not add to the totals shown. Ratios are calculated using data of firms supplying both quantity and value information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table VII-10
SRAM modules: End-of-period inventories held by U.S. importers, by sources, 1994-96

* * * * * * *

Table VII-11
SRAMs and SRAM modules: End-of-period inventories of subject imports, by products and by "sources," 1994-96

Item	1994	1995	1996
	Quantity (*billion bits*)		
Uncased SRAMs:			
Korea	***	***	***
Taiwan	***	***	***
Total	***	***	***
Cased SRAMs with dice fabricated in--			
Korea	***	***	***
Taiwan	***	***	***
Total	***	***	***
SRAM modules:			
Korea	***	***	***
Taiwan	***	***	***
Total	***	***	***
Alleged LTFV imports:			
Korea	***	***	***
Taiwan	***	***	***
Total	4,408	11,075	18,213
	Ratio to total shipments of imports, on the basis of bits (*percent*)		
Uncased SRAMs:			
Korea	***	***	***
Taiwan	***	***	***
Average	***	***	***
Cased SRAMs with dice fabricated in--			
Korea	***	***	***
Taiwan	***	***	***
Average	***	***	***
SRAM modules:			
Korea	***	***	***
Taiwan	***	***	***
Average	***	***	***
Alleged LTFV imports:			
Korea	***	***	***
Taiwan	***	***	***
Average	16.5	23.5	34.0

Note.--Because of rounding, bit figures may not add to the totals shown. Ratios are calculated using data of firms supplying both numerator and denominator information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

APPENDIX A

FEDERAL REGISTER NOTICES

[Investigations Nos. 731–TA–761–762 (Preliminary)]

Static Random Access Memory Semiconductors From the Republic of Korea and Taiwan

AGENCY: United States International Trade Commission.

ACTION: Institution of antidumping investigations and scheduling of preliminary phase investigations.

SUMMARY: The Commission hereby gives notice of the institution of investigations and commencement of preliminary phase antidumping investigations Nos. 731–TA–761–762 (Preliminary) under section 733(a) of the Tariff Act of 1930 (19 U.S.C. 1673b(a)) (the Act) to determine whether there is a reasonable indication that an industry in the United States is materially injured or threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports from the Republic of Korea (Korea) and Taiwan of static random access memory (SRAM) semiconductors,[1] that are alleged to be sold in the United States at less than fair value. Unless the Department of Commerce extends the time for initiation pursuant to section 732(c)(1)(B) of the Act (19 U.S.C. 1673a(c)(1)(B)), the Commission must reach preliminary determinations in antidumping investigations in 45 days, or in this case by April 11, 1997. The Commission's views are due at the Department of Commerce within five business days thereafter, or by April 18, 1997.

For further information concerning the conduct of these investigations and rules of general application, consult the Commission's rules of practice and procedure, part 201, subparts A through E (19 CFR part 201), and part 207, subparts A and B (19 CFR part 207), as amended in 61 FR 37818 (July 22, 1996).

EFFECTIVE DATE: February 25, 1997.

FOR FURTHER INFORMATION CONTACT: Fred Fischer (202–205–3179), Office of Investigations, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436. Hearing-impaired persons can obtain information on this matter by contacting the Commission's TDD terminal on 202–205–1810. Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000. General information concerning the Commission may also be obtained by accessing its internet server (http://www.usitc.gov or ftp://ftp.usitc.gov).

SUPPLEMENTARY INFORMATION:

Background

These investigations are being instituted in response to a petition filed on February 25, 1997, by Micron Technology, Inc., Boise, ID.

Participation in the Investigations and Public Service List

Persons (other than petitioners) wishing to participate in the investigations as parties must file an entry of appearance with the Secretary to the Commission, as provided in §§ 201.11 and 207.10 of the Commission's rules, not later than seven days after publication of this notice in the Federal Register. Industrial users and (if the merchandise under investigation is sold at the retail level) representative consumer organizations have the right to appear as parties in Commission antidumping investigations. The Secretary will prepare a public service list containing the names and addresses of all persons, or their representatives, who are parties to these investigations upon the expiration of the period for filing entries of appearance.

Limited Disclosure of Business Proprietary Information (BPI) Under an Administrative Protective Order (APO) and BPI Service List

Pursuant to § 207.7(a) of the Commission's rules, the Secretary will make BPI gathered in these investigations available to authorized applicants representing interested parties (as defined in 19 U.S.C. 1677(9)) who are parties to the investigations under the APO issued in the investigations, provided that the application is made not later than seven days after the publication of this notice in the Federal Register. A separate service list will be maintained by the Secretary for those parties authorized to receive BPI under the APO.

Conference

The Commission's Director of Operations has scheduled a conference in connection with these investigations for 9:30 a.m. on March 18, 1997, at the U.S. International Trade Commission Building, 500 E Street SW, Washington, DC. Parties wishing to participate in the conference should contact Fred Fischer (202–205–3179) not later than March 14, 1997, to arrange for their appearance. Parties in support of the imposition of antidumping duties in these investigations and parties in opposition to the imposition of such duties will each be collectively allocated one hour within which to make an oral presentation at the conference. A nonparty who has testimony that may aid the Commission's deliberations may request permission to present a short statement at the conference.

Written Submissions

As provided in §§ 201.8 and 207.15 of the Commission's rules, any person may submit to the Commission on or before March 21, 1997, a written brief containing information and arguments pertinent to the subject matter of the investigations. Parties may file written testimony in connection with their presentation at the conference no later than three days before the conference. If briefs or written testimony contain BPI, they must conform with the requirements of §§ 201.6, 207.3, and 207.7 of the Commission's rules.

