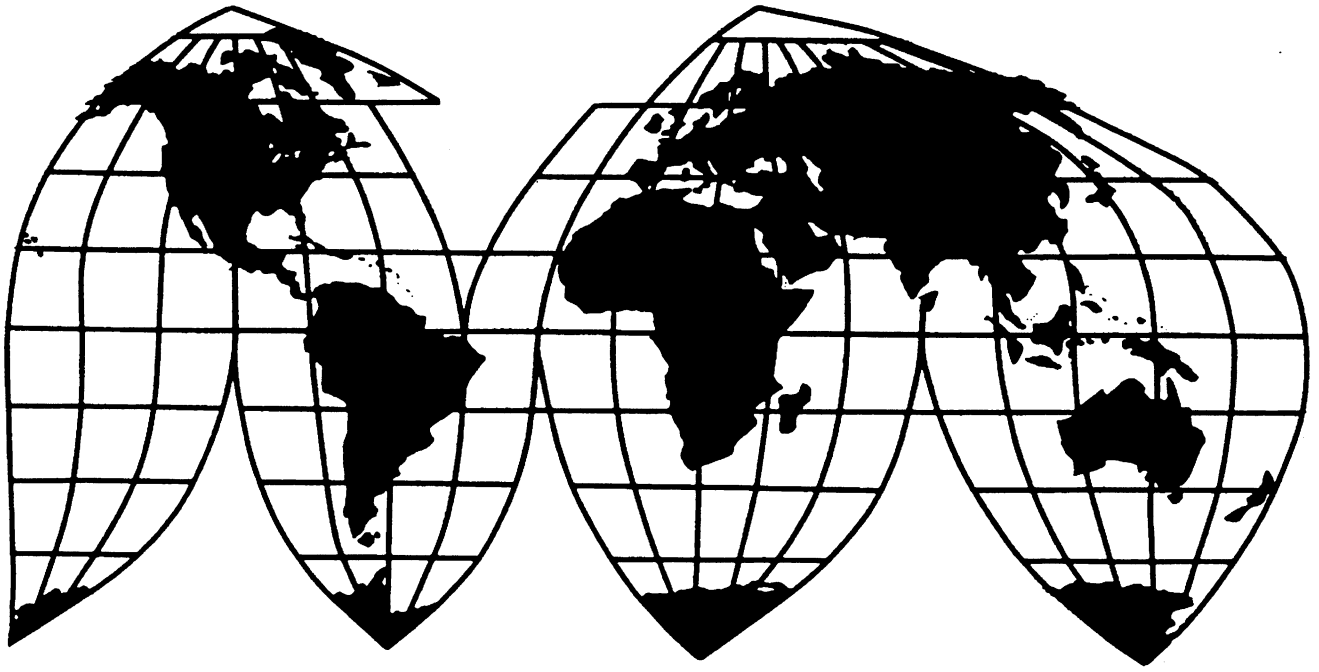
Dynamic Random Access Memory Semiconductors of One Megabit and Above From Taiwan

Investigation No. 731-TA-811 (Final)

Publication 3256 **December 1999**

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Note.–Information that would reveal confidential operations of individual concerns may not be published and therefore has been deleted from this report.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

Investigation No. 731-TA-811 (Final)

DRAMS OF ONE MEGABIT AND ABOVE FROM TAIWAN

DETERMINATION

On the basis of the record[1] developed in the subject investigation, the United States International Trade Commission determines, pursuant to section 735(b) of the Tariff Act of 1930 (19 U.S.C. § 1673d(b)) (the Act), that an industry in the United States is not materially injured or threatened with material injury, and the establishment of an industry in the United States is not materially retarded, by reason of imports from Taiwan of dynamic random access memory semiconductors (DRAMs) of one megabit and above, provided for in subheadings 8542.13.80 and 8473.30.10 through 8473.30.90 of the Harmonized Tariff Schedule of the United States, that have been found by the Department of Commerce to be sold in the United States at less than fair value (LTFV).[2]

BACKGROUND

The Commission instituted this investigation effective October 22, 1998, following receipt of a petition filed with the Commission and the Department of Commerce by Micron Technology, Boise, ID. The final phase of the investigation was scheduled by the Commission following notification of a preliminary determination by the Department of Commerce that imports of DRAMs of one megabit and above from Taiwan were being sold at LTFV within the meaning of section 733(b) of the Act (19 U.S.C. § 1673b(b)). Notice of the scheduling of the Commission's investigation and of a public hearing 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 June 17, 1999 (64 FR 32521). The hearing was held in Washington, DC, on October 19, 1999, and all persons who requested the opportunity were permitted to appear in person or by counsel.

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

[2] Chairman Bragg dissenting. Commissioners Crawford and Askey did not participate.

VIEWS OF THE COMMISSION

Based on the record in this investigation, we find that an industry in the United States is not materially injured or threatened with material injury by reason of imports of dynamic random access memory semiconductors ("DRAMs") from Taiwan that the Department of Commerce ("Commerce") has found are sold in the United States at less than fair value ("LTFV").[1]

I. DOMESTIC LIKE PRODUCT AND INDUSTRY

A. In General

To determine whether an industry in the United States is materially injured or threatened with material injury by reason of imports of the subject merchandise, the Commission first defines the "domestic like product" and the "industry."[2] Section 771(4)(A) of the Tariff Act of 1930, as amended ("the Act"), defines the relevant domestic 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."[3] 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 . . . ."[4]

The 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.[5] No single factor is dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.[6] The Commission looks for clear dividing lines among possible like products, and disregards minor variations.[7] Although the Commission must accept the determination of Commerce as to the scope of the

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[1] Chairman Bragg dissenting. *See* her Dissenting Views. Commissioners Crawford and Askey did not participate in this determination.

[2] 19 U.S.C. § 1677(4)(A).

[3] 19 U.S.C. § 1677(4)(A).

[4] 19 U.S.C. § 1677(10).

[5] *See, e.g.*, NEC Corp. v. Department of Commerce, 36 F. Supp.2d 380, 383 (Ct. Int'l Trade 1998); Nippon Steel Corp. v. United States, 19 CIT 450, 455 (1995); Torrington Co. v. United States, 747 F. Supp. 744, 749, n.3 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991) ("every like product determination 'must be made on the particular record at issue' and the 'unique facts of each case'"). 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, 19 CIT at 455 n.4; Timken Co. v. United States, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

[6] *See, e.g.*, S. Rep. No. 96-249, at 90-91 (1979).

[7] Nippon Steel, 19 CIT at 455; Torrington, 747 F. Supp. at 748-49. *See also* S. Rep. No. 96-249 at 90-91 (1979) (Congress has indicated that the like product standard should not be interpreted in "such a narrow fashion as to permit minor differences in physical characteristics or uses to lead to the conclusion that the product and

(continued...)

imported merchandise allegedly sold at LTFV, the Commission determines what domestic product is like the imported articles Commerce has identified.[8]

B. Product Description

In its final determination, Commerce defined the imported merchandise within the scope of this investigation as follows:

> DRAMs from Taiwan, whether assembled or unassembled. Assembled DRAMs include all package types. Unassembled DRAMs include processed wafers, uncut die, and cut die. Processed wafers fabricated in Taiwan, but packaged or assembled into finished semiconductors in a third country are included in the scope. Wafers fabricated in a third country and assembled or packaged in Taiwan are not included in the scope.
>
> The scope of this investigation includes memory modules. A memory module is a collection of DRAMs the sole function of which is memory. 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 DRAMs whether mounted or unmounted on a circuit board. Modules that contain other parts that are needed to support the function of memory are covered. Only those modules that contain additional items that alter the function of the module to something other than memory, such as video graphics adapter ("VGA") boards and cards, are not included in the scope. Modules containing DRAMs made from wafers fabricated in Taiwan, but either assembled or packaged into finished semiconductors in a third country, are also included in the scope.
>
> The scope also includes, but is not limited to, video RAM ("VRAM"), Windows RAM ("WRAM"), synchronous graphics RAM ("SGRAM"), as well as various types of DRAMs, including fast pagemode ("FPM"), extended data-out ("EDO"), burst extended data-out ("BEDO"), synchronous dynamic RAM ("SDRAMs"), and "Rambus" DRAMs ("RDRAMs"). The scope of this investigation also includes any future density, packaging or assembling of DRAMs. Also included in the scope of this investigation are removable memory modules placed on motherboards, with or without a central processing unit (CPU), unless the importer of the motherboards certifies with Customs that neither it, nor a party related to it or under contract to it, will remove the modules from the motherboards after importation. The scope of this investigation does not include DRAMs or memory modules that are reimported for repair or replacement.

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[7] (...continued)
article are not 'like' each other, nor should the definition of 'like product' be interpreted in such a fashion as to prevent consideration of an industry adversely affected by the imports under consideration.").

[8] Hosiden Corp. v. Advanced Display Mfrs., 85 F.3d 1561, 1568 (Fed. Cir. 1996) (Commission may find single like product corresponding to several different classes or kinds defined by Commerce); Torrington, 747 F. Supp. at 748-52 (affirming Commission determination of six like products in investigations where Commerce found five classes or kinds).

> The DRAMs subject to this investigation are currently classifiable under subheadings 8542.13.80.05, 8542.13.80.24 through 8542.13.80.34 of the Harmonized Tariff Schedule of the United States ("HTSUS"). Also included in the scope are Taiwanese DRAM modules, described above, entered into the United States under subheading 8473.30.10 of the HTSUS or possibly other HTSUS numbers. Although the subheadings are provided for convenience and customs purposes, the written description of the scope of this investigation is dispositive.[9]

DRAM is a class of volatile semiconductor memory that allows data to be both read from and written to the device's storage locations in a non-linear fashion.[10] DRAMs and DRAM modules (collections of DRAMs mounted on a printed circuit board) are used as the main memory in a variety of electronic products including computers and computer peripherals, telecommunications equipment, networking equipment, and consumer electronics devices. By far, the largest use for DRAMs and DRAM modules is as the main memory in computer equipment.[11] DRAMs vary in their memory capacity or "density" (*e.g.*, 4 megabit ("Mb"), 16 Mb, 64 Mb) and addressing technology (*e.g.*, FPM, EDO, synchronous).[12] There are also certain specialty DRAM products, such as video RAM (VRAM), Windows RAM (WRAM), and synchronous graphics RAM (SGRAM) whose functions have been optimized for use in particular applications, but which account for a relatively small share of the total DRAM market.[13]

During the design phase of the DRAM manufacturing process, circuit patterns are transferred to glass photomasks, one for each layer of the DRAM.[14] The fabrication phase of the DRAM production process entails the repeated use of photomasks and photolithographic and etching equipment to "expose" multiple layers of microscopic circuit patterns onto the surface of a wafer of highly-purified silicon.[15] The assembly and test stage includes the separation of the wafer into individual dice or chips, wire bonding metal leadframes to the chips, solder plating the metal leads, trimming and forming the leads into a desired shape, encapsulating (casing) the chips in either plastic or ceramic, final testing, and marking for identification purposes.[16] While some cased DRAMs are sold individually, others are incorporated into modules. Module production involves the attachment of DRAMs and other components to a printed circuit board, which can then be attached to a PC motherboard.[17]

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[9] 64 Fed. Reg. 56308, 56309 (Oct. 19, 1999).

[10] Confidential Report ("CR") at I-5, Public Report ("PR") at I-4.

[11] CR at I-8, PR at I-6. It is estimated that between 75 and 90 percent of DRAMs consumed in the United States are ultimately incorporated into computer systems. CR at I-8 n.20, PR at I-6 n.20.

[12] Addressing technology controls the speed at which DRAM memory is accessed by a microprocessor. CR at I-6-I-7, PR at I-5-I-6.

[13] CR at I-7, PR at I-5-I-6.

[14] CR at I-8, PR at I-7.

[15] CR at I-8-I-9, PR at I-7.

[16] CR at I-9, PR at I-7.

[17] CR at I-11, PR at I-8.

C. Like Product Issues in This Investigation

In its preliminary determination in this investigation, the Commission found a single domestic like product consisting of all DRAMs regardless of density, including cased or uncased DRAMs, DRAMs assembled into memory modules, and specialty DRAMs.[18] In this final phase, petitioner[19] and respondents[20] all support the Commission's preliminary like product determination.[21] In the absence of evidence or argument to the contrary in the final phase, we readopt the domestic like product analysis from the Commission's preliminary determination and find a single domestic like product consisting of all DRAMs, regardless of density, including cased or uncased DRAMs, DRAMs assembled into memory modules, and specialty DRAMs.

D. Domestic Industry

The domestic industry is defined as "the producers as a [w]hole of a domestic like product . . ."[22] 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.[23]

In its preliminary determination, the Commission found that the domestic industry producing DRAMs consists of fabricators and assemblers of DRAMs, but not module assemblers or fabless design houses.[24] In the final phase, petitioner argues that assembly constitutes domestic production only when performed by a domestic fabricator on domestic dice, and that neither module assemblers nor fabless

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[18] DRAMs of One Megabit and Above from Taiwan, Inv. No. 731-TA-811 (Preliminary), USITC Pub. 3149 at 5-7 (Dec. 1998) ("Prelim. Det."). Although we are not bound by prior like product determinations, we note that this was consistent with prior Commission determinations concerning DRAMs. *See* DRAMs of One Megabit and Above from the Republic of Korea, Inv. No. 731-TA-556 (Preliminary), USITC Pub. 2529 (June 1992), (Final) USITC Pub. 2629 (May 1993), (Remand) USITC Pub. 2997 (Oct. 1996); DRAMs of 256 Kilobits and Above from Japan, Inv. No. 731-TA-300 (Preliminary), USITC Pub. 1803 (Jan. 1986); 64K DRAMs from Japan, Inv. No. 731-TA-270 (Preliminary), USITC Pub. 1735 (Aug. 1985), and (Final) USITC Pub. 1862 (July 1986).

[19] The petitioner in this investigation is Micron Technology, Inc. ("Micron").

[20] Respondents who submitted briefs and hearing testimony in the final phase of this investigation are the Taiwan Semiconductor Industry Association ("TSIA") and Taiwan producers Vanguard International Semiconductor Corp. ("Vanguard") and Mosel-Vitelic (collectively "respondents" or "TSIA"). Additional foreign producers and importers, as well as one domestic design house, entered notices of appearance but did not submit briefs or participate in the hearing in this phase of the investigation.

[21] Petitioner's Prehearing Brief at 5-8; TSIA Prehearing Brief at 2.

[22] 19 U.S.C. § 1677(4)(A).

[23] *See* United States Steel Group v. United States, 873 F. Supp. 673, 681-84 (Ct. Int'l Trade 1994), *aff'd*, 96 F. 3d 1352 (Fed. Cir. 1996).

[24] Prelim. Det. at 7-10. Consistent with the scope, however, the Commission did not include U.S.-assembled DRAMs containing dice fabricated in Taiwan in its definition of domestic production, because Commerce considers such DRAMs to be subject merchandise.

design houses are part of the domestic industry.[25] Respondents argue that the domestic industry should be defined to include DRAM fabricators, assemblers of DRAMs, module assemblers, and fabless design houses.[26]

In light of additional evidence obtained during the final phase and because the parties have raised new arguments in support of their positions, we have reconsidered whether, in addition to fabrication of uncased DRAMs, any of the following processes, if performed in the United States, also constitutes domestic production of DRAMs: (1) assembly (casing) of either imported or domestically fabricated uncased DRAMs into cased DRAMs (DRAM "assembly" or "assembly/test" operations); (2) assembly of DRAMs onto memory modules ("module assembly"); and (3) the design of DRAMs that are actually fabricated outside the United States (*i.e.*, the activities of "fabless design houses"). In each instance, the question before us is whether the operation in question involves sufficient U.S. production-related activity to constitute domestic production of the like product.[27] For the reasons discussed below, we reaffirm our preliminary determination that the domestic industry producing DRAMs consists of those producers that fabricate and/or assemble DRAMs in the United States, but does not include module assemblers or fabless design houses

1. Whether Assembly of Uncased DRAMs Into Cased DRAMs Constitutes Domestic Production

The Commission's preliminary definition of domestic production included assembly of both domestically fabricated uncased DRAMs and uncased DRAMs imported from nonsubject countries.[28] In the final phase, respondents support the Commission's preliminary determination to treat DRAM assembly as domestic production.[29] Petitioner continues to argue, as it did in the preliminary phase, that the domestic industry consists of companies that fabricate DRAMs in the United States, including their assembly operations, but should not include the assembly of imported nonsubject DRAMs or the activities of independent or contract assemblers, regardless of the origin of the dice assembled.[30] For the

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[25] Petitioner's Prehearing Brief at 8-11; Petitioner's Posthearing Brief at Exhibit 16.

[26] TSIA Prehearing Brief at Exhibit 1.

[27] In assessing the nature and extent of production-related activities in the United States associated with a particular operation, the Commission generally considers six factors: (1) source and extent of the firm's capital investment; (2) technical expertise involved in U.S. production activities; (3) value added to the product in the United States; (4) employment levels; (5) quantity and type of parts sourced in the United States; and (6) any other costs and activities in the United States directly leading to production of the like product. *See, e.g.*, Certain Seamless Carbon and Alloy Steel Standard, Line, and Pressure Pipe from the Czech Republic, Japan, Mexico, Romania, and South Africa, Inv. Nos. 731-TA-846-850 (Preliminary), USITC Pub. 3221 at 12 n.49 (Aug. 1999).

[28] Prelim. Det. at 8-9. During the period of investigation, 7 of the 12 domestic companies that fabricated uncased DRAMs in the United States also assembled uncased DRAMs in the United States. In addition, two companies without U.S. fabrication facilities assembled imported nonsubject DRAMs in the United States. Domestic producer *** performs assembly on ***. Table III-1, CR at III-3, PR at III-2.

[29] TSIA Prehearing Brief, Exhibit 1 at 1-3.

[30] In a somewhat inconsistent position, petitioner also contends that the "like product" consists only of DRAMs fabricated in the United States, and therefore only assembly of such DRAMs (which would technically

(continued...)

reasons discussed below, we find that DRAM assembly operations constitute domestic production, regardless of whether the producer is integrated and regardless of the origin (domestic or imported nonsubject) of the uncased DRAMs assembled in the United States.

Source and extent of capital investment. The capital investment associated with building a new chip assembly/test facility is currently somewhere in the range of $20-$50 million.[31] By contrast, constructing and equipping a new fabrication facility ("fab") costs more than $1 billion.[32] Four domestic producers reported capital expenditures separately for the various stages of production. While fabrication accounted for between *** and *** percent of total capital expenditures by these producers during the period of investigation, capital expenditures for assembly/test operations were the second largest, ranging from *** to *** percent of the total. The shares of reported capital expenditures devoted to the design and module assembly stages were much smaller.[33]

Technical expertise involved in U.S. production activities. While somewhat more labor intensive than fabrication, DRAM assembly is nevertheless a highly automated and technologically sophisticated process.[34] Several domestic producers engaged in assembly of uncased DRAMs indicated that assembly requires a "medium" level of technical expertise.[35]

Value added to the product in the United States. Three producers provided value added data broken out for the design, fabrication, and assembly/test production stages. For 64 Mb DRAMs, the domestic value added through fabrication ranged from *** to *** percent, while value added by the assembly/test stage ranged from *** to *** percent.[36]

Employment levels. Assembly of uncased DRAMs is more labor intensive than fabrication.[37] For the interim period (Jan.-June 1999), U.S. assemblers reported employing 4,449 production related workers (PRWs), while domestic fabricators reported average employment of 9,112 PRWs.[38]

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[30] (...continued)
include assembly of domestically fabricated DRAMs by non-integrated assemblers) should be considered domestic production. Petitioner's Prehearing Brief at 8-10; Petitioner's Posthearing Brief at Exhibit 16.

[31] TSIA Prehearing Brief, Exhibit 1-A; Transcript of Commission Hearing ("Hearing Tr.") at 78-80 (Oct. 19, 1999).

[32] Hearing Tr. at 20, 78-80.

[33] CR at VI-10, PR at VI-5; Table L-1, CR at L-4-L-5, PR at L-3.

[34] CR at I-9, PR at I-7; TSIA Prehearing Brief, Exhibit 1 at 2, 10-16 (discussing the technological issues facing assemblers in the near future).

[35] *See* Preliminary Producer Questionnaire Responses of *** at Question II-13.a and *** at Question II-12.

[36] Table VI-4, CR at VI-9, PR at VI-4. We note, however, that the reporting producers include ***, which ***. If that company's data are excluded, the lower end of the range is *** percent.

[37] CR at I-9, PR at I-7.

[38] Table III-7, CR at III-18, PR at III-11. This reflects the fact that more fabrication than assembly takes (continued...)

Quantity and type of parts sourced in the United States. The percentage of domestically cased DRAMs incorporating U.S. fabricated dice was *** percent in 1996, *** percent in 1997, *** percent in 1998, and *** percent in interim 1999.[39]

Overall, we find that DRAM assembly is not as sophisticated a process as fabrication, but does involve a moderate degree of technological sophistication, warranting continuing R & D and capital spending to keep up with the latest product and process developments. The amount of capital spending associated with domestic DRAM assembly operations is considerably less than that spent on fabrication operations, but is nevertheless not insubstantial. Similarly, while fabrication involves greater value added than assembly, the total value added by the assembly process is more than minimal in absolute terms. Assembly operations also employ a significant number of domestic PRWs and source domestically the large majority of uncased DRAMs used. For all these reasons, we include operations that assemble domestically fabricated and imported nonsubject DRAMs in the domestic industry.[40]

2. Whether Assembly of Cased DRAMs Into Memory Modules Constitutes Domestic Production

Module assembly involves attaching cased DRAMs and other components to a printed circuit board.[41] In the first stage of the process, the printed circuit board is put through a screen printer and then a glue machine which places an adhesive on the board. An automated pick and place machine selects the appropriate DRAM components, plus associated logic components and capacitors, and places them in the correct positions on the board. Modules are then placed in a reflow oven, which causes the solder of the

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[38] (...continued)
place in the United States.

[39] Table III-4 n.1, CR at III-17, PR at III-9.

[40] We reject petitioner's argument that domestic production should be defined to include assembly operations of integrated domestic producers when performed on domestically fabricated dice, but should not include assembly of domestic dice by independent domestic assemblers or assembly of third country dice by domestic assemblers. Petitioner's Posthearing Brief, Exhibit 16. While the percentage of domestic inputs used in a product or production process is one of the factors typically considered by the Commission in determining whether an activity constitutes domestic production, it is not generally treated as dispositive. *See, e.g.,* Certain All Terrain Vehicles from Japan, Inv. No. 731-TA-388 (Final), USITC Pub. 2163 at 13-14 (Mar. 1989) (finding that a "modest percentage of domestically-sourced parts or raw materials as a percentage of cost does not necessarily mean that a firm is not a domestic producer"). Moreover, the Commission generally considers this factor (and the other factors) on an industry-wide basis, rather than on a company-by-company basis, as petitioner appears to propose. Finally, even if one could arguably find that one company's assembly operation constitutes domestic production while another's does not, based on the origin of the dice, this would not provide a basis for making the second distinction that petitioner advocates: that is, a distinction between assembly of domestic dice by integrated domestic producers versus assembly of domestic dice by independent or contract domestic assemblers. Petitioner offers no legal or factual justification for this latter distinction, and we do not adopt it.

[41] Of the twelve domestic fabricators, five also assembled DRAM modules in the United States (either in their own facilities or using a contractor) during the period of investigation, as did one domestic DRAM assembler without a U.S. fabrication facility. Table III-1, CR at III-3, PR at III-2. There are reported to be a total of over 50 domestic module manufacturers, including companies performing contract module assembly as well as companies that design, build and sell their own modules. TSIA Prehearing Brief, Exhibit 1-B.

leads on the DRAMs and other components to adhere to the printed circuit board. Finally, the modules are put through a wash cycle that removes any excess residue of flux or paste, and are tested in module testing machines.[42]

In the preliminary determination, the Commission concluded that DRAM module assembly does not constitute domestic production.[43] In the final phase, petitioner supports the Commission's preliminary determination, while respondents continue to argue that module assembly should be considered domestic production.[44] For the reasons discussed below, we reaffirm our preliminary determination that module assembly involves insufficient domestic production-related activity to be considered domestic production.

Source and extent of capital investment. Although we lack precise information on the capital investment needed to establish or sustain a module assembly facility, the parties agree that module assembly involves a lesser capital investment than DRAM assembly.[45] Integrated domestic producers reported that module assembly accounted for between *** and *** percent of their total annual capital expenses during the period of investigation.[46]

Technical expertise involved in U.S. production activities. The parties are in general agreement that the degree of technical expertise involved in module production is less than that involved in either fabrication or assembly of DRAMs.[47]

Value added to the product in the United States. One module assembler reported that its value added for all DRAMs is *** percent.[48] This is consistent with the fact that the DRAM chips on a module account for about 90-95 percent of the module's value, from which it can be inferred that module assembly involves limited value added.[49]

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[42] CR at I-11, PR at I-8-I-9.

[43] Prelim. Det. at 9.

[44] Petitioner's Prehearing Brief at 8, 10; TSIA Prehearing Brief, Exhibit 1 at 4-7.

[45] *See* TSIA Prehearing Brief at Exhibit 1 (mistakenly citing information about chip assembly costs rather than module assembly); Hearing Tr. at 78-80; Petitioner's Posthearing Brief at Exhibit 9 (unsubstantiated estimate that a module assembly facility could be constructed for about $1 million). We note that ***, the largest independent domestic module manufacturer, reported capital expenditures of between *** and *** each year from 1996 through 1998, for total capital expenditures over the entire period of investigation of ***. During the same period, it reported a book value of fixed assets ranging from *** to *** and an original cost of fixed assets ranging from *** to ***. Table J-3, CR at J-5, PR at J-3. Because *** is the largest independent module assembler in an industry of mostly much smaller producers, we do not believe that its data are necessarily representative of all independent module assemblers.

[46] Table L-1, CR at L-4-L-5, PR at L-3.

[47] TSIA Prehearing Brief at Exhibit 1; Hearing Tr. at 78-80; Petitioner's Posthearing Brief at Exhibit 9.

[48] CR at VI-8, PR at VI-3.

[49] Transcript of Commission Conference (Nov. 13, 1998) at 37, 80 ("Conf. Tr."); CR at I-7-I-8 n.18, PR at I-6 n.18.

Employment levels. Responding domestic DRAM fabricators and assemblers reported employing *** PRWs in the production of DRAM modules in interim 1999.[50] These numbers are likely to significantly understate employment in module assembly, however, since they account only for integrated producers.

Quantity and type of parts sourced in the United States. The percentage of domestically produced modules made with domestically fabricated dice or third source dice assembled in the United States was *** percent in 1996, *** percent in 1997, *** percent in 1998, and *** percent in interim 1999.[51]

Overall, aside from the fact that most DRAMs assembled into modules in the United States were also fabricated here, the record evidence supports our preliminary determination that module assembly does not constitute domestic production of DRAMs. Because module assembly appears to add little value to cased DRAMs, and given the relatively unsophisticated nature of the production process and the much smaller amount of capital investment involved relative to either DRAM fabrication or assembly, we again find that module assembly does not constitute domestic production.

3. Whether Fabless Design Houses Are Part of the Domestic Industry

"Fabless" design companies focus on the design stage of DRAM production. Using skilled technical employees, computer hardware, and computer-aided design software, they create the design of the circuit layout for a DRAM chip, which is then placed on a mask set (by the design house or by a subcontractor). Unlike DRAM fabricators, which both design and fabricate DRAMs, fabless design houses own no fabrication facilities. Instead, they contract out the production of DRAMs bearing their designs to "foundry" producers, many of which are located in Taiwan.[52]

Both in the preliminary phase of this investigation and in the recent SRAMs investigation, the Commission determined that fabless design houses located in the United States are not part of the domestic industry because they do not actually engage in production of a domestic like product.[53] The Commission reasoned that SRAM (and DRAM) designs, although necessary to SRAM (or DRAM) production, did not come within the definition of the like product, reflecting, in turn, the fact that Commerce did not define the subject merchandise to include SRAM (or DRAM) designs or mask sets. To the contrary, the Commission found that the designs are incorporated into SRAMs (or DRAMs) that Commerce had included in the definition of the subject merchandise.

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[50] Table III-7, CR at III-18, PR at III-11. The *** responding non-integrated module manufacturers that provided usable questionnaire responses reported additional employment of *** PRWs, respectively, for interim 1999. *See* Producer Questionnaire Responses of ***.

[51] Table III-4 n.2, CR at III-17, PR at III-9.

[52] Foundry producers are companies that have capacity to produce DRAMs and/or other semiconductor products which they use to produce to other companies' designs under contract. The design house also contracts out the assembly stage either to the foundry or to another assembler, then generally markets the finished DRAMs under its own brand name. CR at I-8 n.23, PR at I-7 n.23; Alliance Postconference Brief at 2-3.

[53] Prelim. Det. at 9-10; Static Random Access Memory Semiconductors from Korea and Taiwan, Inv. Nos. 731-TA-761-762 (Final), USITC Pub. 3098 at 9-10 (Apr. 1998) ("SRAMs").

In this final phase, respondents do not repeat the legal arguments made in the preliminary phase, in which they criticized the legal reasoning underlying the Commission's SRAMs decision. Instead, their arguments are now focused solely on demonstrating that the facts of record support defining design as domestic production under the six factor test.[54] For the reasons stated in the Commission's preliminary determination and in SRAMs, we find that the activities of fabless design houses do not constitute domestic production as a matter of law. So long as fabless design house resources are being used in the production of a product that Commerce has defined as subject merchandise, rather than a U.S. product, the extent of their capital investment, value added, and employment in the United States is irrelevant to the definition of the domestic industry. Accordingly, we do not need to reach respondents' factual arguments on the extent of fabless design houses' production-related activities in the United States and we continue to exclude fabless design houses from our definition of the domestic industry.

E. Related Parties

We must further determine whether any producer of the domestic like product should be excluded from the domestic industry pursuant to 19 U.S.C. § 1677(4)(B). That provision of the statute allows the Commission, if appropriate circumstances exist, to exclude from the domestic industry producers that are related to an exporter or importer of subject merchandise, or which are themselves importers.[55] Exclusion of such a producer is within the Commission's discretion based upon the facts presented in each case.[56]

In the preliminary determination, the Commission found that U.S. producer Mitsubishi Electronics America ("Mitsubishi") is an importer of subject merchandise and that appropriate circumstances existed to exclude it from the domestic industry.[57] None of the parties challenged that decision, and the information collected in the final phase of the investigation reinforces our decision on

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[54] TSIA Prehearing Brief, Exhibit 1 at 8-9. Petitioner supports the Commission's preliminary determination not to include fabless design houses in the domestic industry. Petitioner's Prehearing Brief at 10-11.

[55] 19 U.S.C. § 1677(4)(B).

[56] 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). The primary factors the Commission has examined in deciding whether appropriate circumstances exist to exclude the related parties include: (1) the percentage of domestic production attributable to the importing producer; (2) the reason the U.S. producer has decided to import the product subject to investigation, *i.e.*, whether the firm benefits from the LTFV sales or subsidies or whether the firm must import in order to enable it to continue production and compete in the U.S. market, and (3) the position of the related producers vis-a-vis the rest of the industry, *i.e.*, whether inclusion or exclusion of the related party will skew the data for the rest of the industry. *See, e.g.*, Torrington Co. v. United States, 790 F. Supp. 1161, 1168 (Ct. Int'l Trade 1992), *aff'd without opinion*, 991 F.2d 809 (Fed. Cir. 1993). The Commission has also considered the ratio of import shipments to U.S. production for related producers and whether the primary interests of the related producers lie in domestic production or in importation. *See, e.g.*, Melamine Institutional Dinnerware from China, Indonesia, and Taiwan, Inv. Nos. 731-TA-741-743 (Final), USITC Pub. 3016 at 14, n.81 (Feb. 1997).

[57] Prelim. Det. at 10-12.

this point in the preliminary determination.[58] In light of Mitsubishi's progression from domestic producer to importer over the investigation period, the improvement of Mitsubishi's financial performance after its U.S. fab was closed, and its ***, we find that Mitsubishi's interests lie principally in importing rather than in domestic production. Accordingly, for the reasons stated in the preliminary determination, we continue to find that appropriate circumstances exist to exclude Mitsubishi from the domestic industry.

In the preliminary phase, the Commission also identified several other domestic producers that are or may be related parties, either by virtue of having imported subject merchandise or through corporate or contractual relationships with Taiwan producers, and stated that it would reconsider which domestic producers might be related parties and whether appropriate circumstances might exist to exclude such producers in any final phase of the investigation.[59] In this final phase, none of the parties has addressed the issue of related parties.

We find that *** and *** are related parties because they imported subject merchandise from Taiwan during the investigation period.[60] We also find that Toshiba America Electronic Components, Inc. ("Toshiba") and TwinStar/Texas Instruments ("TwinStar/TI") are related parties because of corporate or contractual relationships with Taiwan producers involving direct or indirect control.[61] Toshiba's corporate grandparent, Toshiba Corp. of Japan ("Toshiba Japan"), transferred technology and training to Taiwan producer Winbond pursuant to an agreement that requires Winbond to supply Toshiba Japan with DRAMs on an OEM basis.[62] Based on the comprehensiveness of the arrangement between Toshiba Japan and Winbond and Toshiba Japan's corporate control of its subsidiary Toshiba, we find that Toshiba and Winbond are under common control and, therefore, that Toshiba is a related party. We also find that TwinStar/TI was a related party up until its June 1998 acquisition by Micron, because ***.[63]

Based on the available information, we do not find evidence of direct or indirect control in any of the other corporate or contractual relationships between domestic producers and producers or importers of the subject merchandise. For the reasons discussed below we do not find appropriate circumstances to exclude any domestic producers other than Mitsubishi from the domestic industry.

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[58] *See* Table III-1, CR at III-3, PR at III-2; Table III-2, CR at III-13, PR at III-6; Table III-4, CR at III-16, PR at III-9; and Table VI-3, CR at VI-7, PR at VI-3.

[59] Prelim. Det. at 12.

[60] Table III-2, CR at III-13, PR at III-6. There is insufficient information to determine whether *** were imported from Taiwan during or before the investigation period. This issue is largely moot, however, because none of *** financial data is available for inclusion in the industry-wide performance tables. Table VI-3, CR at VI-5-VI-7, PR at VI-3.

[61] 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)(ii).

[62] Petitioner's Prehearing Brief at Exhibit 14. ***. TSIA Posthearing Brief at Q-6.

[63] Table III-2, CR at III-13, PR at III-6.

***. Although *** imports rose between 1996 and 1997, they fell in 1998 and returned to zero by interim 1999.[64] Even though ***, it does not appear to have benefitted financially from its imports.[65] In addition, because of ***,[66] we find that *** primary interest lies in domestic production rather than in importing the subject merchandise. We therefore find that appropriate circumstances do not exist to exclude *** from the domestic industry.

***. ***, imported subject merchandise from Taiwan during the period of investigation.[67] Nevertheless, *** U.S. DRAMs producer.[68] Moreover, *** imports were small relative to its domestic production, and, as a consequence, its *** financial condition cannot be attributed to its decision to import subject merchandise.[69] Accordingly, we find that appropriate circumstances do not exist to exclude *** from the domestic industry.

Toshiba. Notwithstanding Toshiba's corporate grandparent's relationships with various Taiwan producers, Toshiba's commitment to domestic production is evidenced by its large investment in and recent takeover of Dominion.[70] In any event, Toshiba ***, so including Toshiba in the domestic industry is not likely to affect industry-wide trends. We therefore find that appropriate circumstances do not exist to exclude Toshiba from the domestic industry.

TwinStar/TI. During the investigation period, *** as a percentage of domestic production as TwinStar/TI's domestic facility moved into commercial operation, indicating a continuing commitment to domestic production. TwinStar/TI did not benefit from ***; its financial performance was ***.[71] Accordingly, we find that appropriate circumstances do not exist to exclude TwinStar/TI from the domestic industry.

II. NO MATERIAL INJURY BY REASON OF THE SUBJECT IMPORTS

In the final phase of antidumping or countervailing duty investigations, the Commission determines whether an industry in the United States is materially injured by reason of the imports under

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[64] Table III-2, CR at III-13, PR at III-6.

[65] *** financial performance was ***, when its imports declined. Table III-1, CR at III-3, PR at III-2; Table VI-3, CR at VI-7, PR at VI-3.

[66] Table III-4, CR at III-16, PR at III-9; CR at III-5, PR at III-3.

[67] Table III-2, CR at III-13, PR at III-6; CR at III-2 n.6, PR at III-2. ***.

[68] Table III-4, CR at III-16, PR at III-9.

[69] Table III-2, CR at III-13, PR at III-6; Table VI-3, CR at VI-7, PR at VI-3.

[70] CR at III-4-III-5, PR at III-5; *see also* Petitioner's Prehearing Brief at Exhibit 1 ("IBM Sells Its Dominion DRAM Stake to Toshiba," Electronics Times (Jul. 12, 1999); "IBM to Exit Chip Venture with Toshiba," located on Oct. 13, 1999, at *http://www.techweb.com/wire/story/TWB19990707S000).*

[71] Table III-2, CR at III-13, PR at III-6; Table IV-1, CR at IV-3, PR at IV-1; Table VI-3, CR at VI-7, PR at VI-3.

investigation.[72] 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.[73] The statute defines "material injury" as "harm which is not inconsequential, immaterial or unimportant."[74] In assessing whether there is a reasonable indication that the domestic industry is materially injured by reason of subject imports, we consider all relevant economic factors that bear on the state of the industry in the United States.[75] 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."[76]

For the reasons discussed below, we determine that the industry producing DRAMs is not materially injured by reason of the subject imports.

A. Conditions of Competition

A number of conditions of competition are pertinent to our analysis in this investigation. First, the DRAM market is characterized by rapid technological advancements in terms of density (the amount of memory contained in a chip), die shrinks (the number of chips that can be produced on a wafer of a certain size), and addressing technology (which affects interface speed -- the speed with which a DRAM can be accessed by other elements of a computer).[77] Each time a producer moves to a new density, die shrink, or addressing technology, it starts a new "learning curve" or product life cycle. At the beginning of the product life cycle, production costs initially rise and yields (the percentage of usable dice obtained from a single wafer) decline. As each product moves through its life cycle, experience is gained and production volume increases, resulting in declining costs and rising yields. Price trends are generally correlated with the product life cycle. They start high for a new, state-of-the-art product, decline rapidly as the product becomes a commodity, and continue to decline until the product is replaced by the next generation of technology.[78]

At present, the pace of advances in chip density and die shrinks appears to be accelerating, at least for many computer applications, which account for the majority of consumption. This results in shorter life cycles both for a particular density generation or die shrink and, to some extent, the

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[72] 19 U.S.C. §§ 1671d(b) and 1673d(b).

[73] 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). *See also* Angus Chemical Co. v. United States, 140 F.3d 1478 (Fed. Cir. 1998).

[74] 19 U.S.C. § 1677(7)(A).

[75] 19 U.S.C. § 1677(7)(C)(iii).

[76] 19 U.S.C. § 1677(7)(C)(iii).

[77] CR at I-6-I-7, I-10-I-11, PR at I-5-I-6, I-7-I-8.

[78] CR at I-10, I-17, II-1-II-3, PR at I-8, I-12, II-1-II-3; Hearing Tr. at 46; Petitioner's Prehearing Brief at 31; TSIA Prehearing Brief at 11; TSIA Posthearing Brief at 7-8. Thus, per bit DRAM prices always decline over the long term. As discussed below, however, there is typically a seasonal spike in DRAM demand in the fall, which can halt or even reverse this declining price trend in the short term, depending on supply conditions.

equipment used to produce DRAMs.[79] By contrast, some other applications, such as telecommunications equipment and consumer electronics, have not followed the computer industry in switching to each new density. Thus, there is a continuing market in these applications for lower density ("legacy") chips.[80]

To keep developing new technology, DRAM producers must invest constantly in new capital equipment as well as R & D. Historically, that capital equipment has a productive life cycle of about three years, although, as noted above, it may be getting shorter.[81] The cost of constructing a new fab presently exceeds $1 billion, of which half to *** represents equipment costs. Equipment costs continue to rise as the production technology needed to produce smaller circuitry becomes more sophisticated.[82]

The industry's need to innovate is driven, in part, by continually rising demand for more and faster memory. During the period of investigation, apparent consumption, in terms of bits, increased by approximately 370 percent between 1996 and 1998, and by an additional *** percent between interim 1998 and interim 1999.[83]

To meet rising demand, both in the United States and worldwide, world capacity to produce DRAMs has increased significantly over the period of investigation.[84] Production capacity can be increased in several ways: increasing wafer starts (*i.e.,* by constructing a new fab), moving to a higher density chip, or shrinking die sizes.[85] As discussed further below, domestic and worldwide capacity has increased in all three ways during the period of investigation. The scale on which DRAM production must take place assures that the opening of a new fab or the introduction of a new die shrink results in a large immediate increase in production capacity. Because growth in demand for DRAMs has been linear, however, supply and demand in the DRAM market tend to be chronically out of equilibrium.[86]

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[79] CR at II-3, PR at II-2; Hearing Tr. at 173-74; Credit Suisse/First Boston, Taiwan DRAM Industry: A Global Perspective (July 16, 1999) at 9 ("Credit Suisse Report").

[80] CR at II-3, PR at II-2; Tables E-18 and E-19, CR at E-38-E-39, PR at E-5; Hearing Tr. at 60-61, 115.

[81] Conf. Tr. at 16-17; Petitioner's Prehearing Brief at 12-14; Hearing Tr. at 20-21, 23-24.

[82] Hearing Tr. at 20-21, 78; Petitioner's Posthearing Brief at Exhibit 15; Staff Field Trip Notes (Aug. 10, 1999) at 1-2.

[83] Table IV-3, CR at IV-7, PR at IV-5.

[84] Petitioner's Prehearing Brief at 39-40; Petitioner's Posthearing Brief at Exhibit 5.

[85] A new fab generally incorporates the latest technology and thus may contribute to capacity increases through fabrication of the newest density generations and utilization of equipment capable of producing the smallest device geometries as well as added wafer starts. Petitioner's Prehearing Brief at 14-16; Petitioner's Posthearing Brief at Exhibit 4; TSIA Posthearing Brief at 9. Capacity can also be increased by increasing the size of the wafer used in the production process. During the period of investigation, most remaining 6-inch wafer lines were abandoned or converted to 8-inch wafers, which are now standard. Although an industry-wide switch to 12-inch (300 mm) wafers is anticipated at some point in the future, it did not occur during the period of investigation. CR at VII-5, PR at VII-3; Petitioner's Prehearing Brief at 38; Hearing Tr. at 64-65; Petitioner's Posthearing Brief at Exhibit 5; TSIA Posthearing Brief, Exhibit 8 at 2, 5; Credit Suisse Report at 20.

[86] Conf. Tr. at 62; Hearing Tr. at 121-22, 152; Petitioner's Posthearing Brief, Exhibit 4 at 6-7; Credit Suisse Report at 7.

Because of the stark product life cycles and the chronic disequilibrium between supply and demand, the DRAM market has, since its inception in the 1970s, been characterized by repeated boom and bust cycles. In the course of the normal business cycle, the industry will typically experience several years of short supply and high profitability, followed by about a year of oversupply and poor profitability.[87] During most of the period of investigation, worldwide DRAM supply exceeded demand, resulting in significant worldwide price declines and declining profitability for the domestic industry.[88] Thus, that portion of the period of investigation was somewhat atypical, in that the bust cycle was more prolonged (approximately three years) than industry participants and analysts had reason to expect based on past experience.[89] Beginning at some point in 1999, however, the balance shifted markedly, with rising demand overtaking the growth in supply. Since as early as July 1999, domestic producers began placing their regular customers on allocation, while reducing spot market participation.[90]

Also relevant to our analysis is the existence of some degree of segmentation in the domestic DRAM market. Throughout this investigation, respondents have argued that the domestic DRAM market is served by both "Tier 1" or "brand name" producers and so-called "Tier 2" or "own brand" producers, and that there is little direct competition between the two tiers. The brand name producers are U.S., Japanese, Korean, and European producers with recognized brand names and leading edge technology. These producers tend to have production facilities in several countries and may contract for production with Taiwan producers, but generally sell under a single brand name regardless of the country where the DRAM was produced.[91] The own brand producers are Taiwan producers that produce DRAMs based on their own technology (or sometimes using a brand name partner's technology) and market them under their own brand names.[92] We find that overall competition in the U.S. market between the subject merchandise and the domestic like product during the period of investigation has been somewhat attenuated in several respects, although not to the extent argued by respondents. First, during the period of investigation, own brand Taiwan producers generally lagged behind leading domestic and third country producers by a year or more in the adoption of new densities and process technologies.[93] Second,

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[87] Associated Press, "Micron Finances in Good Shape Despite Freefall of Chip Prices" (Jan. 15, 1999); Hearing Tr. at 6, 22, 67-68, 76, 121-22. As noted above, per bit DRAM prices always decline over the long term. Although prices might increase in a market upturn, the boom cycle in this industry is not necessarily defined by rising prices and can occur even as prices continue to decline in a manner consistent with the product life cycle.

[88] Hearing Tr. at 71-72, 121-22; TSIA Prehearing Brief at Exhibit 3; Petitioner's Posthearing Brief at Exhibit 3 and Exhibit 4 at 10.

[89] Hearing Tr. at 6, 22, 121-22; Credit Suisse Report at 4, 8.

[90] Hearing Tr. at 87-88, 90, 96, 102; Petitioner's Posthearing Brief, Exhibit 13 ("Sold Out: DRAM Vendors Place OEMs on Allocation," Electronic Buyers' News (Oct. 8, 1999)).

[91] CR at I-13, I-15-I-16, VII-2, PR at I-10, I-11-I-12, VII-1-VII-2; TSIA Prehearing Brief at 6, 8-9, and Exhibit 4; Hearing Tr. at 153-54; TSIA Posthearing Brief at Q4-Q9.

[92] CR at I-13, PR at I-10; TSIA Prehearing Brief at 10; Hearing Tr. at 160, 165-66; TSIA Posthearing Brief at Q4-Q-9. The own brand Taiwan producers are Nan Ya, Vanguard, and Mosel-Vitelic. There is some record information to suggest that Nan Ya and Vanguard may ***. *Compare* Foreign Producer Questionnaire Response of *** at 8 with those of ***.

[93] CR at I-14, II-15-II-18, PR at I-10, II-10-II-13. We recognize that this "technology gap" between name

(continued...)

DRAMs from own brand Taiwan producers sell overwhelmingly in the U.S. spot market and in the form of cased DRAMs, while a large majority of domestically produced DRAMs sell under contract and in the form of modules.[94]

On the purchaser side, the market can be divided into name brand PC OEMs (such as Compaq, Dell, IBM, Hewlett-Packard, and Gateway), other OEMs (PC "clone" manufacturers, as well as producers of telecommunications equipment and consumer electronics), module makers, and distributor/resellers.[95] The record indicates that name brand PC OEMs have stricter supplier qualification requirements than other categories of DRAM purchasers.[96] During the period of investigation, own brand Taiwan producers have generally not been qualified to supply name brand PC OEMs, which account for about 60 percent of domestic DRAM consumption.[97] While petitioners point to evidence that at least one name brand PC OEM, ***, lists *** own brand Taiwan producers on its list of qualified suppliers, one of those producers denies that it is qualified at that purchaser.[98]

Another condition of competition is the significant presence of nonsubject imports, principally from Korea and Japan, in the U.S. market. During the period of investigation, the U.S. market share held by nonsubject imports in terms of volume ranged from approximately *** to *** percent.[99] A number of nonsubject producers have production facilities in several countries, including joint ventures or

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[93] (...continued)
brand and own brand producers may be in the process of closing as own brand Taiwan producers acquire U.S. and third country technology partners. This is a fairly recent phenomenon, however, and is only beginning to become meaningful in the market. CR at II-18, VII-2-VII-3, PR at II-12-II-13, VII-1-VII-2; Credit Suisse Report at 26-27 (Vanguard) and 28 (Nan Ya).

[94] CR at I-16-I-17, II-5-II-6, PR at I-12, II-3-II-4; Petitioner's Posthearing Brief at Exhibit 1.

[95] CR at I-15, II-1, II-3, PR at I-11.

[96] CR at II-12-II-13, PR at II-8-II-9; Hearing Tr. at 121, 127-28; TSIA Posthearing Brief, Exhibit 13 at 18-23.

[97] CR at II-1, II-5, II-18, PR at II-1, II-3-II-4, II-12; Conf. Tr. at 23; Hearing Tr. at 144-45, 212; TSIA Posthearing Brief, Exhibit 13 at 2; Purchaser Questionnaire Responses of *** at 17.

[98] Petitioner's Prehearing Brief at 35; Petitioner's Posthearing Brief at 7; Hearing Tr. at 127-28, 142-46; CR at II-18, PR at II-12-II-13. In a follow-up telephone call after our hearing, *** clarified that ***. CR at II-5 n.13, PR at II-3 n.13. Since *** is not yet marketing a 64 Mb DRAM in the United States because it has not yet completed its internal qualification on that product, any product it was qualified to supply to *** would have to be a legacy product rather than the industry standard 64 Mb SDRAM. Hearing Tr. at 143. Similarly, ***. Importer and Foreign Producer Questionnaire Responses of ***. Some of the confusion on whether particular Taiwan producers are in fact currently qualified to supply name brand PC OEMs may stem from the fact that the term "qualified supplier" seems to have more than one meaning in this industry. The PC OEM qualification process can involve multiple steps, including an overall corporate qualification, qualification of each specific fab, and qualification of specific products for specific applications. TSIA Prehearing Brief at Exhibit 2; Hearing Tr. at 127-28. While some market participants might refer to a supplier as "qualified" when it has passed the first or second step of the process, it still might not be qualified to supply any specific product to that customer and therefore would not be making any sales to the customer pending further qualification steps.

[99] Table IV-4, CR at IV-10, PR at IV-7.

technology partnerships with Taiwan producers. These companies may have the option of sourcing DRAMs for any particular customer or market from manufacturing facilities in several countries.[100]

Finally, we note that, because conditions in the DRAM market in terms of technology, capacity, pricing, and other factors change so rapidly, we have placed particular reliance in this investigation on the most recent information available to us concerning the volume, price effects and impact on the domestic industry of the subject imports. Such information includes both questionnaire data for the first six months of 1999 and secondary source materials covering most of 1999 (up until the closing of the record in this investigation on November 15, 1999).[101] [102]

B. Volume of the Subject Imports

Section 771(7)(C)(i) of the Act provides that 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."[103]

As in the preliminary determination, we have focused on bits for purposes of assessing the volume and market share of imports, because total bits are a uniform measure of the quantity of DRAMs.[104] The use of bits as a unit of measurement presents difficulties for our analysis, however, as total bits are a function of chip density and product mix, both of which have changed substantially over the period of investigation.[105] Accordingly, we do not view the increase in subject imports in the DRAM market measured in terms of bits the same way we might view an increase of such magnitude in the

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[100] CR at II-10, II-13-II-14, PR at II-6, II-8-II-9; TSIA Prehearing Brief at 3-6; Hearing Tr. at 120, 122.

[101] We find that the court's admonition in Saarstahl, AG v. United States, 858 F. Supp. 196, 200 (Ct. Int'l Trade 1994), that the Commission should use "information concerning the domestic industry in as contemporaneous a time frame as possible," has particular relevance under the circumstances of this investigation.

[102] In the final phase, none of the parties challenges our preliminary determination that the captive production provision does not apply in this investigation. *See* 19 U.S.C. § 1677(7)(C)(iv). Because the record indicates that in 1998 the domestic industry captively consumed approximately 5 percent of its production of the domestic like product in the manufacture of downstream products, CR at III-22, PR at III-14, we again find that the threshold requirement of significant captive consumption is not satisfied and that the captive production provision does not apply in this investigation.

[103] 19 U.S.C. § 1677(7)(C)(i).

[104] Petitioner's Posthearing Brief, Exhibit 1 at 3-4.

[105] In 1995, the first year for which we collected questionnaire data in the preliminary phase, the industry standard was moving from the 4 Mb DRAM to the 16 Mb DRAM. In 1998, the 64 Mb DRAM became the industry standard. Each of these changes quadrupled the number of bits of memory contained on a single chip. The presently ongoing switch to 128 Mb DRAMs will double the bit content of a single chip over that of a 64 Mb DRAM. CR at I-6, PR at I-5.

volume of imports of another product.[106] For this reason, we have focused our analysis on subject import market shares.

Throughout the period of investigation, subject imports held a relatively small share of the domestic DRAM market and increased that share by less than *** percentage points. Subject imports' market share by quantity increased from 4.67 percent in 1996 to 5.58 percent in 1997 and 6.43 percent in 1998, and was *** percent in interim 1999, compared with 5.32 percent in interim 1998.[107] The domestic industry's market share in terms of bits remained relatively constant between 1996 and 1998, falling from 30.61 percent in 1996 to 30.23 percent in 1998. However, the domestic industry's market share rose by *** percentage points between the interim periods, from 28.95 percent in interim 1998 to *** percent in interim 1999.[108] Thus, while subject imports have gained market share, their gain has been primarily at the expense of nonsubject imports rather than the domestic like product.[109]

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[106] The quantity of subject imports, measured in bits, increased markedly during the period of investigation, rising from 356,921 billion in 1996 to 982,946 billion in 1997 and 2,464,169 billion in 1998. Subject imports were 1,904,392 billion bits in interim 1999, compared with 904,530 billion bits in interim 1998. Table IV-2, CR at IV-4, PR at IV-2. This rise in subject import volume is largely tempered, however, by the fact that apparent consumption, in terms of bits, also grew rapidly over the period of investigation, increasing by 24,478,017 billion bits, or approximately 370 percent, between 1996 and 1998 and by *** billion bits, or *** percent, between interim 1998 and interim 1999. Table IV-3, CR at IV-7, PR at IV-5.

In terms of value, subject imports followed a more gradual trend, rising from $376.4 million in 1996 to $440.1 million in 1997 and $449.9 million in 1998. Subject imports by value were $281.2 million in interim 1999, compared with $216.8 million in interim 1998. Table IV-2, CR at IV-4, PR at IV-2. Analyzing the volume of subject imports in value terms is somewhat misleading, however, because of the large price declines that occurred over much of the period of investigation, which we discuss at length below in the context of price effects. Accordingly, we have also given these value data relatively little weight.

[107] Table IV-4, CR at IV-10, PR at IV-7. In value terms, the market share of subject imports rose from 4.25 percent in 1996 to 6.16 percent in 1997 and 7.10 percent in 1998, and was *** percent in interim 1999, compared with 6.48 percent in interim 1998. Subject imports have a higher market share in value terms than in terms of quantity because they are concentrated in lower density chips that cost more per bit.