In accordance with §§ 201.16(c) and 207.3 of the rules, each document filed by a party to the investigations must be served on all other parties to the investigations (as identified by either the public or BPI service list), and a certificate of service must be timely filed. The Secretary will not accept a document for filing without a certificate of service.

Authority: These investigations are being conducted under authority of title VII of the Tariff Act of 1930; this notice is published pursuant to § 207.12 of the Commission's rules.

Issued: February 27, 1997.

By order of the Commission.

Donna R. Koehnke,

Secretary.

[FR Doc. 97–5410 Filed 3–4–97; 8:45 am]

BILLING CODE 7020–02–P

[1] The products covered by these investigations are synchronous, asynchronous, and specialty static random access memory semiconductors (SRAMs), whether assembled or unassembled, from the Republic of Korea and Taiwan. Assembled SRAMs include all package types. Unassembled SRAMs include processed wafers, uncut dice, and cut dice. Processed wafers produced in Korea or Taiwan but packaged or assembled into memory modules in a third country are included in the scope; however, wafers produced in a third country and assembled or packaged in Korea or Taiwan are not included in the scope.

The scope of these investigations includes modules containing SRAMs. Such modules include single in-line processing modules (SIPs), single in-line memory modules (SIMMs), dual in-line memory modules (DIMMs), memory cards, or other collections of SRAMs whether unmounted or mounted on a circuit board.

The SRAMs subject to these investigations are currently classified in statistical reporting numbers 8542.13.8037 through 8542.13.8049, the subject modules are classified in statistical reporting number 8473.30.10, and the subject processed wafers, uncut dice and cut dice are classified in statistical reporting number 8542.13.8005 of the Harmonized Tariff Schedule of the United States.

[A-580-828 and A-583-827]

Initiations of Antidumping Duty Investigations: Static Random Access Memory From the Republic of Korea and Taiwan

AGENCY: Import Administration, International Trade Administration, Department of Commerce.

ACTION: Initiation of antidumping investigation.

EFFECTIVE DATE: March 21, 1997.

FOR FURTHER INFORMATION CONTACT: Shawn Thompson at (202) 482-1776 or Roy Unger at (202) 482-0651, Import Administration—Room B099, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, N.W., Washington, DC 20230.

Initiations of Investigations

The Applicable Statute

Unless otherwise indicated, all citations to the statute are references to the provisions effective January 1, 1995, the effective date of the amendments made to the Tariff Act of 1930 ("the Act") by the Uruguay Round Agreements Act ("URAA").

The Petition

On February 25, 1997, the Department of Commerce ("the Department")

received a petition filed in proper form by Micron Technology, Inc. ("petitioner"). The Department received supplemental information to the petition on March 11, 1997.

In accordance with section 732(b) of the Act, petitioner alleges that imports of Static Random Access Memory ("SRAMs") from the Republic of Korea ("Korea") and Taiwan are being, or are likely to be, sold in the United States at less than fair value within the meaning of section 731 of the Act, and that such imports are materially injuring, or threatening material injury to, an industry in the United States.

The Department finds that petitioner has standing to file the petition because it is an interested party as defined in section 771(9)(C) of the Act.

Scope of Investigations

The products covered by these investigations are synchronous, asynchronous, and specialty SRAMs from Korea and Taiwan, whether assembled or unassembled. Assembled SRAMs include all package types. Unassembled SRAMs include processed wafers or die, uncut die, and cut die. Processed wafers produced in Korea and Taiwan, but packaged or assembled into memory modules in a third country, are included in the scope; wafers produced in a third country and assembled or packaged in Korea or Taiwan are not included in the scope.

The scope of these investigations includes modules containing SRAMs. Such modules include single in-line processing modules ("SIPs"), single in-line memory modules ("SIMMs"), dual in-line memory modules ("DIMMs"), memory cards, or other collections of SRAMs, whether unmounted or mounted on a circuit board.

The SRAMs subject to these investigations are classifiable under subheadings 8542.13.8037 through 8542.13.8049, 8473.30.10 through 8473.30.90, and 8542.13.8005 of the Harmonized Tariff Schedule of the United States ("HTSUS"). Although the HTSUS subheadings are provided for convenience and customs purposes, our written description of the scope of these investigations is dispositive.

Determination of Industry Support for the Petition

Section 732(b)(1) of the Act requires that petitions be filed on behalf of the domestic industry. In this regard, section 732(c)(4)(A) of the Act requires the Department to determine, prior to the initiation of an investigation, whether certain percentage thresholds of industry support are satisfied. A petition meets the minimum requirements for initiation if the domestic producers or workers who support the petition account for: (1) at least 25 percent of the total production of the domestic like product; and (2) more than 50 percent of the production of the domestic like product produced by that portion of the industry expressing support for, or opposition to, the petition.

Section 771(4)(A) of the Act defines the "industry" as the producers of a domestic like product. Thus, to determine whether the petition has the requisite industry support, the Act directs the Department to look to producers and workers who account for production of the domestic like product. The International Trade Commission ("ITC"), which is responsible for determining whether "the domestic industry" has been injured, must also determine what constitutes a domestic like product in order to define the industry. However, while both the Department and the ITC must apply the same statutory definition of domestic like product, they do so for different purposes and pursuant to separate and distinct authority. In addition, the Department's determination is subject to limitations of time and information. Although this may result in different definitions of the domestic like product, such differences do not render the decision of either agency contrary to the law.[1]

Section 771(10) of the Act defines domestic like product as "a product that is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation under this title." Thus, the reference point from which the domestic like product analysis begins is "the article subject to an investigation," i.e., the class or kind of merchandise to be investigated, which normally will be the scope as defined in the petition.