[108] Table IV-4, CR at IV-10, PR at IV-7. In value terms, the domestic industry's market share declined slightly from 30.32 percent in 1996 to 27.85 percent in 1998, and was *** percent in interim 1999, compared with 26.34 percent in interim 1998. *Id.*

[109] Petitioner contends that our data understate the volume of subject imports because a number of smaller importers did not respond to questionnaires and urges us to draw an adverse inference against importers as a group and rely on official statistics as the facts available. Petitioner's Prehearing Brief at 24-28. We agree that our data may understate the volume of subject imports, but note that for the same reason the data also understate the volume of nonsubject imports. Because a significant number of importers, including most of the largest importers of the subject merchandise, did respond to the questionnaire, we do not believe it would be appropriate to draw an adverse inference against importers as a group. CR at IV-1, PR at IV-1. Moreover, because official statistics do not define DRAMs in a manner consistent with the scope of this investigation, we find that the questionnaire data are the best information available to us reflecting the volume of subject and nonsubject imports. CR at I-3, IV-1, PR at I-2-I-3, IV-1. Finally, although complete import data might increase the market shares of subject and nonsubject imports relative to that of the domestic industry in each period for which data were collected, we have no reason to believe that additional data would have changed the trends, which appear consistent with trends reported by other sources. *See, e.g.*, TSIA Posthearing Brief, Exhibit 7 at 2, 4, 8-10.

We find that even this modest market share overstates the effects of subject imports in the U.S. market, since U.S. shipments of subject DRAMs contained a much higher share of lower density legacy products than did shipments of the domestic like product throughout the period examined.[110] As discussed above, these differences in product mix reflect the fact that some, although not all, Taiwan producers have lagged behind the domestic industry technologically during much, if not all, of the period of investigation.[111] While the record indicates that DRAMs one density generation apart can technically be used interchangeably in a memory module, such interchangeability has practical limits, including space constraints within higher density modules and technological factors that can lead to sub-optimal performance.[112] Moreover, for other applications (such as some telecommunications equipment), purchasers are not willing to pay for a higher-priced higher-density chip for an application that can be satisfied by a lower density chip.[113] Thus, Taiwan producers are, in part, serving domestic demand for legacy products that the domestic industry is no longer making in significant volumes.[114]

Based on the relatively small absolute volume and market share of the subject imports, the less than *** percentage point gain in market share made by such imports over the period examined, the fact that any gains in subject import market share were largely not at the expense of the domestic industry (which increased its share over the period), the growth in apparent consumption during the period, the differences between the product mix of domestic and subject producers' U.S. sales, and our finding (discussed below) that subject imports have not caused significant adverse price effects, we find that neither the volume of subject imports nor the increase in that volume is significant, either in absolute terms or relative to production or consumption in the United States.

C. Price Effects of the Subject Imports

Section 771(C)(ii) of the Act provides that, in evaluating the price effects of the subject imports, 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,

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[110] For example, in interim 1999, 16 Mb DRAMs accounted for *** percent of the value of U.S. commercial shipments of subject DRAMs, but only *** percent of the value of U.S. commercial shipments of domestic DRAMs. During the same period, 64 Mb DRAMs accounted for *** percent of the value of U.S. commercial shipments of Taiwan DRAMs and *** percent of the value of shipments of domestic DRAMs. However, the domestic industry shipped another *** percent by value in the form of modules, most of which were likely made up of 64 Mb DRAMs, which are currently the industry standard. Table E-18, CR at E-38, PR at E-5. *See also* TSIA Prehearing Brief at Exhibits 18 and 19.

[111] CR at I-14, II-15-II-18, PR at I-10, II-10-II-13.

[112] CR at I-12-I-13, PR at I-9; Hearing Tr. at 130; TSIA Posthearing Brief, Exhibit 13 at 4-6. Some substitutions, while technically possible, must be made at the design stage of the downstream product. CR at I-12, PR at I-9. Thus, we find that the record does not support petitioner's assertion (Hearing Tr. at 83-84, 97) that DRAM users are completely indifferent as to the density of the chips used so long as the total amount of memory is the same.

[113] CR at II-3, PR at II-2; TSIA Posthearing Brief, Exhibit 13 at 14-15.

[114] *See* TSIA Prehearing Brief at Exhibit 5 (Micron Obsolete Data Sheets). We note in particular that while petitioner continues to sell out of inventory certain legacy products that it no longer produces, it sells those products "as is" with no guarantee that they will work in purchasers' applications.

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.[115]

The parties agree that the product life cycle generally causes prices to decline by about 20 percent per year (or more) and that per bit DRAM prices, in general, decline constantly over the long term.[116] In fact, domestic producers' prices for all 7 DRAM products[117] for which we obtained usable monthly data fell precipitously from 1996 through early 1999, with a short interruption for some products in early 1997.[118] Public reports indicate, however, that DRAM prices in the U.S. market have been increasing significantly since July 1999 and that spot prices now exceed contract prices.[119]

While petitioner argues that the current supply shortage and associated allocations and price increases reflect only a seasonal peak in demand that occurs every year in the fourth quarter,[120] the record indicates that supply began tightening several months earlier in 1999 than it does in the normal seasonal peak. Moreover, while previous years' seasonal peaks have been associated with some product allocations and price stabilization, they have not generally resulted in sustained increases in DRAM prices over 4 or 5 months, as is occurring this year.[121] Nor do we accept petitioner's claim that the recent price increases are the result of one-time events like the recent Taiwan earthquake (Sept. 21, 1999) and Japanese nuclear accident (Sept. 30, 1999).[122] In particular, although the Taiwan earthquake caused a short period of panic buying, resulting in a price spike, the record indicates that the interruption to domestic and world supply caused by the earthquake was minimal and that the market quickly recovered. After declining from the price spike that occurred immediately after the earthquake, however, prices

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[115] 19 U.S.C. § 1677(7)(C)(ii).

[116] Hearing Tr. at 46; TSIA Posthearing Brief at 7-8.

[117] The products for which we collected pricing data include 4 Mb, 16 Mb, and 64 Mb DRAMs as well as an 8 Mb SGRAM, a specialty DRAM product. There was only one reported sale of Taiwan-fabricated product 8 (a 16 megabyte SIMM). CR at V-4, PR at V-3.

[118] *See* Tables V-8-V-14, CR at V-12-V-24, PR at V-9-V-10. Reported prices bottomed out and/or hit their lowest prices during the period for which data were collected in February 1999 (product 1), June/July 1998 (product 2), October 1998 (product 3), between January and June 1999 (products 4 and 5), June 1999 (product 6), and January 1999 (product 7).

[119] *See, e.g.,* "Chip Industry Says It Will Post Strong Gains Through 2003," Wall Street Journal (Oct. 28, 1999) (noting price increases beginning in July 1999); Associated Press, "Micron Makes Chip Deal With Gateway," Yahoo! News (Oct. 28, 1999) (current 64 Mb DRAM price about $12); "Sold Out: DRAM Vendors place OEMs on allocation," Electronic Buyers' News Online (Oct. 8, 1999) (contract OEM prices for 64 Mb DRAMs above $10, up from $4.50 in July); "Micron Technology says memory chip demand 'overwhelming,'" AFX News (Oct. 5, 1999) (petitioner Micron reports that its contract price for 64 Mb DRAMs rose to $10 in early October 1999, from a low point of $4 in the fourth quarter of 1998); TSIA Posthearing Brief, Exhibits 15 and 16; Petitioner's Posthearing Brief at 11.

[120] Hearing Tr. at 47, 87-88, 89, 96, 103; Petitioner's Posthearing Brief at Exhibit 13.

[121] Hearing Tr. at 132, 174-75; Petitioner's Posthearing Brief, Exhibit 13 (***; news articles). *See also* note 119 *supra.*

[122] Petitioner's Posthearing Brief, Exhibit 13 at 3.

continued on their rising trend.[123] Thus, recent price increases, which are not consistent with either the product life cycle or the typical seasonal demand pattern, are generally understood to be the result of tightening supply.[124]

Indeed, the October 1999 announcements of three major DRAM multi-year supply agreements between petitioner Micron and PC OEMs Compaq and Gateway and between domestic/Korean producer Samsung and PC OEM Dell are strong evidence that the current price increases and supply shortages in the domestic DRAM market are more significant and of longer duration than can be accounted for by seasonal or one-time factors. Each of these agreements, which are unprecedented in this industry, guarantees the respective DRAM producer a nearly 50 percent share of the purchaser's DRAM requirements, while guaranteeing the purchaser a stable source of supply.[125] These unprecedented supply arrangements are a strong signal that major participants in the domestic DRAM market consider the current short supply conditions in the market to be more pervasive and of longer likely duration than seasonal or one-time factors would suggest.

Finally, we reject for several reasons petitioner's contention that the reported price increases in the second half of 1999 are the result of the pendency of this investigation. First, as discussed above, Taiwan has been a small volume participant in the U.S. market during the period of investigation, with limited overlap between subject product mix and domestic producers' product mix, lessening the likelihood that the prospect of antidumping duties on subject imports would cause price increases of the magnitude that have occurred. Second, as discussed further below, purchasers in the U.S. market source globally from worldwide supply. In fact, third country producers that sell DRAMs manufactured for them by technology partners in Taiwan can supply their U.S. customers with nonsubject DRAMs in the event that antidumping duties are imposed, further lessening the price impact that the prospect of such duties could have. Third, we note that the price increases began in July 1999, many months after the filing of the petition in October 1998 and well after the suspension of liquidation in this investigation on

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[123] TSIA Posthearing Brief at Q-28-Q-29 and Exhibit 16. Another one-time factor cited by petitioner is the delayed roll-out of a new Intel product requiring the new Rambus DRAM addressing technology. Petitioner's Posthearing Brief, Exhibit 13 at 4; Hearing Tr. at 53. While Rambus delays may have contributed in a small way to the current DRAM undersupply, there is no evidence that total wafer starts committed to Rambus in recent months account for a large percentage of total production. Moreover, even if fabricators temporarily switch back from Rambus DRAM to SDRAM, petitioner admits that market demand for Rambus is merely delayed, not canceled. Petitioner's Posthearing Brief, Exhibit 15 at 1.

[124] *See* note 119, *supra.*

[125] *See* Micron Press Release (Oct. 27, 1999) (Gateway); Micron Press Release (Oct. 25, 1999) (Compaq); "Compaq, Micron in $20 Bln Chip Deal," Yahoo! News (Oct. 25, 1999) (Compaq/Micron and Dell/Samsung); "Compaq and Micron Technology Announce Strategic Alliance for Memory Supply," located on November 4, 1999 at *http://www.micron.com;* "Compaq, Micron in Chip Deal Worth up to $20 Billion," New York Times (Oct. 25, 1999); "Compaq Signs Multi-Billion-Dollar DRAM Supply Deal with Micron, Electronic Buyer's News Online (Oct. 25, 1999); "Micron Makes Chip Deal with Gateway," located on Oct. 28, 1999 at *http://dailynews.yahoo.com*; "Gateway and Micron Technology Announce Strategic Memory Supply Agreement," located on Nov. 4, 1999 at *http://www.micron.com;* "Micron Strikes 5-Year Deal with Gateway," located on Nov. 9, 1999 at *http://www.techweb.com.* By contrast, the typical contract in this industry covers a much smaller percentage of the purchaser's requirements and is of much shorter duration. Hearing Tr. at 28-29, 36-37 (share of purchaser requirements allocated quarterly or yearly); Purchaser Questionnaire Responses of *** at 17 (***); Purchaser Questionnaire Response of *** at Question IV-8 (***).

May 28, 1999.[126] Thus, the price trend is not correlated in time with the events which petitioner contends are responsible for it.[127]

Comparisons obtained for the seven pricing products do show a preponderance of underselling by subject imports.[128] We do not find this underselling to be significant, however, for several reasons. First, purchasers reported that price is not always the most important consideration guiding DRAM purchases. Most responding purchasers ranked quality/reliability, availability/delivery, or vendor relationship as more important than price.[129] Equally important for our underselling analysis, most purchasers reported that they seldom change suppliers.[130] In such circumstances, the effects of any underselling are further muted.

Second, about *** percent of subject imports are produced pursuant to technology partnership agreements and sold by the domestic or third country technology partner under the partner's brand name.[131] The parties agree that these name brand Taiwan products are identical to those sold in the United States by the domestic or third country partner companies sourced from their U.S. or third country fabs.[132] There is no reason why a global producer that serves the United States market with identical DRAMs fabricated in two or more countries would price its Taiwan-fabricated product to undersell its

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[126] "Chip Industry Says It Will Post Strong Gains Through 2003," Wall Street Journal (Oct. 28, 1999); "Chip Industry Experts Predict Strong Demand Will Lift Prices," Wall Street Journal (Nov. 5, 1999).

[127] Petitioner's Posthearing Brief at 3-6. Since even contract prices in the domestic DRAM market can change weekly or even daily, this delay cannot be due to a lag in the market's ability to reflect the effect of the investigation on prices. Hearing Tr. at 27-28, 42-43; Staff Field Trip Notes (Aug. 10, 1999) at 3.

[128] Tables V-1-V-7, CR at V-8-V-11, PR at V-5-V-8.

[129] Tables II-1 and II-2, CR at II-14-II-15, PR at II-9-II-10; TSIA Posthearing Brief, Exhibit 13 at 1 and 7-9; Staff Field Trip Notes (Aug. 10, 1999) at 1, 4 (***). Reliability can mean several things in this market. For example, some purchasers require that a vendor be able to supply at least 10-15 percent of the customer's needs for a particular product and/or that the customer not represent more than 50 percent of the vendor's production before the vendor can be qualified. TSIA Prehearing Brief at Exhibit 2. Because some Taiwan producers were still ramping up their DRAM fabs during the period of investigation, not all could meet this standard of reliability for all products. Tables VII-2 and VII-3, CR at VII-4 and VII-6, PR at VII-4 and VII-6. Alternatively, as OEMs have moved to just-in-time inventory systems, they have required vendors to inventory product on the vendor's books but at the customer's location. Petitioner's Posthearing Brief, Exhibit 9 at 2; Staff Field Trip Notes (Aug. 10, 1999) at 3-4. It is not clear that all importers of subject merchandise are able to satisfy these kinds of inventory needs. Vendor relationships would tend to be more important to purchasers that have strict or lengthy qualification requirements, require special inventory arrangements, purchase advanced or specialty product, or require other unusual vendor support.

[130] TSIA Posthearing Brief, Exhibit 13 at 11-12.

[131] Staff Worksheet (Nov. 3, 1999) (Doc. No. 199911045019) (data for interim 1999 for ***); Table IV-3, CR at IV-7, PR at IV-5; Hearing Tr. at 153-54, 160; TSIA Posthearing Brief at Q4-Q9 and Exhibit 7 at 1; Conf. Tr. at 19-20.

[132] Conf. Tr. at 19-20, 54-56; Petitioner's Prehearing Brief at 18.

own domestic or nonsubject product in the U.S. market.[133] Thus, we conclude that the underselling is largely accounted for by U.S. sales from own brand Taiwan producers, which accounted for more than half of total subject imports in 1998.[134]

For a variety of reasons, we would expect these own brand Taiwan products to sell for less than name brand DRAMs. First, as discussed above, the overwhelming majority of domestic sales by own brand Taiwan producers take place in the spot market, while the majority of sales by domestic producers are contract sales. It is generally agreed that, in periods of DRAM oversupply such as existed until the last portion of the period of investigation, the spot market price of DRAMs is lower than the contract price by as much as 20 percent.[135] Thus, we would expect domestic prices of DRAMs fabricated by own brand Taiwan producers to be lower than those for the approximately 60-70 percent of domestic DRAMs sold under contract during that period.[136]

In addition, as discussed above, because of the own brand Taiwan producers' technology lag, a significant portion of U.S. sales of DRAMs fabricated by own brand Taiwan producers made during the period of investigation were a density generation or more behind the U.S. producers' principal volume product at any given time. Thus, the underselling on the record is largely in lower density products that are not as important in volume terms to the domestic industry, reducing the significance of the underselling. The significance of the underselling is further reduced because, due to this technology lag, own brand Taiwan product does not enter the United States until new generation products have already exited the introduction phase of the product life cycle when they reap the highest profits for the first producers to market them. Similarly, as discussed above, during the period of investigation own brand Taiwan producers were generally not qualified to supply name brand PC OEMs in the United States. This too lessens the significance of the underselling because it restricts or even eliminates the access of own brand Taiwan product to the domestic industry's major customers. This diminished effect is borne out by the recent supply arrangements concluded by name brand PC OEMs, all of which are with domestic or nonsubject producers.

For the foregoing reasons, we find that there has not been significant underselling by the imported merchandise as compared with the domestic like product in the United States. This conclusion

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[133] This inference is consistent with purchasers' tendency to identify the origin of DRAMs by the nationality of the corporation whose name it bears rather than by the location at which the particular DRAM was fabricated. CR at II-13-II-14, PR at II-8-II-9.

[134] Combined imports from the three own brand Taiwan producers were *** percent of total imports in 1998. Table IV-1, CR at IV-2, PR at IV-1. Any subject product produced by own brand Taiwan producers and imported by other importers would increase the percentage.

[135] Hearing Tr. at 44-45, 131; Importer Questionnaire Response of ***, Attachment A at 1.

[136] We do not dispute petitioner's contention that spot and contract prices in the DRAM market affect each other. *See, e.g.,* Petitioner's Posthearing Brief at 7-8; Hearing Tr. at 43-45. Despite the facts that spot and contract prices follow similar trends over the long term and that contract purchasers have access to relatively good information on spot prices on a daily or weekly basis, the record is clear that spot and contract prices are usually not the same, with contract prices exceeding spot prices when DRAM supply exceeds demand and vice versa. In fact, there is some evidence in the record to suggest that, even comparing prices within the spot market, prices for name brand product exceed those for own brand DRAMs from Taiwan. *See* Petitioner's Posthearing Brief, Exhibit 13 (Donaldson, Lufkin & Jenrette, Tech Daily (Oct. 4, 7, and 13, 1999)).

is supported by our inability to confirm any of petitioner's lost sales or lost revenues allegations.[137] Similarly, purchasers almost unanimously reported that they do not consider Taiwan producers to be downward price leaders.[138]

Overall, the evidence of record indicates that subject imports did not lead or contribute to the unusual steepness of the price declines experienced by the domestic industry during most of the period of investigation in any significant way and that the recovery in prices that began late in the period is not the result of the pendency of this investigation. Rather, the price declines and subsequent recovery are accounted for by other factors, including worldwide DRAM supply conditions and the product life cycle. Moreover, the limited extent of competition between domestic and subject merchandise indicates that subject imports could have no more than a *de minimis* effect on overall domestic prices. We also find that any price increases by the domestic industry would be severely constrained in the period of oversupply by the significant domestic market presence of nonsubject imports, which compete more directly on price with the domestic like product than do the bulk of the subject imports.[139] Accordingly, we find that subject imports have not depressed or suppressed prices for the domestic like product to a significant degree.

D. Impact of the Subject Imports on the Domestic Industry

Section 771(7)(C)(iii) provides that the Commission, in examining the impact of the subject imports on the domestic industry, "shall evaluate all relevant economic factors which have a bearing on the state of the industry." 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."[140] [141]

Between 1996 and 1998, the domestic industry experienced price declines that exceeded the rate of cost reduction the industry was able to achieve through density increases, die shrinks, and other process improvements. As a consequence, the industry suffered increasing financial losses in each full

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[137] CR at V-25-V-28, PR at V-10-V-11.

[138] TSIA Posthearing Brief, Exhibit 13 at 13. Of the two purchasers that identified one or more Taiwan producers as price leaders, *** indicated that other reasons, such as quality and reliability, caused it not to consider these producers as suppliers.

[139] CR at II-18-II-19, PR at II-13.

[140] 19 U.S.C. § 1677(7)(C)(iii). *See also* SAA at 851 and 885 and Live Cattle from Canada and Mexico, Inv. Nos. 701-TA-386 and 731-TA-812-813 (Preliminary), USITC Pub. 3155 at 25 n.148 (Feb. 1999).

[141] As part of its consideration of the impact of imports, the statute specifies that the Commission is to consider "the magnitude of the margin of dumping" in an antidumping proceeding. 19 U.S.C. § 1677(7)(C)(iii)(V). In its final determination, Commerce found the following dumping margins: Etron Technology, 69.00 percent; Mosel-Vitelic, 35.58 percent; Nan Ya, 14.18 percent; Vanguard, 8.21 percent; and all others, 21.35 percent. 64 Fed. Reg. 56308, 56327 (Oct. 19, 1999).

year of the period.[142] Because we have found no causal connection between subject import volumes or prices and the decline in domestic DRAM prices in 1996-1998, however, we cannot conclude that the domestic industry's financial troubles are attributable to the subject imports. Moreover, by the first half of 1999, much of the domestic industry reported favorable operating returns and the industry's financial losses overall were beginning to decline significantly, even before the substantial price increases that started later in the year.[143]

We also note that trends in most of the indicators that we generally examine in considering the impact of subject imports on the domestic industry were strongly positive throughout the period of investigation. In particular, the domestic industry experienced rising fabrication capacity, production, shipment quantities, and employment throughout the period.[144]

In the preliminary determination, the Commission expressed concern that declining prices and profits might eventually force the domestic industry to reduce its capital spending and R&D, jeopardizing its ability to develop new DRAM technologies.[145] The record in the final phase indicates that, in fact, capital spending and R& D spending remained strong throughout the period[146] and the domestic industry continues to develop and market leading edge products and technologies.[147]

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[142] Table VI-1, CR at VI-2, PR at VI-2; Memorandum INV-W-260 (Nov. 18, 1999) (Table C-1 revised to exclude Mitsubishi). The industry's operating income margin declined from negative 2.4 percent in 1996 to negative 20.2 percent in 1997 and negative 67.0 percent in 1998.

[143] Table VI-1, CR at VI-2, PR at VI-2; Table IV-4, CR at IV-10, PR at IV-7; Memorandum INV-W-260 (Table C-1 revised to exclude Mitsubishi). The industry's operating income margin was negative 8.4 percent in interim 1999, compared with negative 86.5 percent in interim 1998.

[144] Memorandum INV-W-260 (Table C-1 revised to exclude Mitsubishi). The industry's fabrication capacity utilization was 93 percent or above in all periods except interim 1998, while capacity to produce cased DRAMs and modules was also high throughout the period. *Id.* Because a high level of capacity utilization is a necessity for DRAM fabrication, however, we give limited weight to this factor. Conf. Tr. at 28.

[145] Prelim. Det. at 20-21.

[146] The domestic industry's capital expenditures rose from $2.07 billion in 1996 to $2.49 billion in 1997 and $2.59 billion in 1998. Capital expenditures did decline between the interim periods, from $1.43 billion in interim 1998 to $0.71 billion in interim 1999, but we find no record basis to conclude that this represents a reversal of the overall trend in light of the ongoing recovery in the DRAM market. Memorandum INV-W-260 (Table C-1 revised to exclude Mitsubishi). The domestic industry's R& D expenses rose from $*** million in 1996 to $*** million in 1997 and leveled off at $*** million in 1998. R& D expenses were $*** million in interim 1999, compared with $*** million in interim 1998. Table VI-5, CR at VI-10, PR at VI-4. During the period of investigation, the domestic industry opened multiple new fabs, including two greenfield facilities, and increased its capacity both in terms of wafer starts and in terms of bits. Table III-3, CR at III-15, PR at III-8. Moreover, as petitioner notes, there is partially completed capacity available (including the unfinished Lehi facility ***) that could be in production in 6 months to a year if demand warrants. Staff Field Trip Notes (Aug. 10, 1999) at 1-2; "Micron Shareholders Keep Eye on Future," Idaho Statesman (Jan. 15, 1999).

[147] *See, e.g.,* "Micron Claims DDR SDRAM Shines in Benchmark Tests," Electronic Buyers' News (Nov. 9, 1999); "Hyundai Samples 256-Mbit SDRAM Using 0.15-Micron Process," Electronic Buyers' News (Nov. 9, 1999); Dominion Field Trip Notes (Nov. 12, 1999); Hearing Tr. at 60-61; Petitioner's Prehearing Brief, Exhibit 1 at 1-2 ("Toshiba to Buy IBM's Stake in Dominion," Electronic News (July 12, 1999) (IBM/Toshiba/Infineon have

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We find that the domestic industry as a whole has emerged from the downturn in its business cycle well-positioned to compete with subject imports and reject petitioner's contention that the industry's improving financial situation in interim 1999 is a result of the exit of the most injured producers. While petitioner Micron attempts to characterize its purchase of Texas Instruments' ("TI") worldwide DRAM assets as a "fire sale,"[148] we view the petitioner's ability to attract significant amounts of capital investment from TI and Intel as evidence of strength.[149] Indeed, petitioner Micron is now one of the world's three largest DRAM producers and is widely viewed as a global leader in DRAM technology and production. Dominion and White Oak, both greenfield fabs using state-of-the-art technology, opened during the period of investigation. Despite *** operations during their respective ramp up phases, *** is now *** and both are *** domestic market share.[150] Korean producers Hyundai and Samsung also both opened state-of-the-art production facilities in the United States during the period.[151] Of the six U.S. production facilities closed during the period of investigation, two were assembly facilities, and the others either used 6-inch wafers, which are no longer the industry standard, had wafer start capacities below the level that is currently considered the minimum for economic operation, or both.[152] Although IBM has been *** domestic producers during the period of investigation, its ***.[153] Similarly, the financial results of Fujitsu, also ***.[154]

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[147] (...continued)
agreement for joint development of process technology below 0.15 micron through March 2000)).

[148] Conf. Tr. at 13-14.

[149] In 1998, petitioner Micron experienced *** during the period of investigation. Table VI-3, CR at VI-5, PR at VI-3. In that same year, Micron acquired Texas Instruments' worldwide DRAMs assets, and received equity infusions from both Texas Instruments and Intel. While petitioner argues that the change in its business practices from financing all operations and growth out of cash flow to selling equity and issuing debt is evidence of injury by reason of subject imports, Hearing Tr. at 21-22, the company has publicly characterized the terms of these deals as favorable to Micron. *See, e.g.,* TSIA Prehearing Brief, Exhibit 4 ("Micron's Appleton Loves His DRAM Deal with Texas Instruments," Semiconductor Business News (July 1, 1998)). *Cf.*, TSIA Posthearing Brief, Exhibit 2 (Merrill Lynch reviews of Micron stock dated Oct. 1 and Oct. 5, 1999).

[150] CR at III-4-III-5, III-11-III-12, PR at III-2-III-4; Table VI-3, CR at VI-7, PR at VI-3. *** did not report financial data.

[151] CR at III-6, III-10, PR at III-3, III-5.

[152] Some also produced legacy products. CR at III-5-III-11, PR at III-3-III-6; Petitioner's Posthearing Brief at Exhibit 7; TSIA Posthearing Brief at Exhibit 8. Petitioner refers to the closure of domestic fabs by ***, but *** and therefore do not reflect exits from the industry. Although Motorola is exiting the industry, the domestic fab that it helped to create (White Oak) continues to operate *** under other ownership. In any event, Motorola was using its share of the fab to produce SRAMs, not DRAMs. Petitioner's Prehearing Brief, Exhibit 10. The TwinStar facility, which Micron closed after acquiring it from TI in 1998, has been maintained as a research facility and could be reopened as a fab under appropriate demand conditions.

[153] CR at III-6-III-7, PR at III-3-III-4; Table VI-3, CR at VI-7, PR at VI-3; Table III-4, CR at III-16, PR at III-9 (*** in interim 1999). ***. Producer Questionnaire Response of ***.

[154] Table VI-3, CR at VI-7, PR at VI-3; Petitioner's Posthearing Brief, Exhibit 7 at 1; Tables E-1 and E-2, CR at E-3-E-8, PR at E-3. Fujitsu *** and has stated that it is ***. Table III-1, CR at III-3, PR at III-2; CR at M-
(continued...)

Overall, the industry had already begun a financial recovery in interim 1999. Price increases in the second half of the year could only have contributed to further improvements in the industry's financial condition through our record-closing date in November. All other indicators are positive and the industry has maintained its technological leadership. In light of the lack of significant volumes of subject imports and significant price effects, the high level of investments by the domestic industry, and the improving trend in the industry's financial condition, we do not find that the subject imports are presently having an adverse impact on the domestic industry.

III. NO THREAT OF MATERIAL INJURY BY REASON OF SUBJECT IMPORTS

Section 771(7)(F) of the Act directs the Commission to determine whether the U.S. industry is threatened with material injury by reason of the subject imports by analyzing whether "further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued ... ."[155] The Commission may not make such a determination "on the basis of mere conjecture or supposition," and considers the threat factors "as a whole" in making its determination whether dumped imports are imminent and whether material injury by reason of imports would occur unless an order is issued.[156] In making our determination, we have considered all statutory factors that are relevant to this investigation.[157] For the reasons discussed below, we find that the domestic DRAMs industry is not threatened with material injury by reason of subject imports.

Over the period examined, domestic consumption of DRAMs and imports of subject merchandise have both increased in roughly the same proportion.[158] Subject imports' share of domestic consumption has been low throughout the investigation period and increased by less than *** percentage points, as discussed in our analysis of no present material injury.[159] We anticipate that Taiwan's share of the U.S. market will continue to be small, particularly compared to the shares of U.S. producers and nonsubject imports, which have been substantially larger than Taiwan's throughout the investigation period.[160] The new supply arrangements with Compaq, Gateway, and Dell guarantee domestic and nonsubject producers a large share of future name brand PC OEM demand for DRAMS.[161] These new supply arrangements reduce the likelihood that own brand Taiwan producers (who accounted for a majority of subject imports during the investigation period) will be able to significantly increase the volume of their imports to the United States or their U.S. market share in the imminent future. Moreover, we note that Taiwan is a large consumer and a net importer of DRAMs, and is the world's

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[154] (...continued)
3, PR at M-3.

[155] 19 U.S.C. §§ 1673d(b)(1) and 1677(7)(F)(ii).

[156] 19 U.S.C. § 1677(7)(F)(ii).

[157] 19 U.S.C. § 1677(7)(F)(i). Factor I is inapplicable because no subsidies are alleged. Factor VII is inapplicable because this investigation does not involve imports of a raw agricultural product.

[158] Table IV-3, CR at IV-7, PR at IV-5.

[159] *See supra* § II.B.

[160] Table C-1, at CR C-3, PR at C-3.

[161] *See supra* note 125.

largest producer of motherboards.[162] The share of Taiwan's production of subject merchandise that is exported to the United States has been small in comparison to the share sold in the home- and third-country markets throughout the investigation period, and there is no information on the record indicating that demand from those markets is decreasing or that Taiwan will abandon those markets in the imminent future.[163] Accordingly, we conclude that the volume and market penetration of imports of the subject merchandise is not likely to increase substantially in the imminent future.

Furthermore, there is no indication of increased capacity or excess production capacity in Taiwan that would suggest the likelihood of substantially increased imports. Although the Taiwan industry brought more new wafer start capacity on line during the investigation period than did producers in any other country, Taiwan began at a low base.[164] Moreover, as the new wafer start capacity comes on line in Taiwan, Taiwan producers' capacity utilization has been and is projected to remain at high levels in 1999 and 2000 (above 85 percent) for both cased and uncased DRAMs.[165] This increased DRAMs capacity during the investigation period has not resulted in a flood of subject imports to the United States because of the significance of Taiwan's home and third-country markets.[166] Although petitioner pointed to press reports suggesting very large planned capacity increases in Taiwan, we note that many of the more ambitious plans for expansion announced in the press failed to materialize when the market experienced an extended downturn in prices, and that a number of the semiconductor capacity increases to which petitioner refers are not specific to DRAMs.[167] Thus, we find that any capacity increases have not been, and are not likely in the imminent future to be, at nearly the level that petitioner indicated. Based on this evidence we do not conclude that the existence of additional or unused production capacity, or imminent increases in capacity, indicate a likelihood of substantially increased imports of subject merchandise into the United States.

Petitioner argues that Taiwan producers, particularly foundries, are likely to shift production from non-DRAM products to DRAMs.[168] We agree that it is technically possible for foundries and some other semiconductor producers to shift capacity to DRAM production. We find, however, that the record does not support the conclusion that product shifting to DRAMs is likely because worldwide demand for semiconductor products in general, not just for DRAMs, is projected to outweigh supply in the imminent future, and industry reports indicate that semiconductor producers have not expanded capacity in pace

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[162] *See, e.g.*, TSIA Prehearing Brief at 48; Hearing Tr. at 135-36.

[163] Tables O-1, O-2, and O-3, CR at O-3 to O-8, PR at O-3 to O-6 (according to foreign producer questionnaire responses the percentage of subject uncased DRAMs, cased DRAMs, and DRAM modules shipped to home- and third-country markets was *** in 1998, and is projected to be ***, respectively in 1999 and 2000). We note that Taiwan producers are not subject to antidumping or countervailing duty orders elsewhere in the world, so production is not likely to be diverted from other markets to the United States.

[164] Tables O-1 and O-2, CR at O-3, O-5, PR at O-3 to O-6.

[165] Tables O-1 to O-2, CR at O-3 to O-6, PR at O-3 to O-6.

[166] Tables O-1, O-2, and O-3, CR at O-3 to O-8, PR at O-3 to O-6.

[167] Appendix N, CR at N-2 to N-6, PR at N-3 to N-7; TSIA Posthearing Brief at Exhibit 10.

[168] Petitioner's Prehearing Brief at 76-78.

with demand.[169] Indeed, record evidence indicates that some Taiwan producers have shifted production away from DRAMs to other semiconductor products.[170] Under these market conditions, we see no reason why Taiwan producers would abandon other profitable semiconductor markets to convert facilities to DRAM production. Accordingly, we conclude that there is little threat that Taiwan producers will engage in product shifting to DRAMs in the imminent future.

U.S. importer and foreign producer inventories increased slightly during the period as reflected by the questionnaire data, but given the widespread reports of producers putting customers on allocation, we expect that inventories have largely, if not entirely, disappeared in the intervening months.[171] In any event, the parties have not argued that inventories play a significant role in this case,[172] and we attributed little weight to this factor in our threat analysis.

As stated above, subject imports at current volumes and prices have not had any significant adverse effects on prices for the domestic like product in the United States.[173] We find no record basis for concluding that adverse price effects are likely to occur in the imminent future, particularly in light of record evidence indicating that stable or rising prices and a shortage in DRAMs supply world-wide are likely to continue into 2000 and perhaps beyond.[174] The effect of any underselling by subject imports during the investigation period has been greatly attenuated by differences in product mix, pricing practices, and ability to satisfy PC OEM qualification requirements, as well as by the small market share of subject imports.[175] Petitioner argues that, as the technology gap between Taiwan and other producers lessens, Taiwan producers increasingly will become qualified to supply the major consumers of DRAMs,

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[169] *See, e.g.*, Dean Takahashi, "Chip Industry Says It Will Post Strong Gains Through 2003," Wall Street Journal (Oct. 28, 1999); "Dataquest Warns Capital Spending Won't Keep Up With Chip Demand," Electronic Buyers' News, located on Nov. 2, 1999, at *http://www.ebnonline.com*; "Dataquest: Chip Industry Will Hit $250B by 2002," Electronic Buyers' News, located on Nov. 2, 1999, at *http://www.ebnonline.com*; Dean Takahashi, "Chip Industry Expected to Thrive for Years," Wall Street Journal (Oct. 28, 1999).

[170] CR at N-4 to N-6, PR at N-5 to N-7.

[171] Table VII-4, CR at VII-8, PR at VII-7; Table VII-5, CR at VII-9, PR at VII-8.

[172] TSIA Prehearing Brief at 55, Exhibit 15; Petitioner's Posthearing Brief Exhibit 6 at 2-3.

[173] *See supra* § II.C.

[174] *See, e.g.*, "Micron Technology Says Memory Chip Demand Overwhelming'," AFX News (Oct. 5, 1999) (citing Petitioner's Chief Executive Officer, Steve Appleton's observations that demand for the company's memory chips is "overwhelming" and all of the company's product lines are on allocation, and that given the "amount of volume of business we are turning away, I don't see any downward pressure on prices."); Brian Fuller, "Double-digit Chip Growth Forecast for Next Three Years," Semiconductor News, located on Nov. 2, 1999, at *http://www.eetimes.com*; Jonathan Cassell, "DRAM Market Back in Gear," Electronic News (Mar. 29, 1999), a copy of which is provided in Respondent's Prehearing Brief, Exhibit 7; Dean Takahashi, "Chip Industry Says It Will Post Strong Gains Through 2003," Wall Street Journal (Oct. 28, 1999); "Dataquest Warns Capital Spending Won't Keep up with Chip Demand," Electronic Buyers' News, located on November 2, 1999, at *http://www.ebnonline.com*; "Dataquest: Chip Industry Will Hit $250B by 2002," Electronic Buyers' News, located on Nov. 2, 1999, at *http://www.ebnonline.com*; Dean Takahashi, "Chip Industry Expected to Thrive for Years," Wall Street Journal (Oct. 28, 1999).

[175] *See supra* § II.A.

thereby reducing attenuating factors.[176] While we decline to speculate how quickly own brand Taiwan producers might become qualified suppliers to name brand PC OEMs, we find that in a market characterized by short supply and stable or rising prices, own brand Taiwan producers that are able to qualify for PC OEM sales would have little incentive to significantly undersell the domestic industry and, given their relative size, little ability to lead prices down in any event. Accordingly, we do not find that subject imports are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices or are likely to increase demand for further subject imports.

In light of the foregoing,[177] we do not find that subject imports are having or are likely to have negative effects on the development and production efforts of the domestic industry. Rather, as discussed above in our analysis of no present material injury, the domestic industry emerged from the downturn in its business cycle well-positioned to compete with subject imports.[178] Improving trends in prices that began in July 1999 are expected to continue in the imminent future.[179] Moreover, throughout the investigation period, the industry continued to increase capacity and invest in capital improvements and research and development.[180]

As noted earlier, three of the largest domestic name brand PC OEMs have recently entered into multi-year, multi-billion dollar supply agreements with domestic producers Micron and Samsung.[181] The willingness of these major consumers of DRAMs to enter into such agreements, which are unprecedented in this industry, lends credence to industry analysts' forecasts[182] of a continued tight supply of DRAMs and higher prices in the near future.[183]

Finally, there are no other demonstrable adverse trends that indicate the probability the domestic industry is likely to be materially injured by reason of subject imports.

Evaluating all of the relevant statutory threat factors, we find that the record indicates neither that substantially increased volumes of subject DRAMs are imminent nor that material injury by reason of subject imports would occur absent issuance of an antidumping duty order. Accordingly, we determine that the domestic DRAMs industry is not threatened with material injury by reason of subject imports from Taiwan.

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[176] Petitioner's Prehearing Brief at 73-75.

[177] *See also supra* § II.D.

[178] *See id.*

[179] *See, e.g.*, Jonathan Cassell, "DRAM Market Back in Gear," Electronic News (Mar. 29, 1999), a copy of which is provided in TSIA Prehearing Brief at Exhibit 7.

[180] *See supra* § II.D.

[181] *See supra* note 125.

[182] *See supra* note 170.

[183] The emergence of five-year, guaranteed supply agreements covering nearly a majority of a consumer's requirements, distinguishes the present situation from earlier unrealized optimistic forecasts referenced by petitioner. *See, e.g.*, Hearing Tr. at 96.

CONCLUSION

For the foregoing reasons, we determine that the domestic DRAMs industry is neither materially injured nor threatened with material injury by reason of imports of DRAMs from Taiwan that were found to be sold in the United States at less than fair value.

DISSENTING VIEWS OF CHAIRMAN LYNN M. BRAGG

I find that the domestic industry producing dynamic random access memory semiconductors (DRAMs) is materially injured by reason of imports of the subject merchandise from Taiwan which are sold in the United States at less-than-fair-value.

OVERVIEW

The record indicates that over the period of investigation ("POI"), subject imports entered the United States in increasingly significant volumes as prices for both domestic and subject merchandise dropped precipitously and financial losses in the domestic industry mounted. While there were several factors which contributed to the industry's financial losses, such as the Asian economic crisis and the presence of non-subject imports, I find that the volume of subject imports was significant, and that this volume had significant adverse price effects, particularly in the key 16 megabit product category, which resulted in a significant adverse impact on the domestic industry.

My determination is based primarily upon my finding that subject imports competed in all segments of the U.S. market, impacting both contract prices and prices in the spot market, and thereby significantly impeding the domestic industry's ability to generate adequate revenue streams. As a result, a majority of the domestic industry was forced to finance capital expenditures and research and development through debt accumulation rather than from cash flow accruing from operations, thereby adversely impacting credit ratings as well as the costs and availability of future funding.

ANALYSIS

I. LIKE PRODUCT

As I did in the preliminary determination, I define the domestic like product[1] consistent with the scope of the investigation as determined by the Department of Commerce, namely: all DRAMs, regardless of density, including cased and uncased DRAMs; DRAMs assembled into modules; and speciality DRAMs. I note that all parties support this like product definition.

II. DOMESTIC INDUSTRY

In the preliminary investigation, the Commission found that the domestic industry corresponded to producers of only a subset of the domestic like product. Specifically, the Commission included in the domestic industry companies that produce DRAM chips and/or assemble uncased DRAMs into cased DRAMs. Excluded from the domestic industry were companies that assemble cased DRAMs into

[1] 19 U.S.C. § 1677(10). In analyzing domestic like product issues, the Commission generally considers a number of factors including: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; and (4) customer and producer perceptions of the products.

memory modules (products which were included in the domestic like product definition) and "fabless" design houses.[2]

The Commission excluded module producers because these entities appeared to add little value to cased DRAMs and were relatively unsophisticated operations, in contrast to the extremely sophisticated fabrication facilities. Fabless design houses were excluded because the Commission determined that they did not manufacture the like product.

Based on the record in this final phase investigation, I determine that there is no new information which warrants deviating from the Commission's preliminary determination regarding the definition of the domestic industry. I therefore find that the domestic industry includes companies that fabricate and/or assemble DRAMs in the United States, but does not include module assemblers and/or fabless design houses.

III. RELATED PARTIES

Having defined the domestic industry, I next consider whether to exclude any domestic producers from the industry as related parties.[3] In the preliminary determination, the Commission excluded the domestic producer Mitsubishi from the domestic industry as a related party, finding that Mitsubishi's primary interests lie principally in importation rather than in domestic production.[4] Neither party addressed the issue of related parties in this final phase investigation.

Consistent with the Commission's preliminary determination, I find that the record in this final phase investigation supports the exclusion of Mitsubishi from the domestic industry as a related party based upon my finding that Mitsubishi's primary interests lie in importation of the subject merchandise.

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[2] Fabless design houses focus on the design stage of DRAM production and then contract out the production of DRAMs to foundry producers. A facility that fabricates DRAMs is called a "fab."

[3] Domestic producers are "related parties" if they import subject merchandise, or if they directly or indirectly control or are controlled by a subject foreign producer or exporter. 19 U.S.C. § 1677(4)(B). In appropriate circumstances, such related parties may be excluded from the domestic industry. The primary factors the Commission examines in deciding whether appropriate circumstances exist to exclude the related parties include:

(1) the percentage of domestic production attributable to the importing producer;
(2) the reason the U.S. producer has decided to import the product subject to investigation, i.e., whether the firm benefits from the LTFV sales or subsidies or whether the firm must import in order to enable it to continue production and compete in the U.S. market; and
(3) the position of the related producers vis-a-vis the rest of the industry, i.e., whether inclusion or exclusion of the related party will skew the data for the rest of the industry.

19 U.S.C. § 1677(4)(B).

[4] Mitsubishi's imports of subject merchandise rose from *** in 1995 and 1996 to *** percent of its domestic production in 1997 and *** percent of its domestic production in 1998. Table III-2, CR at III-13.

My review of the record further indicates that several other domestic producers may also be related parties.[5] I find, however, that the primary interests of each of these domestic producers lie in domestic production, not importation. I therefore determine that appropriate circumstances do not exist to exclude these producers from the domestic industry.

IV. CAPTIVE PRODUCTION

Data collected in this final phase investigation indicate that the domestic industry consumed approximately five percent of production (by volume) internally in 1998. I therefore considered whether the captive production provision applies to this final phase investigation.[6] [7] Upon review of the record, I determine that the volume of captive production evidenced in this investigation does not rise to the level of "significant," as required by statute.[8] Finding that the threshold criterion of "significant" captive production is not met, I determine that the captive production provision does not apply.[9]

V. MATERIAL INJURY BY REASON OF THE SUBJECT IMPORTS

For the reasons discussed below, I find that the domestic industry producing DRAMs is materially injured "by reason of" subject imports from Taiwan which are sold in the United States at less-than-fair-value.[10] In making this determination, as directed by statute, I have considered 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.[11] I have also evaluated all relevant economic factors within the context of the business cycle and other conditions of competition distinctive to the DRAMs industry.[12]

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[5] In addition to Mitsubishi, the following domestic producers may be considered related parties by virtue of their having: (1) imported subject merchandise during the POI; or (2) corporate or contractual relationships with Taiwan producers that involved direct of indirect control: ***.

[6] CR at III-19.

[7] 19 U.S.C. § 1677(7)(C)(iv).

[8] Neither the statute nor legislative history define what level of production is "significant." The SAA does state, however, that the Commission should determine "significance" on a case-by-case basis and that "[c]aptive production and merchant sales are significant if they are of such magnitude that a more focused analysis of market share and financial performance is needed for the Commission to obtain a complete picture of the competitive impact of imports on the domestic industry." SAA at 852.

[9] 19 U.S.C. § 1677(C)(iv).

[10] 19 U.S.C. § 1673d(b).

[11] 19 U.S.C. § 1677(7)(B)(i). The Commission "may consider such other factors as are relevant to the determination" but shall "explain in full its relevance to the determination." 19 U.S.C. § 1677(7)(B)(ii).

[12] 19 U.S.C. § 1677(7)(C)(iii).

A. **Conditions of competition**

A key condition of competition in the domestic DRAM industry is the DRAM life cycle (which lasts approximately three years). As each new succeeding generation of DRAM is introduced to the market, costs of production and, accordingly, selling prices, tend to be high. However, as production increases during the growth phase of the product cycle, costs and prices decline as producers move along the learning curve, lowering the incidence of defects and improving yields. In the mature phase of the product cycle, costs and prices are generally lowest. Thus, prices for each new generation of DRAMs are expected to decline sharply at the beginning of the cycle, followed by flatter trends as the generation matures.

As a result of the rapid technological advances associated with the DRAM life cycle, domestic producers must constantly make large investments in capital equipment and research and development to develop higher density DRAMs, increase production yields, and develop faster interface technologies. It is generally expected that as a result of these investments and subsequent production advances, domestic producers will generate the significant cash flow necessary to fund the ongoing investments. However, this can only occur if domestic producers are able to maximize profits in the early stage of a given cycle. If domestic producers are unable to maximize profits, for example as a result of unfair price competition in the early stage of the cycle, then domestic producers must seek alternate sources of funding for the development of succeeding products, likely at the cost of reduced credit ratings and higher interest payments.

During the preliminary phase, the Commission found that the period of investigation coincided roughly with the life cycle of the 16 megabit DRAM, with production switching from 4 to 16 megabit DRAMs early in the period, and from 16 to 64 megabit DRAMs at the end of the period. In this final phase of the investigation, domestic producers and importers continued to shift their focus from 16 megabit to 64 megabit DRAM production.

The next key condition of competition is the high degree of substitutability of subject imports with the domestic like product. The vast majority of questionnaire responses indicated that there are no perceived differences between subject imports and the domestic like product, and no perceived advantages for either category.[13]

DRAMs fabricated in Taiwan generally fall into two categories, which roughly define respective technology levels: (1) DRAMs produced in cooperation with a technology partner (tier one); and (2) DRAMs produced by fabricators using their own designs (tier two). Importantly, any distinguishing technology gap between tier-one and tier-two producers decreased significantly over the POI, as nearly all Taiwanese DRAM producers entered production and/or technology partnerships with leading global DRAM producers.[14] Tier-one producers sell a majority of their products to PC OEMs while tier-two

[13] CR at II-15.

[14] CR at VII-2.

producers sell mainly into the aftermarket (to customers with less stringent requirements, and those buying DRAMs incorporating older technologies).[15]

There are four main types of DRAM purchasers: brokers/distributors of cased or uncased DRAMs; module manufacturers; brokers/distributors of memory modules; and OEMs. According to responses to the Commission's questionnaires, sales of U.S.-produced DRAMs to OEMs accounted for at least *** percent of the total sales of three U.S. producers in 1999.[16] Each of these companies also made roughly *** percent of their sales to brokers or distributors, and their remaining sales to value-added resellers, module makers, and the aftermarket.[17] In contrast, responses from eight companies that imported DRAMs from Taiwan indicated that roughly 20 percent of their U.S. sales by volume went to OEMs, 55 percent of U.S. sales to value-added resellers/module manufacturers, and 25 percent to brokers or distributors.[18]

In addition, the record indicates that a majority of the firms that sold subject imports in the United States during the POI either sold subject imports to tier-one purchasers or are qualified suppliers to tier-one purchasers, directly contradicting respondents' claim that Taiwanese DRAM producers are not competitive in the U.S. tier-one market.[19]

Another important condition of competition in this investigation is that contract sales are often tied to prices in the spot market, where a majority of subject imports are sold. Any negative price effects in the spot market resulting from unfairly traded imports will directly impact contract prices. Consequently, domestic producers' contract sales tied to the spot market are directly affected by adverse price effects of unfairly traded subject imports sold into the spot market.

Finally, I note the recent supply agreements between Micron and Compaq and Micron and Gateway. The record does not establish that these supply agreements guarantee Micron a set price for its DRAMs sold to either Compaq or Gateway. Thus, these agreements cannot be relied upon to obviate adverse price affects resulting from the unfairly traded subject imports, particularly if these agreements are tied to spot market prices.

B. **Volume**

On a megabit basis, imports from Taiwan increased from 356,921 billion bits in 1996 to 2,464,169 billion bits in 1998, a 590 percent increase.[20] In addition, the market share in terms of quantity of subject imports increased from 4.7 percent in 1996 to 6.4 percent in 1998, before dropping to *** percent in interim 1999, compared to 5.3 percent in interim 1998, likely the result of the filing of the petition.[21]

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[15] CR at II-17-18. The non-PC OEM market is primarily comprised of memory board producers, small PC clone producers, manufacturers of equipment other than PCs, and value-added resellers.

[16] CR at II-1.

[17] CR at I-6.

[18] CR at I-6.

[19] See Table IV-3, CR at IV-7; CR at I-16, II-4, and II-5.

[20] Table IV-2, CR at IV-4; CR at IV-6.

[21] CR at IV-9.

As a share of value of total domestic DRAM sales, subject imports increased from 4.3 percent in 1996, to 6.2 percent in 1997, and then to 7.1 percent in 1998.[22] Between the interim periods, subject imports' share of value increased from 6.5 percent in interim 1998 to *** percent in interim 1999.[23] In addition, Taiwan's share of U.S. imports on a quantity basis rose during the period from roughly *** percent in 1996 to nearly *** percent in interim (January-June) 1999.[24]

The record also shows that the market share of non-subject imports was relatively steady during the POI. On a quantity basis, non-subject import penetration moved only slightly, from 64.7 percent in 1996 to 63.3 percent in 1998.[25] Between the interim periods, non-subject import market share declined from 65.7 in interim 1998 to *** percent in interim 1999.[26] I note, however, that the decline in non-subject market share between the interim periods is largely attributable to a reduction in the volume of DRAM imports from Korea. Accordingly, subject imports increased their market share at the expense of U.S. producers' market share and not non-subject import market share.

Based upon the foregoing, I determine that volume of subject imports is significant.

C. **Price**

The pricing information gathered by the Commission shows a pattern of substantial underselling for all Taiwanese products, extending across all product densities and including both the OEM and non-OEM markets.

Upon review of the full record in this final phase, I determine that given the coincidence of the POI with the 16 megabit product life cycle, the 16 megabit category is the clearest and most relevant indicator of the impact of subjects imports on domestic industry pricing. In 1996, as Taiwan was just beginning to ship 16 megabit DRAMs, subject imports of this product entered at average prices *** imports from Korea and Japan, and *** domestic prices.[27] As prices for this product from all sources continued to fall in 1997, Taiwan remained the ***.[28] By 1998, all prices had funneled together, reaching a low point before rising slightly in the first half of 1999, when Taiwan had the *** for this product.

Average unit values for subject merchandise product 2 (16 Megabit EDO DRAMs) sold to OEMs were priced below the average unit values for the domestic like product in every month in which comparisons could be made.[29] In addition, subject merchandise product 3 (16 Megabit Synchronous DRAMs) sold to OEM customers was priced below the price for the equivalent domestic like product in 18 of 20 months for which prices could be compared.[30]

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[22] CR at IV-9.
[23] CR at IV-9.
[24] CR at IV-5.
[25] CR at IV-10.
[26] CR at IV-10.
[27] See Table V-1-14, CR at V-8-24.
[28] See Table V-1-14, CR at V-8-24.
[29] CR at V-6.
[30] CR at V-6.

I also note that with respect to products 2 and 3 sold to non-OEM purchasers, margins were either mixed or indicated overselling by the subject imports. This finding is qualified, however, by the fact that the U.S. importer ***.[31]

There were also limited reported sales of Taiwan-fabricated products 4 and 5 (64 Megabit DRAMs) to OEM customers in the POI.[32] Taiwan-fabricated products 4 and 5 sold to OEM customers undersold domestic products in every month for which comparisons could be made.[33] Taiwan sales to non-OEMs of product 4 merchandise undersold the domestic product in 12 of 15 months in which comparisons could be made. Taiwan product 5 undersold the domestic product in 6 of 12 months.[34]

As a result of the pervasive underselling by subject imports over the POI, domestic average unit values decreased from $1.03 per million bits in 1996, to $0.43 per million bits in 1997, to $0.14 per million bits in 1998.[35] Between the interim periods, average unit values decreased from $0.17 per million bits in interim 1998 to $*** per million bits in interim 1999.[36] While one would expect prices to decline as a result of the DRAM life cycle, subject imports accelerated price declines, thereby depriving the domestic industry of the ability to generate adequate revenue streams for succeeding product development.

I find that the trend towards decreased patterns of underselling for the key 16 megabit category which occurred towards the latter part of the POI was partly a result of domestic producers abandoning this product category to the Taiwan imports as domestic producers accelerated the shift to a higher density generation in hopes of obtaining better returns. The trend towards pricing equilibrium is also attributable to domestic producers lowering their prices to match the prices of subject imports.

Based upon all the foregoing, I conclude that the significant volume of undersold subject imports have accelerated the normal price decline to be expected as a result of the DRAM cycle, thus resulting in significant price depression.