As noted earlier, the scope of the petition is limited to SRAMs. This is the petitioner's sole proposed domestic like product. The Department has no basis on the record to find this domestic like product definition clearly inadequate. In this regard, we have found no basis on which to reject petitioner's representations that there are no clear dividing lines, in terms of characteristics and uses, between synchronous, asynchronous, and specialty SRAMs . (*See* March 17, 1997, Memorandum to the File.) The Department has, therefore, adopted the domestic like product definition set forth in the petition.

Our review of the production data provided in the petition and petition supplements indicates that the petitioner and supporters of the petition account for more than 50 percent of the total production of the domestic like product, thus meeting the standard of section 732(c)(4)(A) of the Act. The Department received no expressions of opposition to the petition from any domestic producers or workers. Accordingly, the Department determines that the petition is supported by the domestic industry.

Export Price and Normal Value

The following are descriptions of the allegations of sales at less than fair value upon which our decisions to initiate are based. Should the need arise to use any of this information in our preliminary or final determinations, we will re-examine the information and may revise the margin calculations, if appropriate.

Petitioner based export price ("EP") in Korea on an invoice for the sale of one megabit synchronous SRAMs in a 32x32 configuration from one producer/exporter in Korea. Petitioner based EP in Taiwan on two price quotations obtained by a private market research firm for the sale of the same type of SRAM from two producers/exporters in Taiwan. Regarding one of these companies, however, there is no evidence in the petition that it is a foreign producer. Rather, this company appears to be a U.S. customer who has a manufacturing arrangement with a Taiwanese company. Nonetheless, because the price quote involving this company related to merchandise produced in Taiwan, we have considered this offer for purposes of initiation. Petitioner made no adjustments to EP.

With respect to normal value ("NV"), petitioner also provided price quotes obtained from a private market research firm for home market sales in Korea and Taiwan for one megabit 32x32 synchronous SRAMs from the same Korean and Taiwanese sources. Petitioner made no adjustments to the home market price quotes.

In accordance with section 773(b)(2) of the Act, petitioner alleged that sales of SRAMs in both the Korean and Taiwanese home markets were made at prices below the cost of production ("COP"). The components of COP, as enumerated in section 773(b)(3) of the Act, are the cost of manufacture ("COM"), packing, and selling, general, and administrative expenses ("SG&A").

[1] *See Algoma Steel Corp., Ltd. v. United States*, 688 F. Supp. 639, 642–44 (CIT 1988); *High Information Content Flat Panel Displays and Display Glass Therefor from Japan: Final Determination; Rescission of Investigation and Partial Dismissal of Petition*, 56 Fed. Reg. 32376, 32380–81 (July 16, 1991).

SG&A includes the company's net financing expense.

Petitioner calculated COM for each of the Korean and Taiwanese producers for whom it obtained sales data based on its own production experience, adjusted for labor and utility costs in Korea and Taiwan. Petitioner also adjusted production costs for known differences in wafer size, where applicable, die size, and yields. Petitioner used each producer/exporter's most recently available financial statements in order to derive SG&A and research and development expenses. Petitioner based intellectual property expenses on its own experience.

We made the following revisions to petitioner's COP calculations for both the Korean and Taiwanese companies: (1) eliminated intellectual property expenses from the calculation because petitioner provided insufficient evidence that the foreign producers incurred such expenses; and (2) used the higher of petitioner's actual yield experience or petitioner's estimate of foreign producers' yields as a conservative measure because petitioner did not sufficiently substantiate its estimates of the foreign companies' production yields. We also disallowed petitioner's adjustment of the Korean company's fabrication equipment depreciation expense based on wafer size because petitioner was unable to provide adequate support for this adjustment. Instead, we relied on petitioner's own experience for this expense in the COM calculation. Because petitioner did not provide SG&A information for one Taiwanese producer, we relied on the experience of the other SRAMs producer in calculating COP and CV.

The allegation that the Korean and Taiwanese producers are selling the foreign like product in their home markets at prices below their COP is based upon a comparison of the home market prices with the calculated COP. Based upon our analysis of the COP information in the petition, we find reasonable grounds to believe or suspect that sales of the foreign like product may have been made at prices below COP in accordance with section 773(b)(2)(A)(i) of the Act. Accordingly, the Department is initiating cost investigations with respect to both Korea and Taiwan.

To calculate constructed value ("CV"), petitioner used the same information used to calculate COP. For purposes of the petition, petitioner used a profit rate of zero in its calculation of CV. The Department made the same revisions to CV as it did to COP, as discussed above. Because the home market prices of each producer are less than the COP, the Department based NV on CV.

Based on comparisons of EP to NV, the calculated dumping margin for SRAMs from Korea is 55.36 percent ad valorem. The calculated dumping margins for SRAMs from Taiwan range from 93.54 to 113.85 percent ad valorem.

Initiations of Investigations

We have examined the petition on SRAMs from Korea and Taiwan and have found that it meets the requirements of section 732 of the Act, including the requirements concerning allegations of the material injury or threat of material injury to the domestic producers of a domestic like product by reason of the complained-of imports, allegedly sold at less than fair value. Therefore, we are initiating antidumping duty investigations to determine whether imports of SRAMs from Korea and Taiwan are being, or are likely to be, sold in the United States at less than fair value. Unless extended, we will make our preliminary determinations by August 4, 1997.

Distribution of Copies of the Petition

In accordance with section 732(b)(3)(A) of the Act, a copy of the public version of the petition has been provided to the representatives of the government of Korea, as well as to the authorities of Taiwan. We will attempt to provide a copy of the public version of the petition to each exporter named in the petition (as appropriate).

ITC Notification

We have notified the ITC of our initiations, as required by section 732(d) of the Act.

Preliminary Determinations by the ITC

The ITC will determine by April 11, 1997, whether there is a reasonable indication that imports of SRAMs from Korea and Taiwan are causing material injury, or threatening to cause material injury, to a U.S. industry. A negative ITC determination in either of the investigations will result in that investigation being terminated; otherwise, the investigations will proceed according to statutory and regulatory time limits.

Dated: March 17, 1997.

Robert S. LaRussa,

Acting Assistant Secretary for Import Administration.

[FR Doc. 97-7251 Filed 3-20-97; 8:45 am]

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APPENDIX B

CALENDAR OF PUBLIC CONFERENCE

UNITED STATES INTERNATIONAL TRADE COMMISSION

CALENDAR OF PUBLIC CONFERENCE

Those listed below appeared as witnesses at the United States International Trade Commission's conference:

Subject: **Static Random Access Memory Semiconductors From the Republic of Korea and Taiwan**

Investigation Nos.: **731-TA-761-762 (Preliminary)**

Date and Time: March 18, 1997

Location: U.S. International Trade Commission
Main Hearing Room
Room 101
500 E Street, SW
Washington, DC 20436

In Support of Imposition of Antidumping Duties

Hale and Dorr / Washington, DC /
on behalf of

Micron Technology, Inc.

Eugene H. Cloud, Vice President, Marketing
Micron Technology, Inc.
Robert M. Donnelly, Vice President of Memory Products
Micron Technology, Inc.
Jerry Taylor, Vice President of Memory Products
Integrated Device Technology, Inc.
Richard Bruneau, Director of Marketing, Memory Products Division
Cypress Semiconductor Corp.
Mark Love, Economic Consultant
Economic Consulting Services, Inc.
Bonnie B. Byers, Trade Economist
Hale and Dorr

Gilbert B. Kaplan)
Paul W. Jameson)--OF COUNSEL

CALENDAR OF PUBLIC CONFERENCE--*Continued*

In Opposition to the Imposition of Antidumping Duties

Akin, Gump, Strauss, Hauer and Feld / Washington, DC
Graham & James / Washington, DC
Kaye, Scholer, Fierman, Hays & Handler / Washington, DC
on behalf of

Samsung Electronics Company, Ltd.
Samsung Semiconductor, Inc.
Hyundai Electronics Industries Company, Ltd.
Hyundai Electronics America, Inc.
LG Semicon Company, Ltd.
LG Semicon America, Inc.

Bob Eminan, Director, Strategic Marketing and Applications, Memory Division
Samsung Semiconductor, Inc.
Seth T. Kaplan, Economist
Trade Resources Company

Spencer Griffith)
Lawrence R. Walders)
Michael P. House)
Raymond Paretzky)--OF COUNSEL

White & Case / Washington, DC
on behalf of

Winbond Electronics Corp.
Integrated Silicon Solutions (Taiwan), Inc.
Taiwan Semiconductor Manufacturing Corp.
U-Tron Technology, Inc.
Vanguard International Semiconductor Corp.
E-Tron Technology, Inc.
Mosel-Vitelic, Inc.

Gary Fischer, Chief Financial Officer
Intergrated Silicon Solutions, Inc.
Ching-Chu Chiang, Vice President
Winbond Electronics Corp.
Jengda Hu, President
Taiwan Semiconductor Industry Association
John G. Reilly
Nathan Associates

David P. Houlihan)
Edmund W. Sim)
Robert G. Gosselink)--OF COUNSEL

APPENDIX C

SUMMARY DATA

Table C-1
Uncased SRAMs: Summary data concerning the U.S. market, 1994-96

(Quantity=*billion bits, except where noted*; value=*1,000 dollars*; unit values and unit labor costs are per *million bits*; period changes=*percent, except where noted*)

Item	Reported data			Period changes		
	1994	1995	1996	1994-96	1994-95	1995-96
U.S. consumption quantity:						
Amount	9,838	10,631	9,474	-3.7	+8.1	-10.9
Producers' share[1]	91.1	92.7	90.1	-1.0	+1.7	-2.6
Importers' share:[1]						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
Subtotal	***	***	***	***	***	***
Other sources	***	***	***	***	***	***
Total	8.9	7.3	9.9	+1.0	-1.7	+2.6
U.S. consumption value:						
Amount	145,640	190,439	75,299	-48.3	+30.8	-60.5
Producers' share[1]	94.2	94.1	83.6	-10.6	-0.1	-10.5
Importers' share:[1]						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
Subtotal	***	***	***	***	***	***
Other sources	***	***	***	***	***	***
Total	5.8	5.9	16.4	+10.6	+0.1	+10.5
U.S. importers' imports from--						
Korea:						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Taiwan:						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Subject sources:						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Other sources:						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
All sources:						
U.S. shipments quantity	879	774	939	+6.9	-11.9	+21.3
U.S. shipments value	8,378	11,204	12,333	+47.2	+33.7	+10.1
Unit value	$9.42	$14.47	$13.13	+39.4	+53.6	-9.2

See footnotes at end of table.