D. **Impact**

The combined net sales value of domestic DRAM producers decreased in each fiscal year, contributing to increasing operating losses in each year. The domestic industry reported operating losses of negative $68 million in 1996, negative $560 million in 1997, and negative $1.5 billion in 1998.[37] Between the interim periods, operating losses decreased from negative $841 million in interim 1998 to negative $182 million in interim 1999.[38] Only ***.[39] Net margins were negative 3.2 percent in 1996,

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[31] CR at V-6-7.
[32] CR at V-7.
[33] CR at V-7.
[34] CR at V-6.
[35] Table C-1, CR at C-4.
[36] Table C-1, CR at C-4.
[37] Table VI-1, CR at VI-2.
[38] Table VI-1, CR at VI-2.
[39] CR at VI-4.

negative 33.2 percent in 1997, and negative 79.4 percent in 1998.[40] Between the interim periods, net losses improved from negative 97.3 in interim 1998 to negative 13.2 in interim 1999.[41]

Next, I find that over the POI most of the domestic industry's capital expenditures were funded through debt accumulation rather than from cash flow accruing from operations. Therefore, the domestic industry became increasingly vulnerable because it cannot be expected to continue to fund capital expenditures via debt accumulation indefinitely. For example, ***.

Based on my finding that a significant volume of subject imports have depressed domestic prices to a significant degree, and because those price declines have materially contributed to large financial losses for the vulnerable domestic industry and compromised the industry's critical ability to fund the development of the succeeding generation of DRAMs, I find that the subject imports have had a significant adverse impact on the domestic industry. I therefore conclude that the domestic industry is materially injured by reason of the subject imports.

Finally, I find that the material injury by reason of the subject imports from Taiwan is distinct from, and cannot be attributed to, imports from other countries. On a value basis, domestic producers' market share fell from 30.3 percent in 1996 to 27.9 percent in 1998, while subject imports market share rose from 4.3 percent in 1996 to 7.1 percent in 1998.[42] In addition, in terms of both quantity and value, Taiwan's share of total U.S. imports rose during the POI, from roughly *** percent in 1996 to nearly *** percent in interim 1999, while the volume of non-subject imports remained relatively steady.[43]

CONCLUSION

Based on all of the foregoing, I find that the domestic industry producing DRAMs is materially injured by reason of imports of the subject merchandise from Taiwan sold in the United States at less-than-fair-value.

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[40] Table VI-1, CR at VI-2.

[41] Table VI-1, CR at VI-2.

[42] CR at IV-9.

[43] CR at IV-6.

PART I: INTRODUCTION

BACKGROUND

This investigation results from a petition filed by Micron Technology, Inc. (Micron), Boise, ID, on October 22, 1998 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 dynamic random access memory semiconductors (DRAMs) from Taiwan. Information relating to the background of the investigation is provided below.[1]

Date	*Action*
Oct. 22, 1998	Petition filed with Commerce and the Commission; institution of Commission investigation (63 FR 58066, Oct. 29, 1998)
Nov. 18, 1998	Commerce's notice of initiation (63 FR 64040)
Dec. 7, 1998	Commission's preliminary determination (63 FR 69304, Dec. 16, 1998)
May 28, 1999	Commerce's preliminary determination (64 FR 28983)
June 17, 1999	Commerce's amended preliminary determination (64 FR 32480)
June 17, 1999	Scheduling of final phase of Commission investigation (64 FR 32521, June 17, 1999)
Oct. 19, 1999	Commerce's final determination (64 FR 56308, Oct. 19, 1999)
Oct. 19, 1999	Commission's hearing[2]
Nov. 19, 1999	The Commission's vote
Dec. 2, 1999	Commission determination transmitted to Commerce

SUMMARY DATA

A summary of data collected in this investigation is presented in appendix C. Except as noted, U.S. industry data are based on questionnaire responses of 12 firms that accounted for nearly all U.S. production of DRAMs during January 1996-June 1999.[3] U.S. imports are based on responses to Commission questionnaires (see the section on U.S. Tariff Treatment).

PREVIOUS INVESTIGATIONS

Prior to the current investigation, the Commission conducted a number of investigations concerning DRAMs. These included both Title VII and unfair trade practices investigations.[4] In

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[1] Selected *Federal Register* notices cited in the tabulation are presented in app. A.

[2] See app. B for a list of witnesses that appeared at the hearing.

[3] One U.S. producer, ***, responded to the Commission's questionnaire but was unable to supply any data.

[4] See, U.S. International Trade Commission, *DRAMs of One Megabit and Above From the Republic of Korea (Views on Remand)* (Inv. No. 731-TA-556 (Remand)), USITC Pub. 2997, October 1996; *DRAMs of One Megabit and Above From the Republic of Korea* (Inv. No. 731-TA-556 (Final)), USITC Pub. 2629, May 1993; *Dynamic Random Access Memory Semiconductors of 256 Kilobits and Above From Japan* (Inv. No. 731-TA-300 (Preliminary)), USITC Pub. 1803, January 1986; and *64K Dynamic Random Access Memory Components From*

(continued...)

addition, in 1998 the Commission conducted investigations concerning a similar product, SRAMs (static random access memory semiconductors).[5]

SALES AT LTFV

In its final determination, Commerce found that the subject products from Taiwan are being, or are likely to be, sold in the United States at LTFV. The following tabulation provides the weighted-average margins (in percent ad valorem) and the weighted-average per megabit (Mb) rates (in dollars) determined by Commerce for companies subject to this investigation:

Exporter/Manufacturer	Margin percentage (ad valorem)	Per megabit rate (dollars)
Etron Technology	69.0	$0.40
Mosel-Vitelic	35.58	.12
Nan Ya Technology	14.18	.02
Vanguard	8.21	.01
All others	21.35	.04

U.S. TARIFF TREATMENT

The U.S. Customs Service ("Customs") policy for some time has been that, for tariff and marking purposes, the country of origin of imported DRAMs is the location of assembly rather than the location of wafer fabrication. Mounting (also referred to as packaging, assembly, or casing) of integrated circuit chips is considered to be a substantial transformation for both country-of-origin and marking purposes. Because this differs from the basis for identifying subject merchandise in this investigation (wafer fabrication), questionnaire responses are used in this report for import statistics rather than official statistics of the U.S. Department of Commerce.

Imports of DRAM wafers and uncut and cut dice are classified in HTS subheading 8542.13.80, a rate line that includes merchandise other than DRAMs (such as SRAM wafers, and uncut or cut dice); unmounted silicon chips, dice, and wafers are reported under the statistical category 8542.13.8005.[6] Imports of assembled or cased DRAMs fall into the same subheading but are reported under statistical

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[4] (...continued)
Japan (Inv. No. 731-TA-270 (Final)), USITC Pub. 1862, June 1986. Also, see U.S. International Trade Commission Invs. Nos. 337-TA-421, 337-TA-414, 337-TA-345, 337-TA-312, and 337-TA-242.

[5] See, U.S. International Trade Commission, *Static Random Access Memory Semiconductors From the Republic of Korea and Taiwan (*Invs. Nos. 731-TA-761-762 (Final)), USITC Pub. 3098, April 1998. Note: remand pending.

[6] Prior to 1996, DRAM wafers and uncut and cut dice were classified in subheading 8542.11.80 (statistical reporting number 8542.11.8001).

categories numbered 8542.13.8021 through 8542.13.8034.[7] Imports of DRAM memory modules are classified in subheadings 8473.30.10 through 8473.30.90 of the HTS, which cover parts and accessories of automatic data processing machines and units thereof and related machines. The normal trade relations (NTR) tariff rate, applicable to imports from Taiwan, for all subheadings identified is free, as set forth in rates of duty column 1-general.

THE PRODUCT

In the "Scope of Investigation" section of its notice of initiation, Commerce stated that--

The products covered by this investigation are DRAMs from Taiwan, whether assembled or unassembled. Assembled DRAMs include all package types. Unassembled DRAMs include processed wafers, uncut die, and cut die. Processed wafers fabricated in Taiwan, but packaged or assembled into finished semiconductors in a third country are included in the scope. Wafers fabricated in a third country and assembled or packaged in Taiwan are not included in the scope.

The scope of this investigation includes memory modules. A memory module is a collection of DRAMs, the sole function of which is memory. 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 DRAMs whether mounted or unmounted on a circuit board. Modules that contain other parts that are needed to support the function of memory are covered. Only those modules that contain additional items that alter the function of the module to something other than memory, such as video graphics adapter ("VGA") boards and cards, are not included in the scope. Modules containing DRAMs made from wafers fabricated in Taiwan, but either assembled or packaged into finished semiconductors in a third country, are also included in the scope.

The scope includes, but is not limited to, video RAM ("VRAM"), Windows RAM ("WRAM"), synchronous graphics RAM ("SGRAM"), as well as various types of DRAM, including fast page mode ("FPM"), extended data-out ("EDO"), burst extended data-out ("BEDO"), synchronous dynamic RAM ("SDRAM"), and "Rambus" DRAM ("RDRAM"). The scope of this investigation also includes any future density, packaging or assembling of DRAMs. The scope of this investigation does not include DRAMs or memory modules that are reimported for repair or replacement.

The DRAMS subject to this investigation are currently classifiable under subheadings 8542.13.80.05, 8542.13.80.24 through 8542.13.80.34 of the Harmonized Tariff Schedule of the United States ("HTSUS"). Also included in the scope are Taiwanese DRAM modules, described above, entered into the United States under subheading and (sic) *8473.30.10.90 of the HTSUS or possibly other HTSUS numbers.*

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[7] Prior to 1996, assembled or cased DRAMs were classified in subheading 8542.11.80 (statistical reporting numbers 8542.11.8021 through 8542.11.8034). See also the discussion on the following page concerning coverage differences at the 10-digit statistical level.

Although the HTSUS subheadings are provided for convenience and customs purposes, the written description of the scope of this investigation is dispositive.[8]

Although the language used by Commerce in the "Scope of Investigation" section of its initiation notice does not use the term "one megabit and above," the notice earlier states that "petitioner alleges that imports of dynamic random access memory semiconductors of one megabit and above ("DRAMs") from Taiwan . . ." Thus, Commerce first uses the acronym "DRAMs" in its initiation notice to refer apparently only to those semiconductors of one megabit and above. Moreover, the HTS provisions cited by Commerce omit statistical reporting numbers 8542.13.8021, 8542.13.8022, and 8542.13.8023, all of which provide for DRAMs of varying densities, but all of which are under one megabit in density. In addition, in both its preliminary and final determinations, Commerce specifically refers to DRAMs of one megabit and above. Accordingly, for purposes of presentation in this report, "subject" DRAMs from Taiwan are those of one megabit and above and "nonsubject" DRAMs from Taiwan are those below one megabit.

The following sections present information on both imported and domestically produced DRAMs, as well as information related to the Commission's "domestic like product" determination.[9] A glossary of terms is presented in appendix D.

In its preliminary determination,[10] the Commission found one like product consisting of "all DRAMs," irrespective of density, whether cased or uncased, and including DRAMs mounted on memory modules and specialty DRAMs.

Physical Characteristics and Uses

DRAM is a class of volatile semiconductor memory that allows data to be both read from and written to the device's storage locations in a non-linear fashion. DRAMs use a memory or storage cell structure based on a transistor and capacitor combination in which digital information is represented by a charge stored on each of the capacitors in the memory array. Storage requires two different levels of energy, one to represent the binary digit (bit) "0" and another to represent the binary digit "1." DRAM gets the name "dynamic" from the fact that the capacitors are imperfect and will lose their charge unless the charge is repeatedly replenished (refreshed) on a regular basis (every few milliseconds) by externally supplied signals.

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[8] In its final determination, Commerce amended its scope language to include "removable memory modules placed on motherboards, with or without a central processing unit, unless the importer certifies with Customs that neither it, nor a party related to it or under contract to it, will remove the modules from the motherboards after importation." This addition was made "in response to the petitioner's concerns about circumvention of any antidumping duty order issued in this proceeding."

[9] 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.

[10] U.S. International Trade Commission, *DRAMs of One Megabit and Above From Taiwan* (Inv. No. 731-TA-811 (Preliminary)), USITC Pub. 3149, Dec. 1998.

Storage cells in DRAMs are arranged in a matrix of columns and rows allowing each cell to be accessed independently (random access) and in the same amount of time. When a column or row is selected and activated, the cell transistor acts as a solid-state switch that connects the capacitor to the column. The simultaneous selection of a row and column determines the specific cell address. The speed at which the cell can be addressed is called access time and is expressed in nanoseconds (ns), or one-billionths of a second. DRAMs sold in the U.S. market are largely designed with access times ranging from 50ns to over 100ns.[11]

In the early 1970s, DRAM semiconductors (chips) with a density of 1,024 storage cells or bits per chip (1 kilobit or 1 Kb) were introduced. Since then, improvements in semiconductor processing and circuit design have allowed for continued increases in density. The density progression of DRAM chips has typically followed the "rule of four," according to which the cost of development of a new density generation can be justified only by a factor-of-four increase in that density. A 1 megabit, or 1 Mb DRAM, is an integrated circuit (IC) with 1,048,576 bits (1,024 bits squared). It was first offered for sale in limited quantities in 1985 and followed the introductions throughout the 1970s and 1980s of 4 Kb, 16 Kb, 64 Kb, and 256 Kb DRAMs, respectively. In 1989, DRAMs with a density of 4 Mb were introduced, followed by 16 Mb chips in 1991 and 64 Mb chips in 1994. Certain global producers are shipping 128 Mb chips, and 256 Mb products are on the way. Currently, in terms of value, 16 Mb and 64 Mb DRAMs account for the largest part of the market.[12]

Included in the scope of Commerce's investigation are several DRAM types that are offshoots of standard DRAMs but which still use the basic DRAM storage cell structure. First, enhanced addressing modes have been specifically included, such as fast page mode (FPM), extended data out (EDO), burst extended data out (BEDO), synchronous dynamic RAM (SDRAM), and Rambus DRAM (RDRAM). These DRAM products are basically improvements over one another in terms of the speed with which the memory is able to be accessed, thereby affording enhanced communication with ever-advancing microprocessors.[13] In addition, several specialty DRAM products have been specifically included: video RAM (VRAM), Windows RAM (WRAM), and synchronous graphics RAM (SGRAM). VRAM, WRAM, and SGRAM are DRAM products whose functions have been optimized for use in specific

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[11] McGraw-Hill Inc., "Semiconductor Memories" and "Computer Memory," *McGraw-Hill Multimedia Encyclopedia of Science and Technology* (U.S.A.: McGraw-Hill, 1996).

[12] Integrated Circuit Engineering (ICE), Howard Dicken, David Hillis, Ravi Krishnan, Sabina Prioletta, and Lita Shon-Roy, editors, *Mid-Term Status 1998* (Scottsdale, AZ: ICE, 1998), pp. 7-43 to 7-51. According to ICE, certain DRAM producers may forego the traditional rule-of-four increase in density for the next product generation. Instead of moving directly from 64 Mb chips to 256 Mb chips, certain DRAM producers are producing 128 Mb chips as a bridge to the 256 Mb generation. ***. See Memo to Record, Aug. 10, 1999.

[13] FPM is the oldest of these technologies and RDRAM the newest. Generally, each of these products is considered to have been an improvement on its predecessors, and over time the newer technologies replace the older technologies. Currently, SDRAM is the most widely used technology, with EDO being phased out and RDRAM being introduced.

applications.[14] In general, these products have been configured to provide enhanced performance over regular DRAM in computer video and graphics applications.[15]

Also included in the scope are DRAM memory modules.[16] A DRAM memory module is a packaging arrangement generally consisting of a printed circuit board containing two or more DRAMs as well as supporting components such as capacitors and logic devices.[17] The most common types of DRAM memory modules are single in-line processing modules (SIPs), single in-line memory modules (SIMMs), dual in-line memory modules (DIMMs), memory cards, and memory boards.[18] Modules provide a packaging arrangement for DRAMs that allows for their attachment and interconnection (in most applications) with a computer's main circuit board.[19]

DRAMs and DRAM modules are used as the main memory in a variety of electronic products including computers and computer peripherals, telecommunications equipment, networking equipment, and consumer electronics devices. By far the largest use for DRAMs and DRAM modules is as the main memory in computer equipment.[20]

Manufacturing Processes, Facilities, and Employees

The manufacture of DRAMs is a highly capital-intensive and automated process. Starting with silicon wafers,[21] the DRAM manufacturing process can be divided into three stages: design, fabrication, and assembly and test.[22] The design of the circuit layout for a DRAM often requires highly skilled

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[14] According to the petitioner, these products account for a relatively small share of the overall DRAM market. Conference transcript, p. 36.

[15] Neil Randall, "A RAM Primer," *PC Magazine*, Oct. 21, 1997, pp. 267-268.

[16] Memory modules are usually measured in terms of bytes, rather than bits. There are eight bits in a byte. Therefore, a 32 megabyte DRAM module could potentially incorporate four 64-megabit DRAMs or sixteen 16-megabit DRAMs.

[17] DRAM memory modules may also contain other parts. If those other parts change the function of the module to something other than memory, such as video graphics adapter boards and cards, they are excluded from the scope of the investigation.

[18] Both the petitioner and respondents estimate that the DRAM chips incorporated in a DRAM memory module account for approximately 90-95 percent of the value of the module. Conference transcript, pp. 37 and 80.

[19] Petitioner's postconference brief, p. 7.

[20] According to petitioner and respondents, approximately 90 percent of DRAMs are incorporated into computer systems. Conference transcript, pp. 35 and 79. According to ICE, a market research firm, over 75 percent of DRAMs are ultimately incorporated into computer systems.

[21] Wafer preparation entails the chemical transformation of sand (silicon dioxide) into highly pure polysilicon and then into silicon wafers. Most U.S. DRAM fabricators purchase their silicon wafers from third parties and begin the DRAM manufacturing process at the design stage.

[22] This description of DRAM manufacturing draws upon material from Motorola Corp., "The Making of a Semiconductor" (faxed to USITC staff on July 29, 1996); Harris Semiconductor, *How Semiconductors are Made*, found at *http://www.semi.harris.com/docs/lexicon/manufacture.html*, retrieved Jan. 6, 1997; and Crucial Technology, "Micron Makes Memory. Here's How," found at *http://www.crucial.com/library/manufacturing.asp*, retrieved Nov. 15, 1998.

technical employees, computer hardware, and computer-aided design software.[23] During this process, the circuit patterns are transferred to glass photomasks, one for each layer of the DRAM. It is at the design stage that decisions are made relating to the essential characteristics and functions of the DRAMs.

The fabrication process is very automated and extremely capital intensive, with the cost of a new fabrication facility (and equipment) currently estimated at well over $1 billion. DRAMs are produced on a single wafer of highly purified silicon, usually 6 or 8 inches in diameter. The process of fabricating DRAMs on a silicon wafer entails the use of photomasks and photolithographic and etching equipment to "expose" circuit patterns onto the surface of the wafer. Chemical impurities (dopants) are introduced to form conducting and non-conducting regions on the wafer by changing the electrical characteristics of certain areas. The wafers are cleaned, deposition equipment is used to build up additional surface layers, and the process begins again. A typical DRAM will have multiple layers. Metal connections between selected regions of each die are formed and a final protective coating is applied to the wafer. According to the petitioner, the process cycle often takes about 90 days to complete.[24] It is in the wafer fabrication stage that the electrical and technical characteristics of the individual DRAMs (dice or chips) are developed. Depending on the diameter of the wafer and the size of the individual die, hundreds of identical DRAMs 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, the DRAMs are assembled and further tested. Assembly includes the separation of the wafer into individual chips, wire bonding metal leadframes to the chips, solder plating the metal leads, trimming and forming the leads into a desired shape, and encapsulating the chips in either plastic or ceramic.[25] After assembly, the assembled (or cased) chips are given final tests to ensure quality and reliability and marked for identification purposes. Although test and assembly is quite automated, it is relatively labor intensive compared to fabrication and may be conducted in a lower labor-cost third country.[26]

The manufacturing process for DRAMs of different densities or addressing modes, as well as that for specialty DRAMs (VRAM, SGRAM, and WRAM), is essentially the same. Producing different types of DRAMs requires the use of a different mask set during wafer fabrication, but otherwise the same equipment, processes, and production workers are utilized.[27] While certain manufacturers maintain

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[23] "Fabless" DRAM companies concentrate on the design stage. The fabrication stage is contracted out by the fabless company to a "foundry" producer. The foundry producer fabricates the DRAMs, including any prototyping and test run, using the fabless company's design. The assembly stage is also contracted out by the fabless company and can be conducted by the foundry or by a third party. ***, telephone interview with USITC staff, Mar. 6, 1998.

[24] Hearing transcript, p. 96.

[25] E-mail from ***, Jan. 20, 1998.

[26] This delineation of the manufacturing process is referred to as production sharing. For a more detailed explanation of production sharing in semiconductors, see USITC, *Production Sharing: Use of U.S. Components and Materials in Foreign Assembly Operations, 1993-1996* (Inv. No. 332-237), USITC Pub. 3077, December 1997, pp. 3-31 to 3-35. According to petitioner, the cost of constructing an assembly facility would be approximately $50 million. Petitioner's posthearing brief, attachment 6.

[27] Conference transcript, pp. 36 and 80. In addition, the DRAM production process is basically identical for

(continued...)

facilities and production workers dedicated solely to the production of DRAMs, many manufacturers (domestic and in Taiwan) employ their fabrication facilities and personnel in the production of both DRAMs and other semiconductor products such as SRAMs and logic devices.[28]

DRAMs are basically a commodity product. As such, in the DRAM industry great effort is dedicated to maximizing the number of good chips produced per wafer. The higher the number of good DRAMs per wafer, the lower the price that the company can feasibly charge. One way of raising the number of good dice per wafer, the wafer yield, is through improvements in processing to reduce the percentage of defective dice. Such improvements usually occur over the production life of a chip design. Wafer yields generally are low at the introduction of a new density generation and improve over its lifetime.

Of equal, or perhaps greater, significance is the constant effort by producers to generate "die shrinks." A die shrink is a process that results in smaller chip or die sizes. By developing smaller dice, producers are able to fabricate more dice on a given wafer. With the relatively constant cost of processing a wafer, regardless of the number of dice, reducing die size allows for reduced per-unit production costs and increased competitiveness. Die shrinks are often achieved through improving designs to use on existing equipment, by purchasing and utilizing newer equipment capable of producing smaller device sizes, or a combination of the two. As a result of the drive to achieve die shrinks, fabrication facilities are in a constant state of having to upgrade their equipment to remain competitive. In 1996, the industry standard process technology/device geometry being used was approximately 0.35μ (micron or millionth of a meter). By 2000, process technology for DRAMs is expected to be around 0.18-0.22 micron.[29]

According to ***,[30] "Module assembly is a straightforward process whereby cased DRAMs are placed onto a small piece of printed circuit board. In the first stage of the module assembly operation, the printed circuit board is put through a screen printer and then a glue machine which places an adhesive on the board. Next an automated pick and place machine selects the appropriate DRAM components, plus associated logic components and capacitors as required, and positions them in the correct positions on the board. In the next stage the modules are placed in a reflow oven, which causes the solder on the leads of the components to adhere to the printed circuit board. In the final stages the modules are put

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[27] (...continued)
both domestic and Taiwan manufacturers. Both industries use silicon wafers as the basic raw material, and both industries utilize similar photolithographic, diffusion, and etching equipment.

[28] Questionnaire responses of ***.

[29] Integrated Circuit Engineering (ICE), Bill McClean, ed., *Mid-Term Status 1996* (Scottsdale, AZ: ICE, 1996), pp. 8-45 and Credit Suisse First Boston (Hong Kong) Limited, "Taiwan DRAM Industry: A Global Perspective," July 19, 1999. The numerical rating of the process technology refers to the feature or device size that can be attained during fabrication. The smaller (or finer) the feature size, the smaller the size of the entire DRAM. Therefore, smaller feature sizes result in more DRAMs per wafer. Also, smaller feature sizes often result in faster DRAMs because the electronic signals then have shorter distances to travel.

[30] Preliminary questionnaire response of ***.

through a wash cycle that removes any excess residue of flux or paste, and then are tested in module test machines. This process is probably the least sophisticated of any of the manufacturing processes."[31]

Interchangeability

DRAMs of similar density, access speed, and variety (regular DRAM, VRAM, SGRAM, etc.) are generally interchangeable regardless of the origin of fabrication.[32] A 64 Mb SDRAM manufactured in Taiwan should be fully interchangeable with a similarly configured domestically produced device, as well as with a nonsubject import.[33] Substitutability also exists between similarly configured DRAMs of different density, but to a more limited degree.[34] For example, in regard to their use in a memory module, four 16 Mb SDRAMs should be interchangeable with one 64 Mb SDRAM.[35] In addition, though perhaps less common, a limited degree of interchangeability appears to exist among different varieties of DRAMs as well as among those with different addressing modes/access speeds. According to the petitioner, specialty DRAMs and commodity DRAMs are largely substitutable. However, it appears that this substitution must often occur before the system has been designed.[36] For example, according to numerous questionnaire responses, once a system has been designed to operate using a specific type of DRAM such as SGRAM, the system would likely not function optimally using VRAM, WRAM, or commodity DRAM. Similarly, in regard to the different addressing modes, once a memory controller has been designed for an electronic system, a specific addressing mode such as EDO or Rambus has also been designed in.

Questionnaire responses indicated that there is no other product that is generally substitutable for DRAMs. Several responses cited certain other semiconductor products that might be substituted for DRAMs, but, these products were identified as being too expensive relative to DRAMs, or they had not achieved sufficient densities or adequate access speeds.[37]

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[31] According to petitioner, the cost of constructing a module assembly facility is approximately $1 million. Petitioner's posthearing brief, attachment 6.

[32] Questionnaire responses. Responses in a number of questionnaires have identified the necessity of qualifying a DRAM product with original equipment manufacturers (OEMs). The qualification process generally requires the DRAM producer to provide the customer with samples to use as test devices in the customer's equipment. Without qualification, the ability to quickly substitute one producer's DRAM for another producer's would be hampered.

[33] Various questionnaire responses. The largest nonsubject sources of DRAM imports into the United States are Korea and Japan.

[34] Practical interchangeability often occurs between DRAMs one density generation removed (e.g., 4 Mb chips for 16 Mb chips, or 16 Mb chips for 64 Mb chips).

[35] Conference transcript, p. 24. In certain high density modules (those in excess of 32 megabytes (256 Mb)) 16 Mb DRAMs may no longer be substitutable for 64 Mb DRAMs. Conference transcript, p. 69. For example, a 64 megabyte (512 megabit) module would require 32 16-Mb chips, but only 8 64-Mb chips. At a certain point, memory modules may not have sufficient board space to accommodate additional chips. However, personal computers usually come with a number of memory module slots, and the user may well substitute two 32 megabyte modules containing 16 Mb DRAMs for one 64 megabyte module containing 64 Mb DRAMs.

[36] Conference transcript, pp. 35-36, and questionnaire response of *** (p. 36).

[37] Producer questionnaire responses of ***.