Table C-1--*Continued*
Uncased SRAMs: Summary data concerning the U.S. market, 1994-96

(Quantity=*billion bits, except where noted*; value=*1,000 dollars*; unit values and unit labor costs are per *million bits*; period changes=*percent, except where noted*)

Item	Reported data			Period changes		
	1994	1995	1996	1994-96	1994-95	1995-96
U.S. producers'--						
Average capacity (*1,000 wafers*)	534	742	784	+46.8	+39.0	+5.7
Wafer starts (*1,000 wafers*)	525	662	663	+26.3	+26.1	+0.2
Capacity utilization[1]	98.3	89.2	81.0	-17.3	-9.1	-8.2
Production quantity	39,826	64,439	103,308	+159.4	+61.8	+60.3
U.S. shipments:						
Quantity	***	***	***	***	***	***
Value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Export shipments:						
Quantity	***	***	***	***	***	***
Exports/shipments[1]	***	***	***	***	***	***
Value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***
Inventory/shipments[1]	***	***	***	***	***	***
Production workers	1,253	1,563	1,561	+24.6	+24.7	-0.1
Hours worked (*1,000s*)	2,510	3,134	3,169	+26.2	+24.9	+1.1
Total comp. (*$1,000*)	57,974	78,373	75,046	+29.4	+35.2	-4.2
Hourly total compensation	$23.09	$25.00	$23.68	+2.5	+8.3	-5.3
Productivity (*million bits/hour*)	15.9	20.0	31.3	+97.4	+25.8	+56.9
Unit labor costs	$1.46	$1.25	$0.76	-48.1	-13.9	-39.7

[1] 'Reported data' are in percent and 'period changes' are in percentage-point.
[2] An increase of 1,000 percent or more.

Note.--Period changes are derived from the unrounded data. Because of rounding, figures may not add to the totals shown. Unit values and other ratios are calculated from the unrounded figures, using data of firms supplying both numerator and denominator information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table C-2
Cased SRAMs: Summary data concerning the U.S. market, 1994-96

(Quantity=*billion bits, except where noted*; value=*1,000 dollars*; unit values and unit labor costs are per *million bits*; period changes=*percent, except where noted*)

Item	Reported data 1994	1995	1996	Period changes 1994-96	1994-95	1995-96
U.S. consumption quantity:						
Amount	54,199	100,067	115,007	+112.2	+84.6	+14.9
Producers' share:[1]						
U.S. dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
United States	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	***	***	***	***	***	***
3rd-source dice cased in the United States	***	***	***	***	***	***
Total	46.9	41.5	47.3	+0.5	-5.3	+5.8
Importers' share:[1]						
Korean dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
United States	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	22.3	27.4	23.6	+1.3	+5.1	-3.8
Taiwan dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
United States	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	13.9	11.3	12.1	-1.8	-2.5	+0.8
3rd-source dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	17.0	19.7	17.0	4/	+2.7	-2.7
Total	53.1	58.5	52.7	-0.5	+5.3	-5.8
U.S. consumption value:						
Amount	839,468	1,532,617	1,205,739	+43.6	+82.6	-21.3
Producers' share:[1]						
U.S. dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
United States	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	***	***	***	***	***	***
3rd-source dice cased in the United States	***	***	***	***	***	***
Total	58.7	51.9	64.9	+6.2	-6.8	+13.0
Importers' share:[1]						
Korean dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
United States	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	18.4	23.6	17.0	-1.4	+5.2	-6.6
Taiwan dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
United States	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	8.8	8.5	5.9	-2.8	-0.2	-2.6
3rd-source dice cased in--						
Korea	***	***	***	***	***	***
Taiwan	***	***	***	***	***	***
3rd sources	***	***	***	***	***	***
Subtotal	14.2	16.0	12.2	-2.0	+1.8	-3.8
Total	41.3	48.1	35.1	-6.2	+6.8	-13.0

See footnotes at end of table.

Table C-2--*Continued*
Cased SRAMs: Summary data concerning the U.S. market, 1994-96

(Quantity=*billion bits, except where noted*; value=*1,000 dollars*; unit values and unit labor costs are per *million bits*; period changes=*percent, except where noted*)

Item	Reported data 1994	1995	1996	Period changes 1994-96	1994-95	1995-96
U.S. importers' imports from--						
Korea (Korean dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Taiwan (Korean dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
3rd sources (Korean dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Korea (Taiwan dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Taiwan (Taiwan dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
3rd sources (Taiwan dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Korea (3rd-source dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
3rd sources (3rd-source dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Korea (U.S. dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
Taiwan (U.S. dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
3rd sources (U.S. dice):						
U.S. shipments quantity	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory qty	***	***	***	***	***	***
All sources:						
U.S. shipments quantity	47,429	93,874	109,004	+129.8	+97.9	+16.1
U.S. shipments value	725,232	1,397,345	1,109,462	+53.0	+92.7	-20.6
Unit value	$15.29	$14.89	$10.19	-33.4	-2.6	-31.6

See footnotes at end of table.

Table C-2--*Continued*
Cased SRAMs: Summary data concerning the U.S. market, 1994-96

(Quantity=*billion bits, except where noted*; value=*1,000 dollars*; unit values and unit labor costs are per *million bits*; period changes=*percent, except where noted*)

Item	Reported data			Period changes		
	1994	1995	1996	1994-96	1994-95	1995-96
U.S. producers'--						
Average capacity (*1,000 units*)	***	***	***	***	***	***
Assembly (*1,000 units*)	***	***	***	***	***	***
Capacity utilization[1]	***	***	***	***	***	***
Production quantity	***	***	***	***	***	***
U.S. shipments of U.S.-cased SRAMs, by dice-fabrication origin:						
Quantity:						
Korean dice	***	***	***	***	***	***
Taiwan dice	***	***	***	***	***	***
U.S. dice	***	***	***	***	***	***
3rd-source dice	***	***	***	***	***	***
Total	***	***	***	***	***	***
Value:						
Korean dice	***	***	***	***	***	***
Taiwan dice	***	***	***	***	***	***
U.S. dice	***	***	***	***	***	***
3rd-source dice	***	***	***	***	***	***
Total	***	***	***	***	***	***
Unit value:						
Korean dice	***	***	***	***	***	***
Taiwan dice	***	***	***	***	***	***
U.S. dice	***	***	***	***	***	***
3rd-source dice	***	***	***	***	***	***
Total	***	***	***	***	***	***
Export shipments:						
Quantity	***	***	***	***	***	***
Exports/shipments[1]	***	***	***	***	***	***
Value	***	***	***	***	***	***
Unit value	***	***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***
Inventory/shipments[1]	***	***	***	***	***	***
Production workers	201	256	130	-35.3	+27.4	-49.2
Hours worked (*1,000s*)	375	468	257	-31.6	+24.7	-45.2
Total comp. (*$1,000*)	10,342	***	5,890	-43.0	***	***
Hourly total compensation	$27.56	***	$22.96	-16.7	***	***
Productivity (*million bits/hour*)	22.8	20.9	22.2	-2.9	-8.6	+6.2
Unit labor costs	$1.21	$1.46	$1.04	-14.2	+21.0	-29.1

[1] 'Reported data' are in percent and 'period changes' are in percentage-point.
[2] Not available.
[3] Less than 0.05 percent.
[4] An increase of less than 0.05 percentage points.
[5] A decrease of less than 0.05 percentage points.
[6] Not applicable.
[7] An increase of 1,000 percent or more.

Note.--The term "3rd source" refers to countries other than Korea, Taiwan, and the United States. Period changes are derived from the unrounded data. Because of rounding, bit figures and shares may not add to the totals shown. Unit values and other ratios are calculated from the unrounded figures, using data of firms supplying both numerator and denominator information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table C-3
SRAM modules: Summary data concerning the U.S. market, 1994-96

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Table C-4
SRAMs and SRAM modules: Summary financial data concerning the U.S. market, 1994-96

(Value=1,000 dollars, period changes=percent, except where noted)

Item	Reported data			Period changes		
	1994	1995	1996	1994-96	1994-95	1995-96
Net sales value	817,426	1,396,081	1,025,615	25.5	70.8	-26.5
Cost of goods sold (COGS)	505,755	750,240	730,055	44.3	48.3	-2.7
Gross profit or (loss)	311,671	645,841	295,560	-5.2	107.2	-54.2
SG&A expenses	94,301	131,332	132,075	40.1	39.3	0.6
Research and development	87,275	141,173	173,449	98.7	61.8	22.9
Operating income or (loss)	130,095	373,336	(9,964)	-107.7	187.0	-102.7
Capital expenditures	196,088	489,466	504,424	157.2	149.6	3.1
COGS/sales[1]	61.9	53.7	71.2	9.3	-8.1	17.4
Operating results/sales[1]	15.9	26.7	(1.0)	-16.9	10.8	-27.7

[1] "Reported data" are in percent and "period changes" are in percentage points.
Source: Compiled from data submitted in response to Commission questionnaires.

APPENDIX D

ADDITIONAL DATA ON SRAMs BY SOURCE OF DICE FABRICATION AND BY SOURCE OF ASSEMBLY

Table D-1
Cased SRAMs (U.S.-assembled SRAMs containing U.S.-fabricated dice): Shipments by U.S. producers, by types, 1994-96

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Table D-2
Cased SRAMs (U.S.-assembled SRAMs containing Korean-fabricated dice): Shipments by U.S. producers, by types, 1994-96

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Table D-3
Cased SRAMs (U.S.-assembled SRAMs containing Taiwan-fabricated dice): Shipments by U.S. producers, by types, 1994-96

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Table D-4
Cased SRAMs (U.S.-assembled SRAMs containing dice fabricated in countries other than Korea, Taiwan, and the United States): Shipments by U.S. producers, by types, 1994-96

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Table D-5
Cased SRAMs (SRAMs assembled in Korea containing dice fabricated in the United States): Shipments by U.S. importers, by types, 1994-96

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Table D-6
Cased SRAMs (SRAMs assembled in Taiwan containing dice fabricated in the United States): Shipments by U.S. importers, by types, 1994-96

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Table D-7
Cased SRAMs (SRAMs assembled in countries other than Korea, Taiwan, and the United States containing dice fabricated in the United States): Shipments by U.S. importers, by types, 1994-96

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Table D-8
Cased SRAMs: Shipments of "imported" product by U.S. producers and importers, by types, 1994-96

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Table D-9
Cased SRAMs (SRAMs, regardless of where assembled, containing dice fabricated in Korea): Shipments by U.S. producers, by types, 1994-96

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Table D-10
Cased SRAMs (SRAMs, regardless of where assembled, containing dice fabricated in Taiwan): Shipments by U.S. producers, by types, 1994-96

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APPENDIX E

IMPORT DATA COMPILED FROM OFFICIAL STATISTICS OF THE U.S. DEPARTMENT OF COMMERCE

Table E-1
Cased SRAMs **not over 40,000 bits** (HTS item 8542.13.80.37): U.S. imports for consumption, by principal sources, 1994-96