Producer and Customer Perceptions

Taiwan producers have noted several differences in the perception of their DRAM products versus those manufactured domestically. Respondents argued in the preliminary phase of the investigation that the DRAM industry in Taiwan could be divided into two tiers.[38] First-tier producers are often contract manufacturers that obtain leading-edge technology and designs from and manufacture on behalf of third parties, usually large Japanese DRAM producers. Reportedly, DRAMs from first-tier producers compete directly with domestically produced DRAMs for sale to tier-one OEM customers, primarily large computer manufacturers.[39] Second-tier producers in Taiwan are those that have developed their own DRAM products without outside assistance, and generally market their products under their own brand names. Respondents claim that DRAM products from second-tier Taiwan producers lag domestic products in both technology and density. Respondents argue that much of the tier-two production is in 16 Mb EDO DRAMs and does not compete with the bulk of U.S. production, which is in newer 64 Mb SDRAMs. As such, respondents argue that tier-two products from Taiwan are typically perceived as lower end products, lagging in technology and density, lacking in brand name recognition, and relegated to a separate tier of customers.[40]

The majority of U.S. producers generally perceive no difference between similarly configured domestically produced DRAMs and those produced in Taiwan.[41] Petitioner views domestic and Taiwan-produced DRAMs as interchangeable and competitive with one another in the market. Petitioner claims that it sells into both the first- and second-tier markets and that in both it faces direct competition from Taiwan producers.[42] However, two other domestic producers stated that differences in quality existed.[43] In addition, one U.S. producer noted that domestically produced DRAMs likely used newer technology than their Taiwan-produced counterparts, and that certain high performance DRAMs are not always available from Taiwan suppliers.[44]

On the part of importers, there appears to be little difference in the perception of Taiwan-fabricated DRAMs and similarly configured DRAMs fabricated in the United States. The vast majority of questionnaire responses indicated that there are no perceived differences between the domestic and subject products, and no perceived advantages for either product. However, a couple of importers did identify differences in perception, noting that U.S.-produced DRAMS are often of higher density and newer technology, and had brand name recognition, while Taiwan producers offer primarily older

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[38] Conference transcript, pp. 68-73. See Part VII: Threat Considerations, for a further discussion of Taiwan's tier-one and tier-two producers.

[39] Ibid., p. 68.

[40] Ibid., pp. 65-75.

[41] Questionnaire responses of U.S. producers.

[42] Conference transcript, pp. 94-96.

[43] Preliminary phase questionnaire responses of ***.

[44] Preliminary phase questionnaire response of ***.

technologies and lower densities.[45] In addition, one importer stated that Taiwan is the only source for older generation densities.[46]

Channels of Distribution

Both U.S.-produced and Taiwan-fabricated DRAMs are sold to a variety of customers, including OEMs, distributors, brokers, and value-added/aftermarket resellers. The petitioner states that all varieties of DRAMs covered by the investigation (commodity DRAM, WRAM, VRAM, and SGRAM), as well as the various DRAM addressing modes (FPM, EDO, SDRAM, etc.) share the same channels of distribution and are sold primarily to OEMs and distributors.[47] The petitioner further argues that both U.S.-produced DRAMs and the subject imports are sold to a significant degree in all market segments, including the OEM and spot markets, and to all types of customers.[48]

The respondents stress that Taiwan-fabricated DRAMs sold in the United States are divided into two distinct channels of distribution. They state that DRAMs manufactured by tier-one Taiwan producers are sold directly to the advanced OEM market, consisting of brand name PC producers (such as Compaq, Dell, and IBM) and related OEM customers that require qualified sources of supply.[49] The respondents assert that while DRAMs manufactured by Taiwan joint ventures and foundries that produce on behalf of third parties are sold in this channel, the United States, Japan, and Korea dominate the tier-one U.S. market.[50] Reportedly, *** [51] of Taiwan DRAMs are fabricated by tier-two producers, who have not qualified to participate in the aforementioned market segment. These DRAMs are shipped to tier-two customers that do not have the advanced technological requirements of the major OEMs.[52] These customers consist of memory board producers, small PC clone producers, and value-added resellers.[53] According to the respondents, U.S. producers do not significantly compete for tier-two customers.[54]

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[45] Importer questionnaire responses of ***.

[46] Importer questionnaire response of ***.

[47] Petition, p. 6.

[48] Conference transcript, pp. 94-95.

[49] Ibid., pp. 55-56, and postconference brief of Taiwan Semiconductor Industry Association, Vanguard International Semiconductor Corp., and Mosel Vitelic Corp. (White & Case postconference brief), p. 11.

[50] Conference transcript, p. 55, and White & Case postconference brief, p. 12.

[51] According to the respondents, in 1998 tier-one and tier-two companies in Taiwan accounted for about *** and *** of all wafer starts, respectively. White & Case postconference brief, p. A-7.

[52] Conference transcript, p. 54. The respondents argue that tier-two Taiwan suppliers compete only in the tier-one market for "legacy" product, which most major global suppliers no longer produce. The petitioner states that Micron has been a significant player in the market for 16 Mb DRAMs, characterized by the respondents as legacy product. Conference transcript, pp. 71 and 95, and petitioner's postconference brief, p. 33.

[53] Conference transcript, p. 55, and White & Case postconference brief, p. 11.

[54] White & Case postconference brief, pp. 1 and 15.

According to questionnaire responses, sales of U.S.-produced DRAMs to OEMs[55] accounted for at least *** percent of the total sales of three U.S. producers in 1998. Each of these companies made roughly *** percent of their sales to brokers or distributors and the rest to value-added resellers, module makers, and the aftermarket.[56] Responses from eight companies that imported DRAMs primarily or exclusively from Taiwan reveal that roughly 20 percent of their U.S. sales (by volume) were directed to OEMs, 55 percent to value-added resellers/module manufacturers, and 25 percent to brokers or distributors.[57] Respondents argue that differences in customers exist even within OEM sales, claiming that most of domestic OEM sales are for main memory to tier-one computer manufacturers while end users of Taiwan product are generally makers of add-on cards, memory modules, buffer memory for hard disc drives, processors, and memory for graphics.[58] The methods by which domestic product and subject imports are sold appear to vary. According to questionnaire responses of three domestic producers, roughly *** to *** percent of domestic DRAMs are sold under contract, while *** to *** percent are sold into the spot market. By comparison, approximately *** percent of subject imports are sold under contract, while *** percent are sold into the spot market.

Price

DRAMS are considered commodity products and compete largely on the basis of price. The DRAM industry is highly cyclical, with short product life cycles. In the short term, prices may differ for technologically advanced or specialty DRAMs,[59] which begin their life cycles as high-margin products. However, as products exit the introductory phase of their cycle and an increasing number of suppliers join the market, DRAMs are rapidly transformed into commodity goods. Largely because of the perpetual improvements in production efficiencies experienced by this industry, prices are usually in a near constant decline. Petitioner states that in an average year, prices are expected to drop by approximately 20 percent.[60] [61]

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[55] In its questionnaire instructions, the Commission defined OEMs (original equipment manufacturers) as manufacturers of computers, servers, telecommunications equipment, and consumer electronics equipment. When respondents are discussing brand name PC OEMs, they are often referring to a subset of OEMs as defined by the Commission.

[56] Producer questionnaire responses of ***. These producers accounted for approximately *** of U.S. DRAM fabrication in 1998, by volume. Other U.S. producers were unable to complete this portion of the questionnaire in a usable fashion because these producers send their unfinished U.S. DRAMs abroad for further processing. When they return to the United States, products from these firms are captured on importer questionnaires. However, these firms often also import non-U.S. fabricated product, so that their responses on the importer questionnaire may include domestic product, subject imports, and nonsubject imports.

[57] Questionnaire responses of ***.

[58] Respondents' posthearing brief, pp. Q-17 and Q-18.

[59] Conference transcript, p. 36.

[60] Hearing transcript, p. 46.

[61] Differential pricing for different density generations has an effect on the volume of shipments of those generations and typically follows a set pattern. When a newer generation product (for example the 64 Mb chip) drops in price to where it is in parity on a per-bit basis with the previous generation's product (the 16 Mb chip), it then becomes the leading volume product and shipments decline of the older generation product.

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

MARKET SEGMENTS/CHANNELS OF DISTRIBUTION

Domestic producers and importers of DRAMs and memory modules consume them in the production of downstream products or sell the DRAMs to four main types of customers: brokers/distributors of cased or uncased DRAMs, module manufacturers, brokers/distributors of memory modules, and original equipment manufacturers (OEMs).[1] Relatively few DRAMs are sold directly to retail customers by domestic fabricators or importers.

The computer industry is the largest consumer of DRAMs. Approximately 90 percent of DRAMs are consumed in the production of computers and computer parts. The remaining 10 percent are sold to manufacturers of telecommunications equipment, and other consumer and industrial electronics products. Name brand computer manufacturers are the largest consumers of DRAMs. These "major PC OEMs consume about 60 percent of the DRAMs in the market."[2] DRAMs are also consumed by module manufacturers producing add-on video graphics adapters and other electronic devices which are not subject products, or memory modules which are subject products.

New DRAMs with a higher density or new address mode are first adopted by the computer segment of the market, particularly manufacturers of workstations, mainframes, and other high-end computers.[3] The per-unit cost of a new DRAM falls during the "ramp-up" phase, in which producers increase production and yield. The industry-standard DRAM used by OEMs of personal computers generally has the lowest per-bit cost. This can lead manufacturers of other products to also switch to the new generation. Domestic producer *** reports that "(t)o achieve the lowest cost/bit, most applications (independent of performance requirements) have migrated towards the memory architecture adopted by personal computers."[4]

Throughout most of the period examined, the 16 Mb DRAM offered the lowest cost per bit, and this density accounted for the largest volume of sales. The per-bit price for the 4 Mb DRAM was slightly higher for most of 1996, and considerably higher for the remainder of the period. The 64 Mb DRAM was first sold in commercial volumes early in 1998, and the per-bit price dropped to below that for the 16 Mb DRAM in mid-1998. Figure II-1 shows the average reported per-megabit selling price for three common configurations of DRAMs sold by domestic producers to OEM customers during the period of investigation: a 4 Mb (256 Kb x 16 extended data out (EDO)), a 16 Mb (4 Mb x 4 EDO), and a 64 Mb (4 Mb x 16 synchronous).

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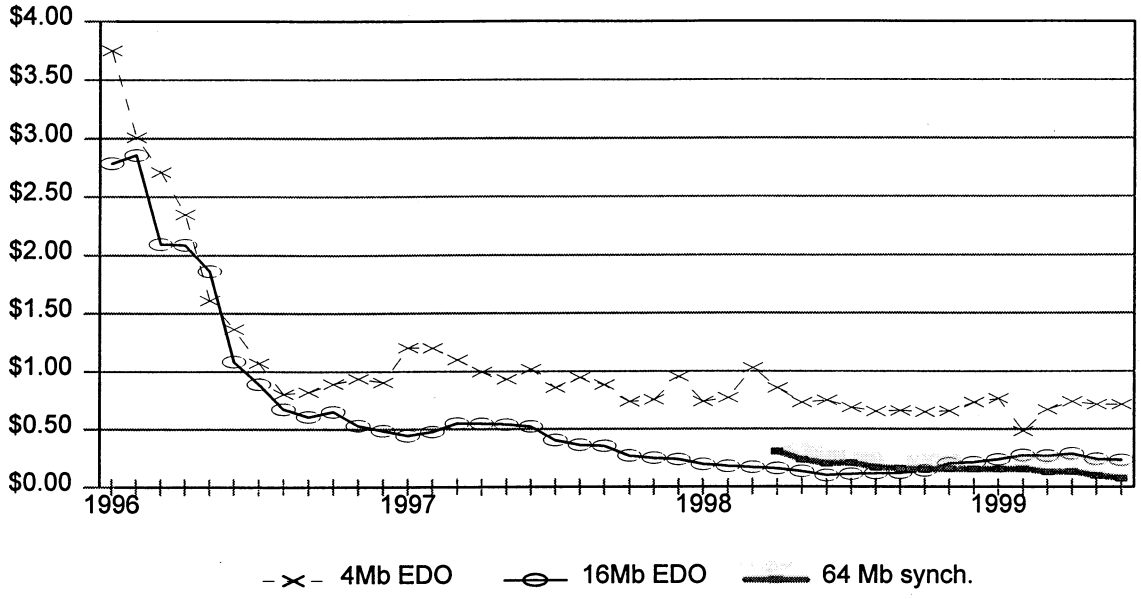
[1] OEMs include name brand personal computer (PC) manufacturers, non-name brand PC manufacturers, and manufacturers of other computer equipment, telecom, and consumer electronics products.

[2] Conference transcript, p. 23.

[3] *DRAM End-Use*, pp. 41-47, Semico Research Corp.

[4] ***'s response to Commission producer questionnaire.

Figure II-1
DRAMs: Reported per-megabit prices for U.S. producers' OEM sales of 4 Mb (256 Kb x 16 EDO), 16 Mb (4 Mb x 4 EDO), and 64 Mb (4 Mb x 16 synchronous) DRAMs



Source: Compiled from responses to Commission questionnaires.

There is evidence that the market for DRAMs is becoming more diverse, with some consumers continuing to demand DRAMs that are no longer the industry standard for main computer memory. Manufacturers of computer accessories such as *** use lower density DRAMs and more mature technologies than those used for computer main memory.[5] Manufacturers of communications equipment such as *** also take longer to adopt higher density DRAMs.[6]

The very different requirements of different segments of the market may explain the diversity of views regarding the product life cycle of DRAMs. Domestic producer *** and importers *** report that the average life cycle of a generation of DRAMs has shortened. Purchaser *** reported that "oversupply and unprofitable pricing leads to shortened product life cycles. This occurs because manufacturers must try to regain profitability by introducing new, more expensive devices as quickly as possible. Essentially, DRAM manufacturers shorten the life cycle of existing products by forcing new products on the market."[7] Importer ***, however, reported that the life cycle has increased, and importer *** reported that some customers have indicated that they will demand 4 Mb DRAMs for 5 more years.[8]

[5] Response to Commission questionnaires.

[6] Response of *** to Commission purchaser questionnaire.

[7] Response to Commission questionnaire.

[8] Response to Commission questionnaire.

According to questionnaire responses, OEMs are generally seen as having more stringent qualification programs than aftermarket distributors and brokers. Responding domestic producers sell the majority of their DRAMs to OEMs, and more often reported that their customers had stringent quality control programs. In 1998, domestic producers generally sold a greater share of production to OEMs than did importers of DRAMs fabricated in Taiwan. For example, Micron reported that *** percent of its sales in 1998 were to OEMs. On average, domestic producers reported that *** percent of sales were to OEMs in 1998. A large but unknown share of domestic producers' OEM sales are to manufacturers of name brand PCs. Two domestic DRAM producers have recently signed long-term contracts with two of the largest PC OEMs. Micron will become the largest supplier of DRAMs to Compaq, and Samsung will become the largest supplier to Dell.[9]

Some importers of DRAMs from Taiwan sell primarily to OEMs while others sell primarily in the aftermarket. Importers of DRAMs from Taiwan with a large share of sales to OEMs include *** with sales to OEMs in 1998 of *** percent, respectively. Other importers of Taiwan-fabricated DRAMs such as *** reported no sales to OEMs in 1998. On average, sales to OEMs accounted for 20 percent of U.S. sales by companies that imported DRAMs primarily or exclusively from Taiwan in 1998.[10]

Most importers of Taiwan-fabricated DRAMs with a large share of sales to OEMs reported that the majority of OEM sales were to manufacturers other than name brand manufacturers of PCs, such as manufacturers of video graphics adapters or peripheral equipment. *** all reported that sales to PC manufacturers accounted for a small share of sales, and that there were no sales to name brand PC manufacturers in 1998.[11] [12] *** reported that all sales were for graphics applications rather than for main memory, and that sales to name-brand PC manufacturers accounted for only *** percent of sales. Other importers of Taiwan-fabricated DRAMs such as *** are also producers of nonsubject and/or domestic DRAMs, and are not primarily importers of the subject product.

The Commission received purchaser questionnaire responses from ***. These firms are major PC OEMs. All require certification of DRAMs or suppliers. *** reported that supplier capacity, future growth potential, and financial status of supplier are factors considered when qualifying a new supplier. All reported that domestic suppliers were among those qualified or certified. *** reported that Taiwan producers *** were among those currently qualified or certified to supply DRAMs.[13] All also reported that *** were qualified suppliers. These companies have Taiwan fabricators as technology partners and sell some DRAMs that are fabricated in Taiwan. It is not known if these firms' Taiwan-fabricated DRAMs are among those qualified by these name brand PC manufacturers.

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[9] Yahoo daily news, *http://dailynews.yahoo.com/h/nm/19991025/bs/tech_microntech_1.htm*, retrieved Oct. 25, 1999, and Electronic Buyers' News Online, *www.ebonline.com/story/OEG19991025S0050*, retrieved Oct. 25, 1999.

[10] ***.

[11] Telephone conversations with staff, Oct. 20-Oct. 25, 1999.

[12] The separation of sales into sales to OEMs and non-OEMs is complicated by the existence of contract manufacturers. Purchasers such as *** assemble components for OEMs. They purchase only those components that are approved by their OEM end users, but the contract manufacturers are not themselves OEMs.

[13] ***.

*** sells to *** for European and Chinese assembly, and to *** in Asia, but states that "We have almost zero sales to U.S. PC box guys," partly because of the possibility of antidumping duties. He also reported that *** had tried to qualify to supply modules to *** for the U.S. market, but had failed to qualify.[14]

Respondents state that a comparison of the share of sales under contract is a better measure of the overlap in market segments than is the share of sales to OEMs.[15] Responding importers of Taiwan-fabricated DRAMs overwhelmingly reported that almost all U.S. commercial sales in 1998 were in the spot market rather than under contract. Ten responding importers with imports of Taiwan-fabricated DRAMs reported that 100 percent of sales in 1998 were in the spot market. Exceptions were ***, with *** percent of sales, respectively, under contract.

A large share of the DRAMs produced by domestic producers are assembled into modules by the fabricating firm or a related firm prior to the first arms-length commercial sale. Domestic producers *** report that *** percent, respectively, of their DRAMs are sold as modules rather than individual units. Domestic producers *** transfer or sell all DRAMs to affiliated firms. These affiliated firms report that *** percent, respectively, of DRAMs are sold as modules. The majority of Taiwan-fabricated DRAMs sold by U.S. importers are sold as units rather than in modules. Most importers of Taiwan-fabricated DRAMs reported 99 to 100 percent of sales as units rather than modules. Importers ***, which import DRAMs from multiple sources including Taiwan, reported sales of modules as *** percent of total sales, respectively.

Overall, sales as modules accounted for a large share of commercial sales of domestic and nonsubject imported DRAMs, and for a small and declining share of total U.S. sales of Taiwan-fabricated DRAMs over the period examined.[16] Sales as modules accounted for *** percent of U.S. commercial sales of domestically produced commodity DRAMs in 1998, *** percent of the sales of nonsubject imports, and *** percent of reported U.S. commercial sales of Taiwan-fabricated DRAMs. In interim 1999, sales of modules accounted for *** percent of sales of domestically produced DRAMs, *** percent of nonsubject imports, and *** percent of Taiwan-fabricated DRAMs (table E-18).

SUPPLY AND DEMAND CONSIDERATIONS

U.S. Supply

Domestic Production

Based on the available information, it appears that domestic producers have limited ability to respond to price increases with an increase in shipments of DRAMs in the short run, but the ability to respond with relatively large increases in one to two years. Several domestic producers have plans to

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[14] Telephone conversation with staff on Oct. 20, 1999.

[15] Public hearing transcript, p. 114.

[16] ***.

open or re-open fabrication facilities. These facilities and the small excess capacity of domestic producers could be used to increase domestic production of DRAMs.

Industry capacity

Capacity utilization at operating domestic fabrication facilities is high. Capacity utilization by petitioner, Micron, expressed as wafer starts as a percentage of average wafer capacity was *** percent in 1998 and *** percent in interim 1999. Domestic fabricators *** reported capacity utilization *** percent in their U.S. fabrication facilities in 1998. Fabricator *** reported capacity utilization of *** percent in 1998. Average capacity utilization for all domestic producers in 1998 was 93.9 percent.

Domestic producers and importers were also asked to provide information on capacity and production of uncased 16 Mb and 64 Mb DRAMs (the most common densities over the period examined). Only domestic producers *** reported production of 16 Mb DRAMs in interim 1999, with capacity utilization of *** percent, respectively. All currently operating domestic fabricators reported some production of 64 Mb DRAMs in interim 1999. The average reported capacity utilization was 80.8 percent. Production of DRAMs of a specific density is based on the production of good DRAMs, and would therefore be lower than wafer capacity by the yield percentage. Domestic producer ***. Average yield for all reporting domestic fabricators was 84.0 percent in 1998 and 86.9 percent in interim 1999. Increases in yield would also result in an increase in the supply of DRAMs to the domestic market.

Matsushita, Hitachi, and Mitsubishi closed their U.S. fabrication facilities in 1998. The TwinStar Semiconductor facility, now owned by Micron, ceased production in June 1998. This facility, if re-opened, would account for *** percent of Micron's current total wafer capacity. The capacity of Micron's Lehi, UT facility is expected to be similar. New fabrication equipment would have to be purchased for both of these facilities, and it would take several quarters to begin fabrication.[17] Production would then increase throughout the "ramp-up" phase. Domestic producer ***.

Production alternatives

*** report that no other products are produced using the same equipment used in the production of DRAMs. *** report that some other products such as SRAMs and logic chips are produced on the same equipment used to produce DRAMs. These producers could presumably switch some production from these other products to production of DRAMs in response to price changes.

Alternative markets

The majority of DRAMs fabricated by domestic producers are consumed in the U.S. market. In 1998 approximately 52 percent of DRAMs fabricated by domestic firms were sold in the U.S. market as DRAMs or modules.[18] DRAMs are also consumed in the production of downstream products. Net

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[17] Communication with Micron during staff plant tour, Aug. 5, 1999.

[18] Tables III-4 and E-6.

exports of U.S.-fabricated DRAMs and modules were approximately 38 percent of production in 1998.[19] Domestic producers have limited ability to divert shipments to or from alternate markets in response to price changes, given their reliance on the domestic market.

Subject Imports

Based on the available information, it appears that Taiwan producers of DRAMs have the ability to respond to price changes with changes in the quantity of shipments of DRAMs. The majority of fabrication facilities in Taiwan are producing at nearly full capacity. However, most producers have some ability to produce other products on the same equipment used to produce DRAMs. *** report that they have or soon will cut production in response to lower prices for DRAMs. *** reports that one of its fab lines has been sold and will be devoted to the fabrication of logic chips, and that the existing fab line is switching to the fabrication of logic chips in the year 2001.

Industry capacity

Capacity utilization for DRAM fabricators in Taiwan is very high. Average capacity utilization was 83.1 percent in 1998, and output exceeded stated capacity in interim 1999. The only fabricator in Taiwan with reported wafer starts in interim 1999 that was less than *** percent of reported capacity was ***, with a capacity utilization rate of *** percent. Reported yield was *** percent in 1998 and *** percent in interim 1999.

Production alternatives

Most Taiwan fabricators of DRAMs reported that they produced some other integrated circuits on the same equipment used to produce DRAMs, or had plans for such production in the future. The exceptions are ***, which reported no production of products other than DRAMs and no plans to begin such production. Foundries such as TSMC and UMC also fabricate DRAMs in addition to other products[20] and have the ability to alter their production mix.

Alternative markets

Reported imports of Taiwan-fabricated DRAMs and modules accounted for approximately *** percent of reported production of uncased DRAMs on a bit basis, and U.S. commercial sales of Taiwan-fabricated DRAMs in 1998 accounted for approximately *** percent.[21] Approximately two thirds of the DRAMs fabricated in Taiwan are produced by firms in joint ventures with, or who have technology-transfer agreements with, electronics firms outside Taiwan. Most commonly these are large Japanese DRAM producers, but they also include ***. Presumably, Taiwan foundries with such foreign partners

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[19] Net exports were calculated by subtracting imports of U.S.-fabricated DRAMs and modules from exports on a bit basis.

[20] Hearing transcript, p. 13.

[21] ***.

could shift some of their exports to third countries. The foreign partners could then replace these shipments with DRAMs from nonsubject countries.[22]

Sales in the spot market account for the majority of domestic (Taiwan) sales for most reporting Taiwan fabricators. Other Taiwan fabricators reported that the majority of sales in the home market are sales to affiliated companies. Taiwan fabricators with sales in the U.S. market were divided between those with the majority of sales in the spot market, and those with the majority of sales to affiliated firms. Most importers of Taiwan-fabricated DRAMs reported that the majority of sales were spot sales. The only Taiwan fabricator with reported sales in export markets other than the United States (***) reported that the majority of sales in third country markets were sales under contract. Since the majority of sales in both the home market and the United States are sales in the spot market or sales to affiliated firms with the majority of sales in the spot market, producers in Taiwan have few contractual barriers to shifting production to markets other than the United States. Taiwan producers *** reported that shifting sales to another country would be difficult because of the need to establish a customer network and have customers qualify their products.

U.S. Demand

Demand Characteristics

Demand for DRAMs increased significantly throughout the period examined, driven by increased sales of personal computers and more demanding software. In terms of bits, domestic consumption of DRAMs is reported to have increased 60 to 70 percent per year. Importer *** reports that annual U.S. apparent consumption increased 79, 96, 87, and 72 percent from preceding year levels for the years 1996 through 1999.[23]

There have been changes in the types and density of DRAMs produced and sold since 1996. Production of DRAMs for OEMs has migrated from fast page mode (FPM) to EDO to SDRAM; and from 4 to 16 and 64 Mb chips. Newer addressing technologies such as Rambus DRAM (RDRAM) and Double Data Rate Synchronous DRAM (DDR SDRAM) and higher density 128 and 256 Mb chips are now in production, but are not yet being produced in as great a volume as the 64 Mb SDRAMs.

Substitute Products

While static random access memory semiconductors (SRAMs) are the closest substitute for DRAMs, a number of factors limit the substitutability between the two. An SRAM is also a memory storage device; however, unlike a DRAM, an SRAM does not have to be continually refreshed but maintains stored information as long as power is supplied. Access times for SRAMs are generally much lower than access times for DRAMs. DRAMs are generally not substitutable for SRAMs because DRAMs must be constantly refreshed, and because of slower access times. SRAMs are generally not

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[22] Conference transcript, pp. 55-56.

[23] *** quoting Semico Research Corp. in response to Commission questionnaire.

substitutable for DRAMs because of their higher price. Most producers and importers reported that there were no close substitutes for DRAMs. Responding importers and producers stated that SRAMs are too costly and flash memory too slow.

Cost Share

The primary use for DRAMs is as memory storage devices in PCs. DRAMs are assembled into modules containing two or more DRAMs. There is often more than one module in a PC. Most producers and importers reported that DRAMs accounted for approximately 90 percent of the total cost of memory modules. DRAMs are also used in the production of other electronic devices commonly found in PCs, such as video graphic adapters and hard drives. According to responding purchasers, DRAMs account for 25 to 35 percent of the cost of video graphics adapters, and approximately 3 percent of the cost of a hard drive. The cost share of DRAMs varies for different types of PCs. Generally DRAMs account for less than 10 percent of the cost of a PC. DRAMs are also used in the production of other electronic devices in the telecom and other industries, where they generally account for a small share of cost.

SUBSTITUTABILITY ISSUES

Factors Affecting Purchasing Decisions

DRAMs of the same density, type, and speed from qualified suppliers are interchangeable, regardless of the country of fabrication. One purchaser stated that: "DRAMs are a commodity item and are generally made to a standard specification. There may be certain internal differences, but overall they must all meet a standard specification."[24] However, some reporting importers indicated that there are significant differences in product characteristics or sales conditions between domestically produced DRAMs , nonsubject DRAMs, and those produced in Taiwan even when of the same density and addressing technology.

DRAMs may be directly attached to a PC motherboard or other electronic device, or used to produce memory modules.[25] There is some evidence that OEMs have more stringent requirements, and view DRAMs fabricated in Taiwan as less substitutable for DRAMs produced domestically or in nonsubject countries. Memory modules and individual dice that make up memory modules are more interchangeable, particularly those sold in the aftermarket. *** noted that "(t)here is some weight given to reliability of supply, support, and quality by OEM purchasers. Any premium declines as you go down the 'food chain.'"[26]

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[24] Purchaser questionnaire response from ***.

[25] Petitioner's post conference brief, p. 6.

[26] ***.

Some purchasers were unable to attribute differences between producers to country of origin. *** noted in its purchaser questionnaire response that "All major suppliers produce in at least 2 countries. Performance is evaluated by supplier, not evaluated (or with a clear correlation to) country of origin." Some purchasers do not know the origin of the DRAMs they purchase. While most purchasers report that they do know the country of fabrication most or all of the time, the behavior of multinational firms in the DRAMs market often makes country of origin difficult to determine. One purchaser that reported purchasing only Japanese DRAMs (***) reported purchasing DRAMs from five producers in 1998. Four are Japanese-headquartered firms with fabrication facilities in the United States. The fifth is a Korean-headquartered firm with a fabrication facility in the United States. Purchasers seem to associate a company name with a country of origin. Purchaser *** reported purchases of DRAMs from "Hyundai (Korea)...and NEC (Japan)" when both of these producers have fabrication facilities in the United States.

The inability to identify country of origin is not limited to purchasers. Several firms with fabrication facilities in the United States also have fabrication facilities in other locations, and DRAMs from different locations may be mixed in casing or module assembly. Domestic producer *** reported that all of its U.S.-fabricated DRAMs are cased outside the United States, and may be mixed with DRAMs fabricated in third countries. *** was unable to provide sales data by country of fabrication. Likewise, *** was unable to report sales of U.S.-fabricated DRAMs because of an inability to distinguish country of fabrication.

Purchasers, importers, and producers were asked a series of questions to determine the factors that influence purchase decisions. Information from Commission questionnaires indicates that availability, quality/reliability of the product, and price are the most important factors in deciding from whom to purchase DRAMs. Product compatibility and relationship with a vendor were each reported to be the most important factor by two responding purchasers. A tabulation of the three most important factors reported by purchasers of DRAMs is reported in table II-1. Purchasers were also asked to rank 14 factors as very important, somewhat important, or not important in their purchase of DRAMs, for each country of production. Availability and delivery time were generally regarded as very important by the greatest number of responding purchasers (table II-2).

Table II-1
DRAMs: Number of responses for most important purchase factors

Rank	Quality/ reliability	Availability/ delivery	Price	Other
Most important	7	5	3	Compatibility/technology 3 Vendor relationship 5
Second most important	5	9	4	Technology 2 Range of products 1 Manufacturing capability 1
Third most important	1	4	12	Vendor relationship 2 Credit terms 1 Capacity 1
Source: Responses to Commission questionnaires.				

Table II-2
DRAMs: Importance of factors in making a purchase decision[1]

Factor	United States	Taiwan	Japan	Korea	All other sources
Availability	3.0	3.0	3.0	3.0	3.0
Delivery terms	2.3	2.3	2.5	2.5	2.3
Delivery time	2.9	2.8	3.0	3.0	2.9
Discounts offered	2.1	2.0	2.0	2.0	2.1
Lower price	2.4	2.5	2.4	2.4	2.4
Minimum quantity requirements	1.8	1.7	2.0	2.0	2.2
Packaging	2.0	1.9	2.0	2.0	2.0
Product consistency	2.8	2.8	2.9	2.9	2.8
Product quality	2.9	2.9	2.9	2.9	2.9
Product range	2.3	2.3	2.4	2.4	2.3
Reliability of supply	2.8	2.8	2.9	2.9	3.0
Technical support/service	2.2	2.0	2.2	2.2	2.2
Transportation network	1.8	1.8	2.0	2.0	2.0
Transportation costs	1.8	1.8	1.8	1.8	1.8

[1] The numbers represent the average ranking of each factor by purchasers, on a scale of 1 (not important) to 3 (very important).

Source: Responses to Commission questionnaires.

Comparisons of Domestic Products and Subject Imports

Producers and importers were in general agreement that DRAMs of the same type and density are interchangeable, regardless of country of origin. However, seven responding importers reported significant differences in product characteristics or sales conditions between the domestic products and imports from Taiwan (table II-3).[27] *** reported that "U.S. produced DRAMs are typically newer technology, and higher density, with established brand recognition. Taiwan producers offer primarily lower density devices, and older technology which engages them with a separate tier of customers."[28] Another difference between the domestic product and imports from Taiwan was reported by ***, which

[27] Any responses from Texas Instruments, Micron Technology, or Micron Electronics were not included in importer responses.

[28] *** response to importer questionnaire, pp. 20 and 21.

stated "Taiwan DRAMs generally have not been fully qualified by U.S. OEMs unlike domestic DRAM producers."[29] *** reported that it imports only lower density DRAMs that are not produced by domestic producers.[30]

Table II-3
DRAMs: Substitutability

Item	Firms reporting "yes"		Firms reporting "no"	
	U.S. producers	U.S. importers	U.S. producers	U.S. importers
Are DRAMs generally used interchangeably?				
U.S. vs Taiwan	6	20	0	1
U.S. vs nonsubject countries	6	20	0	1
Taiwan vs nonsubject countries	6	20	0	1
Significant differences in product characteristics or sales conditions				
U.S. vs Taiwan	1	7	4	11
U.S. vs nonsubject countries	1	5	5	18
Taiwan vs nonsubject countries	1	7	4	15

Note: Responses are from all importers of DRAMs from Taiwan and nonsubject countries.
Source: Compiled from data submitted in response to Commission questionnaires.

Although there is considerable overlap, domestic producers and those in Taiwan tend to focus somewhat on different segments of the market. Domestic producers reported a higher share of sales to OEMs, and a higher share of sales as modules. Importers of Taiwan-fabricated DRAMs report a greater emphasis on lower density DRAMs. Table E-18 shows the U.S. commercial sales of commodity DRAMs by density for individual cased dice and for modules, by country of fabrication, for calendar years 1996 through 1998 and for interim 1999. The majority of modules would be expected to contain

[29] *** response to importer questionnaire.

[30] Responses to Commission questionnaires.

DRAMs with the lowest cost per bit. In 1996 and 1997, the majority of modules would have contained 16 Mb chips. The percentage of 64 Mb chips in memory modules would have increased through 1998.

Since almost all imports of Taiwan-fabricated DRAMs are sold as individual dice, imports from Taiwan can be compared to U.S. fabrication. Table E-19 compares the number of DRAMs fabricated domestically with those imported from Taiwan, by density, for calendar years 1996-98 and interim 1999. Nonsubject DRAMs are not included because many of these may be imported as modules rather than individual DRAMs. Imports of Taiwan-fabricated 1 Mb DRAMs exceeded domestic fabrication of 1 Mb DRAMs throughout the period. Domestic fabrication of 4 Mb DRAMs declined in each year from a high of *** in 1996, while reported imports of Taiwan-fabricated 4 Mb DRAMs reached a high of *** in 1997. Domestic fabrication of 16 Mb DRAMs reached a high of *** in 1997 and *** in 1998, while imports of Taiwan-fabricated 16 Mb DRAMs reached a high of *** in 1998. Domestic fabrication and imports of Taiwan-fabricated 64 Mb DRAMs both began in 1997, and were higher in interim 1999 than in previous periods.

Respondents have stated that DRAMs fabricated in Taiwan fall into two categories, those that are produced in cooperation with a technology partner and those produced in Taiwan by fabricators using their own designs, and that there are differences in distribution channels and acceptability between the two categories. Partners "such as Mitsubishi or Fujitsu, Siemans, ... provide the latest proprietary technology in partnership with the Taiwan manufacturing capability and sell the DRAMs to the advanced OEM market."[31] Taiwan fabricators producing from their own designs include Vanguard, Nan Ya, and Mosel Vitelic.[32] These firms account for approximately *** percent of wafer starts in Taiwan,[33] and about *** of production in terms of bits.[34] However, these tier-two producers are also moving to acquire technology partners. Mosel Vitelic has produced at least some DRAMs to designs acquired from German producer Siemens AG (now Infineon),[35] Vanguard has entered an agreement to purchase DRAM technology from Mitsubishi,[36] and Nan Ya has also acquired a technology partner.[37]

Fabricators also may be classified by their primary customers. Tier-one producers sell mainly to OEMs while tier-two producers sell mainly in the aftermarket, to customers with less stringent requirements and those buying DRAMs incorporating older technologies or addressing modes. However,

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[31] Conference transcript, p. 54.

[32] Conference transcript, p. 60.

[33] White & Case postconference brief, p. A-7.

[34] Responses to Commission foreign producer questionnaires.

[35] Mosel Vitelic press release, *http://www.moselvitelic.com/press/p-102197.html*, retrieved Aug. 31, 1999.

[36] Reuters, *http://news.lycos.com/stories/Tech.../19990622RTTECH-VANGUARD-STAKE.asp*, retrieved June 28, 1999.

[37] Electronic Buyers' News Online, *http://ebns.com/story/OEG19981110S0008*, retrieved Aug. 31, 1999, and *** response to Commission questionnaire.

*** (an OEM) listed *** (tier-two producers) as among those suppliers with products currently certified or prequalified for purchase.[38]

Comparisons of Domestic Products and Nonsubject Imports

DRAMs fabricated in nonsubject countries were generally reported as being interchangeable with those fabricated domestically. Product characteristics and sales conditions were generally reported to be similar. The limited information reported in Commission questionnaires indicated that importers of DRAMs from nonsubject countries and domestic producers largely focus on the same market segments. Approximately half of domestically produced DRAMs and nonsubject imports were sold as modules during the period examined.

Comparisons of Subject Imports and Nonsubject Imports

Imports from Taiwan and from nonsubject countries were reported as being interchangeable by both domestic producers and importers. However, 7 of 18 responding importers (7 of 15 responding importers with imports of Taiwan-fabricated DRAMs in 1998) reported significant differences in product characteristics or sales conditions between imports from Taiwan and nonsubject imports. Importer *** reported that nonsubject imported DRAMs had largely been qualified by U.S. OEM customers, unlike Taiwan-fabricated DRAMs, and importer *** reported that nonsubject imported DRAMs have "established brand recognition, and technology and densities similar to U.S. producers," unlike Taiwan-fabricated DRAMs.

ELASTICITY ESTIMATES

This section discusses the elasticity estimates that are used in the COMPAS analysis detailed in appendix F. Parties were requested to comment on these estimates in prehearing briefs.

U.S. Supply Elasticity

The domestic supply elasticity for DRAMs measures the sensitivity of the quantity supplied by domestic producers to changes in the U.S. market price of DRAMs. The elasticity of supply depends on factors such as the level of excess capacity, the existence of inventories, and the availability of alternate markets for domestically produced DRAMs. Analysis of these factors indicates that the U.S. industry has limited capacity to increase domestic shipments in response to price increases in the short run. An estimate of 0.5 to 1.0 was suggested in the prehearing report. Petitioner estimates that the elasticity is 0.5 or less, pointing out the very high capacity utilization for the domestic industry. Staff concurs with petitioner's estimate. The domestic supply elasticity is estimated to be in the range of 0.3 to 0.5.

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[38] ***.

U.S. Demand Elasticity

The U.S. demand for DRAMs measures the sensitivity of the quantity demanded to a change in the U.S. market price of DRAMs. This sensitivity depends on the availability of substitute products, as well as the component cost share of DRAMs in the production of downstream products. There are very limited substitutes for DRAMs. Other electronic devices are either slower or much more expensive than DRAMs.

There are a number of uses for DRAMs. The component cost of DRAMs in telecommunications equipment, other electronics equipment, and computer hard drives is very low, i.e., no more than 4 percent. The share cost of DRAMs in components such as graphics boards is fairly high, 20 to 50 percent. The share cost of DRAMs in the production of memory modules is very high, approximately 90 percent, but overall, the share component cost of DRAMs in a PC is 5 to 10 percent. Based on available information, the aggregate demand for DRAMs is likely to be relatively inelastic. A range of 0.5 to 0.9 was suggested in the prehearing report. Petitioner points out that overall expenditure on DRAMs has declined markedly since 1996, and estimates that the elasticity of domestic demand is 0.5 or less. Staff agrees that the domestic demand elasticity is unlikely to be in the upper part of the range suggested in the prehearing report. An estimate of 0.3 to 0.7 is suggested.

Substitution Elasticity

The elasticity of substitution measures the responsiveness of the relative U.S. consumption levels of the subject imports and domestic like products to a change in the relative price. The elasticity of substitution depends on the extent of product differentiation between the domestic and imported products. Product differentiation depends on factors such as product quality and reliability, the range of products produced, and reliability of supply. Based on available information, the elasticity of substitution of domestically produced DRAMs for those fabricated in Taiwan is likely to be in the range of 1 to 3 for the 60 percent of DRAMs that are sold to OEMs, and in the range of 3 to 5 for the remaining 40 percent sold to other customers. The elasticity of substitution of domestic for nonsubject imported DRAMs is estimated to be in the range of 5 to 10. The elasticity of substitution of nonsubject imported DRAMs for those fabricated in Taiwan is estimated to be equal to the elasticity of substitution of domestically produced DRAMs for those fabricated in Taiwan, that is, in the range of 1 to 3 for sales to OEMs and 3 to 5 for all other sales.

Petitioners suggest DRAMs fabricated in Taiwan are as substitutable for domestic DRAMs as those produced in nonsubject countries, and that the substitution elasticities between Taiwan-fabricated, nonsubject, and domestic DRAMs are all in the range of 5 to 10. However, there are differences in market penetration of Taiwan-fabricated DRAMs by density. There are perceived quality and brand recognition differences by some importers and purchasers. Importers of Taiwan-fabricated DRAMs have limited sales to the major PC OEMs that are the largest market segment for both domestic and nonsubject producers. Almost all Taiwan-fabricated DRAMs are sold as individual DRAMs rather than as modules (the largest end use of DRAMs by PC OEMs). The majority of Taiwan-fabricated DRAMs are sold on the spot market, while the majority of domestically produced and imported nonsubject DRAMs are sold

on contract.[39] Because of these differences staff suggests that Taiwan-fabricated DRAMs are less substitutable for domestic DRAMs than are nonsubject imported DRAMs, particularly in the OEM market segment. The elasticity of substitution between Taiwan-fabricated and domestic DRAMs is estimated to be in the range of 1 to 3 for the OEM segment, and 3 to 5 for sales to other customers. The elasticity of substitution between domestic and nonsubject imported DRAMs is estimated to be between 5 and 10 in both market segments.

Nonsubject Supply Elasticity

An elasticity of supply is a measure of the responsiveness of the quantity supplied to a change in price. The nonsubject supply elasticity is an estimate of the percent change in the quantity of imports into the U.S. market from nonsubject countries in response to a one percent price change in the U.S. market. Producers in nonsubject countries presumably have the ability to shift sales to home or alternate export markets in response to a price change in the U.S. market. Petitioners suggest that the nonsubject supply elasticity is approximately equal to the domestic supply elasticity, but whereas domestic producers sell almost all DRAMs in the U.S. market, nonsubject importers, including Samsung (reportedly the largest worldwide producer of DRAMs, and a producer that is not constrained by antidumping duties), have a greater ability to shift DRAMs from alternate markets. Most major producers of DRAMs have production facilities in more than one country. Importers of nonsubject imports that also have a production facility or a joint venture in Taiwan would be expected to shift Taiwan-fabricated DRAMs to other markets, and shift a larger share of nonsubject imports to the U.S. market. A nonsubject supply elasticity in the range of 3 to 5 is suggested.

THE COMPAS MODEL

The COMPAS model is a supply and demand model that assumes that domestic and imported products are less than perfect substitutes. Such models, also known as Armington models, are relatively standard in applied trade policy analysis and are used extensively for the analysis of trade policy changes both in partial and general equilibrium. The staff selects a range of estimates that represent price-supply, price-demand, and product-substitution relationships (i.e., supply elasticity, demand elasticity, and substitution elasticity) in the U.S. DRAMs market. The model uses these estimates with data on market shares, Commerce's estimated margins of dumping, transportation costs, and current tariffs to analyze the likely effects of unfair pricing of subject imports on the U.S. domestic industry.

Dumping margins are determined by the Department of Commerce. Where Commerce finds margins to vary by firm, an "all others" rate is calculated, generally equal to the weighted average of the margins for individual firms. The margin used for COMPAS model simulations was 21.35 percent, the ad valorem "all others" rate in the final determination.

Estimated effects of the LTFV imports of DRAMs from Taiwan in 1998 were calculated separately for two market segments. Approximately 60 percent of sales of U.S.-fabricated DRAMs are to

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[39] Most OEMs, including PC OEMs, buy the majority of DRAMs on contract.

OEMs. These OEMs have more stringent requirements than other purchasers, and Taiwan-fabricated DRAMs have captured a smaller share of this market segment. The remaining 40 percent of U.S. consumption is accounted for by sales to distributors/brokers and value-added resellers. Taiwan-fabricated DRAMs have captured a larger share of this market segment, and the impact of LTFV sales is greater. The overall effect is the weighted average of the effects in the two market segments (table II-4).

Table II-4
DRAMs: Estimated effects of LTFV imports from Taiwan

Market segment	Reduction in revenue	Reduction in output	Reduction in price
OEMs	0.1 to 0.8 percent	0.0 to 0.2 percent	0.0 to 0.6 percent
Non-OEMs	4.0 to 9.6 percent	1.2 to 2.3 percent	2.7 to 7.5 percent
Overall	1.7 to 4.3 percent	0.5 to 1.0 percent	1.1 to 3.4 percent

More detailed effects of the dumping and the range of scenarios are shown in appendix F.

PART III: U.S. PRODUCERS' PRODUCTION, SHIPMENTS, AND EMPLOYMENT

The Commission analyzes a number of factors in making injury determinations (see 19 U.S.C. §§ 1677(7)(B) and 1677(7)(C)). Information on the 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 12 firms that accounted for the vast majority of U.S. fabrication of uncased DRAMs and assembly of cased DRAMs from January 1996 through June 1999.[1]

For the purposes of presentation in this report, unless otherwise noted, "domestic" DRAMs include all uncased and cased DRAMs, as well as DRAM modules, that contain U.S.-fabricated dice, regardless of the location of final assembly/casing or module manufacture. In addition, DRAMs assembled/cased in the United States from third-country-sourced dice (i.e., dice not fabricated in the United States or Taiwan) are also included as "domestic" product. However, third-country-fabricated DRAMs, assembled/cased abroad but incorporated into modules in the United States, are not considered to be "domestic" product.[2]

Data in this section are presented for uncased DRAMs, cased DRAMs, and DRAM modules. Additional data on U.S. capacity, production, and shipments of DRAMs, by source of dice (and location of assembly where relevant), are presented in appendix E.

U.S. PRODUCERS

Overview of the Industry

The Commission sent producer questionnaires to all firms identified as producers in the petition, as well as to several other firms believed to have produced or have been capable of producing DRAMs in the United States during any part of the period January 1996-June 1999. According to questionnaire responses, during at least part of this period 12 firms performed wafer fabrication in the United States, 10 performed DRAM assembly/casing, and 6 also assembled DRAM modules.[3] Responding producers are believed to account for the vast majority of U.S. DRAM wafer fabrication and U.S. DRAM assembly, but only a portion of DRAM module assembly.[4]

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[1] One U.S. producer ***.

[2] In its preliminary determination, the Commission found that the U.S. industry includes DRAM fabricators and assemblers, but not companies that manufacture only modules. See *DRAMs of One Megabit and Above From Taiwan (*Inv. No. 731-TA-811 ((Preliminary)), USITC Pub. 3149, Dec. 1998.

[3] The Commission had difficulty collecting accurate data in this investigation because of the complexity and multiple stages of the production process and because most U.S. producers send some portion of their U.S.-fabricated dice to third countries for assembly and/or module production.

[4] In addition to those companies that perform fabrication or assembly, the Commission also sent producer questionnaires to several companies identified as independent DRAM module assemblers.

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 1998 production of uncased and cased DRAMs.

Table III-1
DRAMs: U.S. producers, positions on the petition, shares of 1998 U.S. production (in bits) of uncased and cased DRAMs, U.S. production activities during the period of investigation, and U.S. production locations

* * * * * * *

Overview of Companies[5]

Micron Technology

Micron Technology, Inc., Boise, ID, the petitioner,*** at its headquarters in Boise, ID. Micron has ***.[6] ***.[7] In addition to DRAMs, Micron also manufactures other semiconductor products ***, including SRAMs and flash memory. In 1995 Micron broke ground on a new fab in Lehi, UT. However, in February 1996, Micron announced that it was postponing indefinitely the completion of this facility. Micron has also reportedly postponed planned expansions at its Boise site. In October 1998, Micron acquired the worldwide DRAM production business of Texas Instruments (TI). This purchase included the TwinStar wafer fab in Richardson, TX. In addition, Micron took possession of TI's fab in Avezzano, Italy; its assembly plant in Singapore; its ***-percent stake in a DRAM fab joint venture in Japan (KTI Semiconductor, owned by Kobe Steel and TI); and its 25-percent stake in a Singapore joint venture fab (Tech Semiconductor, owned by Hewlett-Packard, Cannon, the Singapore Economic Development Board, and TI).

Dominion Semiconductor

Dominion Semiconductor, LLC (Dominion), Manassas, VA, is a joint venture between International Business Machines (IBM) and Toshiba Corporation. Dominion fabricates DRAM wafers in its Manassas facility, but does not assemble DRAMs or DRAM modules.[8] The facility's current capacity is *** 8-inch wafers per month dedicated to 64 Mb DRAM production. During the period of investigation, its wafer production was sold, 50 percent each, to IBM and Toshiba. However, IBM has reportedly decided that it will reduce its share of output from 50 percent to 25 percent, and to zero by December 2000.[9] Dominion began manufacturing DRAMs in December 1997 and is still in the process

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[5] According to the petition, 12 firms performed DRAM fabrication in the United States, and only these 12 firms should be considered as the U.S. industry. Petitioner argues that companies performing only DRAM assembly in the United States should not be included in the domestic industry. See petitioner's postconference brief, pp. 11-12.

[6] ***.

[7] Micron producer questionnaire, p. 14.

[8] See Memo to Public File, Mar. 22, 1998, regarding field trip notes of USITC staff visiting the Dominion facility.

[9] David Lammers,"IBM to Exit Chip Venture with Toshiba," *Electronic Engineering Times*, July 7, 1999.

(continued...)

of ramping up production. Tooling for a second module of the plant ***.[10] The Dominion plant is currently a dedicated DRAM fab, and does not manufacture other semiconductor products.

Fujitsu Microelectronics, Inc.

Fujitsu Microelectronics, Inc. (Fujitsu), San Jose, CA, is a subsidiary of Fujitsu Ltd. of Japan. Fujitsu ***. ***. Fujitsu's parent company, Fujitsu Ltd., is a global producer of DRAMs and DRAM modules. As part of its global operations, Fujitsu Ltd. ***. ***.[11]

Hitachi Semiconductor of America

Hitachi Semiconductor of America (Hitachi), Irving, TX, is a wholly owned subsidiary of Hitachi Ltd. of Japan. Hitachi ***[12] in Irving, TX. In September 1998, Hitachi announced the closing of the Irving facilities[13] "***."[14] ***. From 1996 to January 1998, Hitachi was a partner in the TwinStar joint venture (see TwinStar). Hitachi Ltd. of Japan is a global producer of DRAMs and various other semiconductor products and, in June 1999, announced a cooperative agreement with NEC of Japan to design and produce future generations of DRAMs.[15]

Hyundai Electronics America

Hyundai Semiconductor America, Inc. (Hyundai), Eugene, OR, is a subsidiary of Hyundai Electronics Industries Co., Ltd. (HEI) of Korea. Hyundai's U.S. production operations consist of ***. ***. HEI maintains DRAM manufacturing facilities in Korea as well as the United States.

International Business Machines

International Business Machines Corp. (IBM), Armonk, NY, has a wholly owned wafer fab in Essex Junction, VT, and half ownership in a joint-venture fab with Toshiba in Manassas, VA (see Dominion Semiconductor).[16] In addition, IBM has fabs and/or assembly facilities in Japan, Germany, France, Italy, and Canada. ***. ***.[17] ***. According to IBM's questionnaire response, it is currently

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[9] (...continued)
Petitioner's prehearing brief, exhibit 1.

[10] Dominion producer questionnaire, p. 4.

[11] Fujitsu producer questionnaire, attachment 1, pp. 1-5.

[12] Hitachi indicated that ***.

[13] ***.

[14] Hitachi producer questionnaire, p. 4.

[15] Electronic Buyers' News, "Reorganized Hitachi Targets High-End DRAM," found at *http://www.ebonline.com/digest/story/OEG19990924S0024*, retrieved Sept. 28, 1999.

[16] IBM also has a joint-venture fab with Cirrus Logic in Fishkill, NY. According to IBM,***. ***.

[17] ***.

in a *** [18]. ***, IBM is planning to reduce its output consumption from Dominion Semiconductor to 25 percent from 50 percent, and eventually to zero by December 2000.[19] In 1999 IBM established a licensing ***[20] agreement with Nan Ya Technology of Taiwan[21] ***.[22] In addition, according to press articles, IBM has also transferred process technology to Taiwan producer TSMC-Acer, and to the recently formed Pacific Semiconductor Manufacturing Corporation.[23]

Matsushita Semiconductor Corp. of America

Matsushita Semiconductor Corp. of America (Matsushita), Puyallup, WA, was the U.S. subsidiary of Matsushita Electric Corp. of Japan. Matsushita ***.[24] At that time, Matsushita ceased operations and closed the facility.[25] ***. ***.[26] Matsushita's parent company continues to maintain DRAM production facilities in Japan. As part of its global DRAM operations, Matsushita contracts with the Taiwan firm Macronix to fabricate DRAMs on its behalf in Taiwan.

Mitsubishi Electronics America

Mitsubishi Semiconductor America Inc. (Mitsubishi), Durham, NC, is a subsidiary of Mitsubishi Electric of Japan. At its Durham facility, Mitsubishi performed ***.[27] ***. In ***, 1998 the wafer fab was closed, ***. ***. Mitsubishi's parent company also operates wholly owned DRAM production facilities in Japan and Germany. In addition, it participates in a DRAM joint-venture wafer fab, Powerchip Semiconductor Corp., in Taiwan, and according to press reports, is licensing DRAM technology to another Taiwan producer, Vanguard.[28] In its preliminary determination, the Commission found appropriate circumstances existed to exclude Mitsubishi from the domestic industry.

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[18] IBM's producer questionnaire response, p. 4.

[19] David Lammers,"IBM to Exit Chip Venture with Toshiba," *Electronic Engineering Times*, July 7, 1999. Petitioner's prehearing brief, exhibit 1.

[20] IBM's producer questionnaire response, p. 4.

[21] Credit Suisse First Boston (Hong Kong) Limited, "Taiwan DRAM Industry: A Global Perspective," July 19, 1999.

[22] IBM's producer questionnaire response, p. 4.

[23] "Taiwanese Chip Start-Up to Pay $2.5 Billion for Two New Plants," *Computergram International*, Aug. 29, 1999. Petitioner's prehearing brief, exhibit 14.

[24] ***.

[25] ***.

[26] Matsushita's producer questionnaire, p. 9.

[27] ***.

[28] Reuters, *http://news.lycos.com/stories/Tech.../19990622RTTECJ-VANGUARD-STAKE.asp*, retrieved June 28, 1999.