Source	1994	1995	1996
	Quantity *(1,000 units)*		
Korea	10,317	5,305	8,320
Taiwan	1,598	2,244	2,634
Japan	3,777	11,884	8,609
Malaysia	5,070	6,339	6,186
Philippines	13,076	2,660	4,652
Thailand	8,642	8,802	8,015
Indonesia	[1]	2,347	11,971
All other	3,020	5,552	8,648
Total	45,501	45,132	59,035
	Quantity *(estimated billion bits)*		
Korea	169	87	136
Taiwan	26	37	43
Japan	62	195	141
Malaysia	83	104	101
Philippines	214	44	76
Thailand	142	144	131
Indonesia	[1]	38	196
All other	49	91	142
Total	745	739	967
	Value *(1,000 dollars)*		
Korea	14,812	16,860	22,605
Taiwan	2,803	7,777	2,246
Japan	11,488	58,708	33,221
Malaysia	24,177	30,702	28,525
Philippines	33,039	10,113	8,649
Thailand	12,276	13,293	15,795
Indonesia	2	3,029	14,293
All other	5,861	7,617	8,737
Total	104,459	148,099	134,071
	Average unit value *(per unit)*		
Korea	$1.44	$3.18	$2.72
Taiwan	1.75	3.47	0.85
Japan	3.04	4.94	3.86
Malaysia	4.77	4.84	4.61
Philippines	2.53	3.80	1.86
Thailand	1.42	1.51	1.97
Indonesia	4.11	1.29	1.19
All other	1.94	1.37	1.01
Average	2.30	3.28	2.27

[1] Less than 500 units or 0.5 billion bits.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table E-2
Cased SRAMs **over 40,000 bits but not over 80,000 bits** (HTS item 8542.13.80.38): U.S. imports for consumption, by principal sources, 1994-96

Source	1994	1995	1996
	Quantity *(1,000 units)*		
Korea	14,829	12,619	6,702
Taiwan	4,682	6,183	4,197
Japan	8,898	5,835	2,697
Malaysia	5,995	5,996	4,780
Philippines	37	45	1,256
Thailand	14,804	11,435	9,217
Indonesia	15	6,712	4,479
All other	606	1,425	1,665
Total	49,865	50,250	34,993
	Quantity *(estimated billion bits)*		
Korea	972	827	439
Taiwan	307	405	275
Japan	583	382	177
Malaysia	393	393	313
Philippines	2	3	82
Thailand	973	749	604
Indonesia	1	440	294
All other	40	93	109
Total	3,268	3,293	2,293
	Value *(1,000 dollars)*		
Korea	22,538	20,255	10,318
Taiwan	6,243	8,769	7,251
Japan	20,480	19,836	8,302
Malaysia	12,614	13,779	13,662
Philippines	218	221	1,628
Thailand	20,767	16,837	19,503
Indonesia	126	8,629	5,543
All other	3,539	6,242	8,823
Total	86,524	94,567	75,031
	Average unit value *(per unit)*		
Korea	$1.52	$1.61	$1.54
Taiwan	1.33	1.42	1.73
Japan	2.30	3.40	3.08
Malaysia	2.10	2.30	2.86
Philippines	5.97	4.97	1.30
Thailand	1.40	1.47	2.12
Indonesia	8.40	1.29	1.24
All other	5.85	4.38	5.30
Total	1.74	1.88	2.14

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table E-3
Cased SRAMs **over 80,000 bits but not over 300,000 bits** (HTS item 8542.13.80.39): U.S. imports for consumption, by principal sources, 1994-96

Source	1994	1995	1996
	Quantity *(1,000 units)*		
Korea	32,003	39,568	33,475
Taiwan	48,077	88,225	63,118
Japan	27,687	41,002	35,272
Malaysia	28,871	59,455	31,503
Philippines	322	531	7,738
Thailand	13,629	14,052	18,096
Indonesia	63	7,786	12,176
All other	3,193	12,765	8,403
Total	153,844	263,383	209,780
	Quantity *(estimated billion bits)*		
Korea	8,389	10,372	8,775
Taiwan	12,603	23,128	16,546
Japan	7,258	10,748	9,246
Malaysia	7,568	15,586	8,258
Philippines	84	139	2,028
Thailand	3,573	3,684	4,744
Indonesia	16	2,041	3,192
All other	837	3,346	2,203
Total	40,328	69,044	54,993
	Value *(1,000 dollars)*		
Korea	92,599	104,957	85,056
Taiwan	92,325	175,306	114,399
Japan	101,521	139,160	116,448
Malaysia	87,775	148,479	91,685
Philippines	3,521	1,771	10,837
Thailand	18,453	17,392	39,033
Indonesia	164	9,909	14,608
All other	9,143	25,125	16,408
Total	405,501	622,100	488,474
	Average unit value *(per unit)*		
Korea	$2.89	$2.65	$2.54
Taiwan	1.92	1.99	1.81
Japan	3.67	3.39	3.30
Malaysia	3.04	2.50	2.91
Philippines	10.93	3.33	1.40
Thailand	1.35	1.24	2.16
Indonesia	2.60	1.27	1.20
All other	2.86	1.97	1.95
Total	2.64	2.36	2.33

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table E-4
Cased SRAMs **over 300,000 bits but not over 3,000,000 bits** (HTS item 8542.13.80.41): U.S. imports for consumption, by principal sources, 1994-96

Source	1994	1995	1996
	Quantity *(1,000 units)*		
Korea	8,786	27,700	25,154
Taiwan	1,588	3,864	5,654
Japan	18,800	35,998	38,291
Malaysia	4,215	9,484	12,307
Philippines	174	429	1,737
Thailand	1,031	1,489	2,209
Indonesia	(1)	14	2,025
All other	397	1,954	6,614
Total	34,991	80,932	93,991
	Quantity *(estimated billion bits)*		
Korea	10,130	31,938	29,001
Taiwan	1,831	4,455	6,519
Japan	21,676	41,506	44,150
Malaysia	4,860	10,935	14,190
Philippines	201	495	2,003
Thailand	1,189	1,717	2,547
Indonesia	1	16	2,335
All other	458	2,253	7,627
Total	40,345	93,315	108,372
	Value *(1,000 dollars)*		
Korea	71,361	176,770	161,841
Taiwan	2,421	14,836	22,946
Japan	181,034	459,872	323,628
Malaysia	51,638	62,843	85,460
Philippines	3,121	4,990	5,877
Thailand	7,196	8,109	8,753
Indonesia	1	50	2,293
All other	3,330	61,109	89,245
Total	320,104	788,579	700,043
	Average unit value *(per unit)*		
Korea	$8.12	$6.38	$6.43
Taiwan	1.52	3.84	4.06
Japan	9.63	12.77	8.45
Malaysia	12.25	6.63	6.94
Philippines	17.95	11.64	3.38
Thailand	6.98	5.45	3.96
Indonesia	35.13	3.45	1.13
All other	8.39	31.29	13.49
Total	9.15	9.74	7.45

(1) Less than 500 units.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table E-5
Cased SRAMs **over 3,000,000 bits** (HTS item 8542.13.80.49): U.S. imports for consumption, by principal sources, 1994-96

Source	1994	1995	1996
	Quantity *(1,000 units)*		
Korea	531	16,423	4,074
Taiwan	108	858	2,527
Japan	3,535	3,291	6,307
Malaysia	82	263	1,523
Philippines	54	124	42
Thailand	23	4	20
Indonesia	0	0	19
All other	475	462	715
Total	4,808	21,425	15,226
	Quantity *(estimated billion bits)*		
Korea	2,227	68,878	17,086
Taiwan	453	3,598	10,598
Japan	14,826	13,802	26,447
Malaysia	344	1,103	6,387
Philippines	226	520	176
Thailand	96	17	84
Indonesia	0	0	80
All other	1,992	1,938	2,999
Total	20,165	89,856	63,857
	Value *(1,000 dollars)*		
Korea	27,271	146,978	78,154
Taiwan	351	2,553	6,288
Japan	69,246	77,5245	121,558
Malaysia	293	3,345	4,050
Philippines	1,439	1,262	1,799
Thailand	92	31	12
Indonesia	0	0	95
All other	1,193	5,329	10,332
Total	99,885	237,023	222,289
	Average unit value *(per unit)*		
Korea	$51.31	$8.95	$19.18
Taiwan	3.25	2.98	2.49
Japan	19.59	23.56	19.27
Malaysia	3.59	12.70	2.66
Philippines	26.78	10.18	42.98
Thailand	3.93	7.86	0.64
Indonesia	-	-	4.99
All other	2.51	11.53	14.46
Total	20.78	11.06	14.60

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table E-6
All cased SRAMs (HTS items 8542.13.80.37-49): U.S. imports for consumption, by principal sources, 1994-96

Source	1994	1995	1996
	Quantity *(1,000 units)*		
Korea	66,466	101,614	77,726
Taiwan	56,053	101,373	78,130
Japan	62,697	98,010	91,176
Malaysia	44,232	81,538	56,298
Philippines	13,662	3,789	15,425
Thailand	38,131	35,782	37,557
Indonesia	78	16,859	30,670
All other	7,689	22,156	26,045
Total	289,009	461,121	413,026
	Quantity *(estimated billion bits)*		
Korea	21,887	112,102	55,437
Taiwan	15,220	31,623	33,981
Japan	44,405	66,633	80,161
Malaysia	13,248	28,121	29,249
Philippines	727	1,201	4,365
Thailand	5,973	6,311	8,110
Indonesia	18	2,535	6,097
All other	3,376	7,721	13,080
Total	104,854	256,247	230,480
	Value *(1,000 dollars)*		
Korea	228,581	465,820	357,974
Taiwan	104,143	209,242	153,130
Japan	383,768	755,100	603,158
Malaysia	176,498	259,148	223,381
Philippines	41,338	18,358	28,790
Thailand	58,785	55,663	83,097
Indonesia	293	21,617	36,832
All other	23,067	105,421	133,545
Total	1,016,473	1,890,368	1,619,908
	Average unit value *(per unit)*		
Korea	$3.44	$4.58	$4.61
Taiwan	1.86	2.06	1.96
Japan	6.12	7.70	6.62
Malaysia	3.99	3.18	3.97
Philippines	3.03	4.84	1.87
Thailand	1.54	1.56	2.21
Indonesia	6.73	1.28	1.20
All other	3.00	4.76	5.13
Average	3.52	4.10	3.92

[1] Estimated.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

APPENDIX F

PRICING DATA FOR "SLOW" AND "FAST" SRAMs IMPORTED FROM KOREA

Figure F-1
Product 4: Weighted-average net f.o.b. prices reported by Korean importers, by speed of SRAM, Jan. 1994-Feb. 1997

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Figure F-2
Product 5: Weighted-average net f.o.b. prices reported by Korean importers, by speed of SRAM, Jan. 1994-Feb. 1997

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APPENDIX G

COMMENTS RECEIVED FROM U.S. PRODUCERS ON THE IMPACT OF IMPORTS OF SRAMS FROM KOREA AND TAIWAN ON THEIR GROWTH, INVESTMENT, ABILITY TO RAISE CAPITAL, AND DEVELOPMENT AND PRODUCTION EFFORTS

The Commission requested U.S. producers to describe any actual or anticipated negative effects of imports of SRAMs from Korea and Taiwan on their growth, investment, ability to raise capital, or existing development and production efforts, including efforts to develop a derivative or more advanced version of the product. ***. ***. The responses of the other producers were as follows:

1. Since January 1, 1994, has your firm experienced any actual negative effects on its return on investment or its growth, investment, ability to raise capital, existing development and production efforts (including efforts to develop a derivative or more advanced version of the product), or the scale of capital investments as a result of imports of SRAMs and SRAM modules from Taiwan and Korea?

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2. Does your firm anticipate any negative impact of imports of SRAMs and SRAM modules from Taiwan and Korea?

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