NEC Electronics

NEC Electronics (NECEL), Santa Clara, CA, is a subsidiary of NEC Corp. of Japan (NEC). NECEL ***.[29] It currently processes ***. ***. ***.[30] NEC's parent company maintains DRAM production facilities in Japan, China, Singapore, the United Kingdom, and Ireland. In addition, NEC recently announced a cooperative partnership with Hitachi to design and produce future generations of DRAMs.[31]

Oki Semiconductor Manufacturing

Oki Semiconductor Manufacturing (Oki), Tualatin, OR, is a subsidiary of Oki America, which in turn is a subsidiary of Oki Electric Industry Co. of Japan. Oki's U.S. operations consisted of a ***[32] ***. This facility was closed ***. Before it closed, ***. Oki's parent company also manufactures DRAMs in Japan. In addition, according to press reports, Oki has licensed DRAM technology to Taiwan producer, Nan Ya.[33]

Samsung Austin Semiconductor, LLC

Samsung Austin Semiconductor, LLC (Samsung), Austin, TX, is ***-percent owned by U.S. subsidiaries of Samsung Electronics Co. Ltd. (SEC), of Korea, and ***-percent owned by Intel Corp. of Santa Clara, CA. Samsung operates ***. ***. ***.[34] SEC also has several wafer fabs producing DRAMs, as well as other semiconductor products, in Korea.

Toshiba America Electronic Components, Inc.

Toshiba America Electronic Components, Inc. (Toshiba), Irvine, CA, is a subsidiary of Toshiba America, Inc., which in turn is a subsidiary of Toshiba Corp. of Japan. Toshiba ***. ***. Toshiba is also a joint-venture partner with IBM in the Dominion wafer fab (see Dominion), where it currently consumes 50 percent of the plant's output. However, due to a renegotiation with IBM, Toshiba will eventually take 75 percent of the plants DRAM output. ***. In addition, Toshiba of Japan maintains DRAM production facilities in Japan, collaborates in production with Winbond of Taiwan, and reportedly has licensed DRAM technology to WSMC of Taiwan.[35]

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[29] ***.

[30] NEC producer questionnaire, pp. 5-10, and attachments 2-2 to 2-12.

[31] Electronic Buyers' News, "Reorganized Hitachi Targets High-End DRAM," found at *http://www.ebonline.com/digest/story/OEG19990924S0024*, retrieved Sept. 28, 1999.

[32] ***.

[33] Jack Robertson and Sandy Chen, "IBM and Nan Ya Map Out Details of DRAM Licensing Agreement," *CMP Publications*, Dec. 7, 1998. Petitioner's prehearing brief, exhibit 14.

[34] Samsung producer questionnaire, pp. 5-11.

[35] "Taiwan Fabs Supporting DRAM Giants," *Electronic Buyers' News*. May 17, 1999. Petitioner's prehearing brief, exhibit 4.

TwinStar Semiconductor, Inc.

TwinStar Semiconductor, Inc. (TwinStar), Richardson, TX, was a joint venture between TI and Hitachi Ltd. that began operations in 1996. In January 1998, TI purchased Hitachi's stake in TwinStar. In June 1998, as part of its buyout of TI's global DRAM business, Micron took possession of the TwinStar facility (see Micron).[36] While under the ownership of TI and Hitachi, and later TI, the TwinStar facility consisted of a DRAM wafer fab. ***. In August 1998, Micron announced that it would convert the TwinStar facility from a wafer fab into a research and development location.

White Oak Semiconductor

White Oak Semiconductor (White Oak), Sandston, VA, is a joint venture between Infineon Technologies AG (Infineon)[37] of Germany and Motorola Corp. (Motorola) of Schaumburg, IL. White Oak concluded construction of its production facility in late 1997, and began shipping DRAMs in August 1998. White Oak is scheduled to produce both DRAMs, of which Infineon will take possession, and other semiconductor products, of which Motorola will take possession. Currently, White Oak has the capacity to process approximately ***.[38] In addition to a wafer fab, the White Oak facility also includes a wafer assembly plant. Though at one time a U.S. DRAM producer, Motorola has since exited the DRAM business (circa 1991) and did not produce DRAMs in the United States during the period of investigation. Infineon is a global DRAM producer with facilities in Europe and Asia. As part of its global operations, Infineon is a partner in a joint-venture wafer fab, ProMOS, with Mosel-Vitelic in Taiwan.[39]

Imports Relative to Production

Data relating to subject imports relative to production of U.S. producers are presented in table III-2.

III-2
DRAMs and DRAM modules: Certain U.S. "domestic production,"[1] certain subject "imports"[2] by U.S. producers, and ratio of "imports" to "domestic production," by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999

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[36] ***.

[37] Infineon Technologies AG was formerly Siemens Semiconductors. See "White Oak Semiconductor, Who We Are," found at *http://www.whiteoaksemi.com/WOwho2.htm* and *http://www.whiteoaksemi.com/WOwho.htm,* retrieved Sept. 21, 1999. Infineon was recently established as a subsidiary of Siemens, and according to Infineon representatives, ***. For a more detailed description of Siemens' affiliation with Infineon, please see staff's Memo to Record of Sept. 15, 1999.

[38] White Oak producer questionnaire, p. 10.

[39] Credit Suisse First Boston (Hong Kong) Limited, "Taiwan DRAM Industry: A Global Perspective," July 19, 1999.

U.S. PRODUCTION, CAPACITY, AND CAPACITY UTILIZATION

U.S. producers' capacity, production, and capacity utilization data for DRAMs and DRAM modules are presented in table III-3. U.S. production data, by firms, of DRAMs and DRAM modules are presented in table III-4 and appendix E.

U.S. PRODUCERS' DOMESTIC SHIPMENTS

Data on U.S. producers' shipments of DRAMs and DRAM modules are presented in table III-5.

U.S. PRODUCERS' INVENTORIES

Data on U.S. producers' inventories of DRAMs and DRAM modules are presented in table III-6.

U.S. EMPLOYMENT, WAGES, AND PRODUCTIVITY

U.S. producers' employment data for DRAMs and DRAM modules are presented in table III-7.

CAPTIVE CONSUMPTION BY U.S. PRODUCERS

Based on questionnaire responses, captive consumption of DRAMs for use in downstream products by U.S. manufacturers is estimated to account for approximately 5 percent of domestic production by volume. *** reported a captive consumption rate of *** percent, by far the highest among U.S. producers. *** and *** reported rates of *** percent and *** percent, respectively. No other producer, including ***, reported a captive consumption rate above *** percent. Items cited as downstream products for captive DRAM consumption include ***.

Table III-3
DRAMs and DRAM modules: U.S. average-of-period capacity, production,[1] and capacity utilization, by products, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Uncased DRAMs					
Wafer start capacity[2] *(1,000 wafers)*	1,694	2,041	2,309	1,126	1,351
Wafer starts *(1,000 wafers)*	1,650	1,925	2,162	977	1,307
Capacity utilization *(percent)*	97.39	94.28	93.62	86.73	96.72
Cased DRAM assembly					
Assembly capacity	***	***	***	***	***
Assembly *(1,000 units)*	***	***	***	***	***
Capacity utilization *(percent)*	***	***	***	***	***
DRAM module assembly					
Assembly capacity *(billion bits)*	***	***	***	***	***
Module assembly *(billion bits)*	***	***	***	***	***
Capacity utilization *(percent)*	***	***	***	***	***

[1] "Production" presented for uncased DRAMs is wafer starts and that shown for cased DRAMs is assembly.
[2] Wafer start capacity data was collected from all U.S. producers except ***, which was unable to provide information. According to the petitioner ***. ***. Note: Wafer start data provided here is done so on a unit basis only, and does not take into account the size of the wafer (e.g., 6 inches or 8 inches). During the period of investigation, most new capacity has been in 8-inch wafers, while most of the lost capacity has been in 6-inch wafers.

Note: Only those companies that provided data on both capacity and production are included in this table.

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

Table III-4
DRAMs and DRAM modules: U.S. production (billion bits), by products and by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

Table III-5
DRAMS and DRAM modules: Shipments of "domestic" product by U.S. producers and importers, by types, 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

Table III-6
DRAMs and DRAM modules: End-of-period inventories of "domestic"[1] product, by origin of dice, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Uncased DRAMs	***	***	***	***	***
Cased DRAMs	232,155	457,190	657,964	841,885	1,292,172
DRAM modules	***	***	***	***	***
Total	322,530	619,749	1,247,406	1,263,991	2,502,064
Ratios of total shipments *(percent)*					
Uncased DRAMs	***	***	***	***	***
Cased DRAMs	***	***	***	***	***
DRAM modules	***	***	***	***	***
Average	***	***	***	***	***

[1] "Domestic" product includes DRAMs and DRAM modules made from U.S.-fabricated dice, regardless of assembly location, and U.S.-assembled cased DRAMs (and modules when they include such DRAMs) from DRAMs that were fabricated in countries other than Taiwan.

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

Table III-7
Average number of U.S. production and related workers producing DRAMs and DRAM modules, hours worked by and wages paid to such employees, and hourly wages, productivity, and unit production costs, by products, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Number of production and related workers (PRWs)					
Uncased DRAMs	7,263	8,971	10,216	8,613	9,112
Cased DRAMs	3,541	4,524	4,734	3,688	4,449
DRAM modules	***	***	***	***	***
All products	***	***	***	***	***
Hours worked by PRWs *(1,000 hours)*					
Uncased DRAMs	16,747	17,252	18,378	9,031	8,926
Cased DRAMs	8,673	10,245	8,814	4,654	4,438
DRAM modules	***	***	***	***	***
All products	***	***	***	***	***
Wages paid to PRWs *(1,000)*					
Uncased DRAMs	325,837	310,501	410,637	199,228	210,726
Cased DRAMs	154,534	186,230	187,754	80,966	92,301
DRAM modules	***	***	***	***	***
All products	***	***	***	***	***
Hourly wages paid to PRWs					
Uncased DRAMs	$19.46	$18.00	$22.34	$22.06	$23.61
Cased DRAMs	17.82	18.18	21.30	17.40	20.80
DRAM modules	***	***	***	***	***
All products	***	***	***	***	***

Continued.

Table III-7--Continued
Average number of U.S. production and related workers producing DRAMs and DRAM modules, hours worked by and wages paid to such employees, and hourly wages, productivity, and unit production costs, by products, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Productivity *(million bits per hour)*					
Uncased DRAMs	193	390	907	664	2,224
Cased DRAMs	292	591	1,292	1,103	2,507
DRAM modules	***	***	***	***	***
Unit production costs *(per million bits)*					
Uncased DRAMs	$0.1008	$0.0462	$0.0246	$0.0332	$0.0106
Cased DRAMs	.0611	.0307	.0165	.0158	.0083
DRAM modules	***	***	***	***	***

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

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

U.S. IMPORTERS

The Commission sent importer questionnaires to approximately 90 U.S. companies that were believed to fabricate, assemble, import, or distribute DRAMs or DRAM modules. Thirty companies provided the Commission with usable data on U.S. imports for the period January 1996-June 1999. Table IV-1 presents a list of major U.S. importers.

Table IV-1
DRAMs and DRAM modules: U.S. imports, by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999
(In billions of bits)

* * * * * * *

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. Most U.S. fabricators ship uncased U.S.-fabricated dice overseas for assembly, with much 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. Official statistics are not being used in the body of the report because the U.S. Customs Service has determined that the country of origin of imported DRAMs 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 Taiwan should be determined by the source of dice fabrication regardless of where final assembly takes place.

Table IV-2 presents U.S. imports of DRAMs and DRAM modules as reported by respondents to the Commission's questionnaires. In terms of bits, from 1996 to 1998 the quantity of total U.S. imports of DRAMs and DRAM modules experienced a cumulative increase of roughly 312 percent. However, the rate of growth moderated during the period of investigation, with year to year increases of 116 percent and 91 percent, respectively, and an interim 1999 increase of 55 percent when compared to the same period in 1998. The reduction in the rate of growth of total imports, particularly in the January to June interim data, is largely attributable to a decline in the growth of imports from Korea. As noted in Part III, Korea's two largest DRAM producers and exporters, Samsung and Hyundai, both established U.S. DRAM fabrication facilities in ***. In addition, imports from Hyundai and another Korean DRAM producer, LG Semicon, were assessed antidumping margins by Commerce as part of an earlier DRAM investigation. From 1996 to 1998, subject imports rose by roughly 590 percent, with a 110 percent increase when comparing interim 1999 to interim 1998.

Table IV-2
DRAMs and DRAM modules: U.S. "imports,"[1] by origin of dice, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Quantity (*billion bits*)					
Subject Taiwan dice	356,921	982,946	2,464,169	904,530	1,904,392
Nonsubject Taiwan dice	***	***	***	***	***
Korea dice	3,273,120	6,050,479	12,146,693	5,618,587	7,343,007
Japan dice	1,777,015	4,008,375	6,634,207	3,037,097	5,237,083
3rd-source dice	661,361	2,056,934	3,741,965	1,708,314	3,013,446
Total, all "imports"	***	***	***	***	***
Value *($1,000)*					
Subject Taiwan dice	376,363	440,127	449,859	216,753	281,247
Nonsubject Taiwan dice	***	***	***	***	***
Korea dice	3,264,371	2,380,561	2,007,276	942,591	1,162,309
Japan dice	1,978,336	1,712,866	967,072	516,372	655,167
3rd-source dice	561,885	641,180	784,340	377,156	487,708
Total, all "imports"	***	***	***	***	***
Unit value (*per million bits*)					
Subject Taiwan dice	$1.05	$0.45	$0.18	$0.24	$0.15
Nonsubject Taiwan dice	***	***	***	***	***
Korea dice	1.00	0.39	0.17	0.17	0.16
Japan dice	1.11	0.43	0.15	0.17	0.13
3rd-source dice	0.85	0.31	0.21	0.22	0.16
Average, all "imports"	***	***	***	***	***

Continued.

Table IV-2--Continued
DRAMs and DRAM modules: U.S. "imports,"[1] by origin of dice, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Share of total quantity (*percent*)					
Subject Taiwan dice	***	***	***	***	***
Nonsubject Taiwan dice	***	***	***	***	***
Korea dice	***	***	***	***	***
Japan dice	***	***	***	***	***
3rd-source dice	***	***	***	***	***
Total, all "imports"	***	***	***	***	***
Share of total value (*percent*)					
Subject Taiwan dice	***	***	***	***	***
Nonsubject Taiwan dice	***	***	***	***	***
Korea dice	***	***	***	***	***
Japan dice	***	***	***	***	***
3rd-source dice	***	***	***	***	***
Total, all "imports"	***	***	***	***	***

[1] "Imported" product includes DRAMs and DRAM modules made from Taiwan-fabricated dice (regardless of assembly location) and 3rd-source fabricated dice assembled outside of the United States.

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

Although imports experienced tremendous quantity growth, the rate of growth did not keep pace with severe declines in the unit values of the products. As a result, the overall value of imports dropped from $*** billion to $*** billion during 1996-98. However, this trend appears to have reversed with a total of $*** billion for interim 1999 when compared to $*** billion for interim 1998. While total imports exhibited significant declines in value, subject Taiwan imports rose from $376 million to $450 million during 1996-98, and from $217 million to $281 million during the January to June periods of 1998-99. In terms of both quantity and value, Taiwan's share of U.S. imports rose during the period from roughly *** percent in 1996 to nearly *** percent in interim 1999.

APPARENT U.S. CONSUMPTION

Table IV-3 presents apparent U.S. consumption and shipments of "domestic" and "imported" product. As was the case with DRAM imports, the quantity of U.S. apparent consumption exhibited tremendous growth during the period of investigation. In terms of bits, consumption grew by nearly 375 percent during 1996-98, and another *** percent in interim 1999 over 1998. Conversely, as erosion in unit values outpaced increases in shipment volumes, the value of U.S. consumption dropped from $6.9 billion in 1996 to $4.9 billion in 1998. This trend reversed in interim 1999 with consumption rising to $*** billion, an increase of over 50 percent when compared to the total for interim 1998.

U.S. MARKET SHARES

U.S. market share data are presented in table IV-4. The domestic producers' share of U.S. consumption based on quantity declined slightly from 30.6 percent in 1996 to 30.2 percent in 1998. However, the domestic producers' market share rose substantially in interim 1999, to *** percent. The market share trend in terms of value followed a somewhat similar pattern. Market share dropped by nearly 2.5 percentage points during 1996-98 to 27.9 percent, then rebounded in interim 1999 to *** percent. The growth in domestic market share corresponded with the closing of *** domestic fabrication plants, the opening of *** fabrication plants, and a drop in import market share. While total import market share declined over the entire period in terms of quantity, from 69.7 percent in 1996 to *** percent in interim 1999, subject imports rose nearly throughout. Subject imports grew from 4.7 percent in 1996 to 6.4 percent in 1998 before dropping to *** percent in interim 1999. The subject import share in terms of value rose from 4.3 percent in 1996 to 7.1 percent in 1998 and *** interim 1999. The largest declines in nonsubject market share, which fell from 64.4 percent in 1996 to *** percent in interim 1999, were experienced by Korean product. As noted earlier, two of the new plants built in the United States were constructed by Samsung and Hyundai of Korea. The decline in market share of Korean imports corresponds somewhat with the establishment of domestic production facilities and the imposition of antidumping duties on imports from Hyundai and LG Semicon.

Additional questionnaire data on U.S. imports and consumption are shown in appendix E. Official U.S. import statistics are presented in appendix G.

Table IV-3
DRAMs and DRAM modules: U.S. shipments of "domestic"[1] product, U.S. shipments of "imported"[2] product, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
	Quantity (*billion bits*)				
U.S.-fabricated dice	1,843,570	3,748,851	8,681,588	2,984,895	9,662,905
Third source dice assembled in the U.S.	182,295	348,727	717,099	501,327	***
Total, all "domestic"	2,025,864	4,097,577	9,398,687	3,486,221	***
Subject "imports" from Taiwan-fabricated dice	308,845	790,243	1,999,694	640,191	1,492,903
Nonsubject "imports" from Taiwan-fabricated dice	***	***	***	***	***
Japan-fabricated dice	1,294,468	2,985,429	5,447,620	2,334,476	4,300,720
Korea-fabricated dice	2,483,144	5,038,307	12,549,440	4,940,664	7,590,515
All other 3rd source dice	***	***	***	***	***
Total, all "imports"	4,591,659	10,055,323	21,696,853	8,556,178	15,385,727
Apparent consumption	6,167,524	14,152,900	31,095,541	12,042,399	***

Continued.

Table IV-3--Continued
DRAMs and DRAM modules: U.S. shipments of "domestic"[1] product, U.S. shipments of "imported"[2] product, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
	Value *($1,000)*				
U.S.-fabricated dice	1,927,384	1,627,415	1,278,185	533,192	1,183,933
Third source dice assembled in the U.S.	158,190	138,753	84,289	58,265	***
Total, all "domestic"	2,085,574	1,766,168	1,362,474	591,457	***
Subject "imports" from Taiwan-fabricated dice	292,617	373,225	347,200	145,410	241,688
Nonsubject "imports" from Taiwan-fabricated dice	***	***	***	***	***
Japan-fabricated dice	1,439,694	1,367,170	950,063	469,463	650,830
Korea-fabricated dice	2,748,647	2,253,739	1,927,374	918,667	1,067,463
All other 3rd source dice	***	***	***	***	***
Total, all "imports"	4,793,554	4,291,275	3,528,918	1,654,080	2,211,179
Apparent consumption	6,879,128	6,057,443	4,891,392	2,245,537	***

[1] "Domestic" product includes DRAMs and DRAM modules made from U.S.-fabricated dice, regardless of assembly location, and U.S.-assembled cased DRAMs from DRAMs that were fabricated in countries other than Taiwan, and those fabricated in Taiwan of less 1 Mb. Data presented are net of company transfers of uncased and cased DRAMs that were used to make the downstream subject DRAM products. Adjustments for producer purchases of the upstream product destined for downtream production have been made to avoid double counting.

[2] "Imported" product includes DRAMs and DRAM modules made from Taiwan-fabricated dice (regardless of assembly location) and 3rd-source fabricated dice assembled outside of the United States. Data presented are net of company transfers of uncased and cased DRAMs that were used to make the downstream subject DRAM products. Adjustments for producer purchases of the upstream product destined for downstream production have been made to avoid double counting.

Note: "Nonsubject" Taiwan product are uncased and cased DRAMs<1 Mb and DRAM modules that do not contain and dice greater than or equal to 1 Mb; all other DRAMs and DRAM modules containing Taiwan dice are "subject." The term "3rd-source" refers to countries other than Taiwan and the United States. Because of rounding, figures may not add to the totals shown.

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

Table IV-4
DRAMs and DRAM modules: Apparent U.S. consumption and market shares, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Quantity (*billion bits*)	6,617,524	14,152,900	31,095,541	12,042,399	***
Value (*$1,000*)	6,879,128	6,057,443	4,891,392	2,245,537	***
	Quantity (*Percent share*)				
U.S.-fabricated dice	27.86	26.49	27.92	24.79	***
Third source dice assembled in the U.S.	2.75	2.46	2.31	4.16	***
Total "domestic" product shipments	30.61	28.95	30.23	28.95	***
Subject "imports" from Taiwan-fabricated dice	4.67	5.58	6.43	5.32	***
Nonsubject "imports" from Taiwan-fabricated dice	***	***	***	***	***
Japan-fabricated dice	19.56	21.09	17.52	19.39	***
Korea-fabricated dice	37.52	35.60	40.36	41.03	***
All other 3rd source dice	***	***	***	***	***
Total, all "imports"	69.39	71.05	69.77	71.05	***

Continued.

Table IV-4--Continued
DRAMs and DRAM modules: Apparent U.S. consumption and market shares, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
	Value (*Percent share*)				
U.S.-fabricated dice	28.02	26.87	26.13	23.74	***
Third source dice assembled in the U.S.	2.30	2.29	1.72	2.59	***
Total "domestic" product shipments	30.32	29.16	27.85	26.34	***
Subject "imports" from Taiwan-fabricated dice	4.25	6.16	7.10	6.48	***
Nonsubject "imports" from Taiwan-fabricated dice	***	***	***	***	***
Japan-fabricated dice	20.93	22.57	19.42	20.91	***
Korea-fabricated dice	39.96	37.21	39.40	40.91	***
All other 3rd source dice	***	***	***	***	***
Total, all "imports"	69.68	70.84	72.15	73.66	***

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

PART V: PRICING AND RELATED INFORMATION

FACTORS AFFECTING PRICES

Raw Material Costs

The primary raw materials in the production of DRAM semiconductors are silicon wafers, sawn from a single cylindrical crystal. These wafers range in size from 5 to 8 inches in diameter. Important determinants of raw material costs include the size of the dice and the yield, or proportion of starts that reach the final test stage prior to assembly. Raw materials cost is a very small share of total cost. However, the number of saleable DRAMs per wafer is an important determinant of average cost.

Yield, or the percentage of good dice, is generally expected to average approximately 90 percent after ramping-up periods.[1] The average reported yield for domestic producers was 84.0 percent in 1998 and 86.9 percent in interim 1999. The only U.S. producer with reported yield less than *** percent in interim 1999 was ***. The average reported yield for Taiwan producers was 81.1 percent in 1998 and 79.1 percent in interim 1999. Fabricators in Taiwan with reported yield less than *** percent were ***. ***.

Transportation Costs to the U.S. Market

Subject DRAMs are classified under subheading 8542.13.80 of the Harmonized Tariff Schedule of the United States. Also included in this investigation are memory modules containing DRAMs of 1 Mb density or greater, which may be classified under subheadings 8473.30.10 through 8473.30.90. These are categories that include a wide variety of parts and accessories for automatic data processing machines.

Transportation costs, for both domestic inland freight and overseas shipments, represent a very small share of the overall cost of DRAMs. Average freight and insurance costs for DRAMs of 1 Mb or more from Taiwan in 1998 (not including memory modules) were 0.39 percent of the customs value. Freight and insurance costs were calculated as the difference between the c.i.f. value and the customs value, expressed as a percentage of the customs value. Most responding importers reported that overseas transportation was 1 percent or less of the total cost.

U.S. Inland Transportation Costs

Most producers and importers reported that U.S. inland transportation costs were 1 percent or less of the total delivered cost of DRAMs. Most domestic producers and importers ship f.o.b. warehouse, with the purchaser paying freight. Because transportation costs are a small share of total costs, geographic location did not seem to be important for most producers and importers. Most reported selling in the entire domestic market with no geographic limitations.

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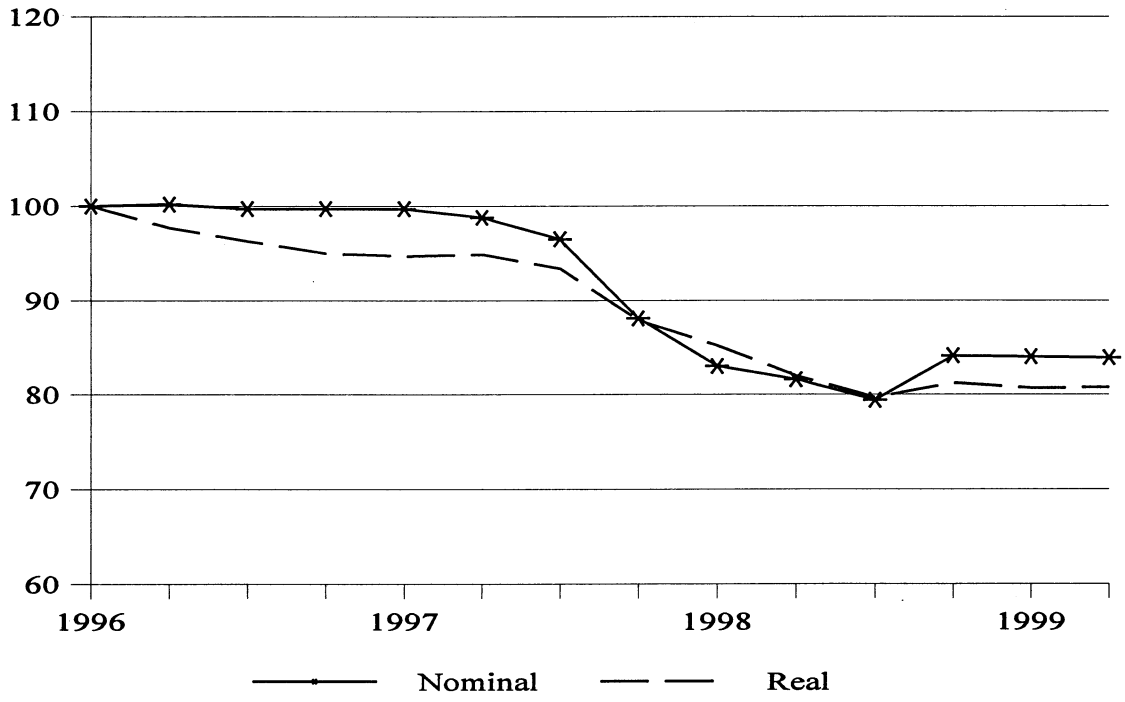
[1] Conference transcript, p. 16.

Exchange Rates

Over the period examined, the value of the Taiwan NT dollar has fallen with respect to the U.S. dollar (figure V-1). The value of the Taiwan NT dollar fell gradually from the first quarter of 1996 to the third quarter of 1997. Between the third quarter of 1997 and the third quarter of 1998, the value of the Taiwan NT dollar fell 17.1 percent in nominal terms and 13.7 percent in real terms in comparison to the U.S. dollar. Since the third quarter of 1998 the Taiwan NT dollar has appreciated slightly with respect to the dollar, but both the nominal and real exchange rates remain well below the values in the third quarter of 1997.

Figure V-1
Exchange rates: Indices of the nominal and real exchange rates of the Taiwan NT dollar relative to the U.S. dollar, by quarters, Jan. 1996-June 1999



Source: International Monetary Fund, *International Financial Statistics*, Sept. 1999, and The Central Bank of China, *Financial Statistics: Taiwan District, the Republic of China*, July 1999.

PRICING PRACTICES

Pricing Methods

Domestic producers sold a greater share of DRAMs on contract than did importers of DRAMs from Taiwan. Contract prices are negotiated frequently. Sales under contract for domestic producers *** were reported to be *** percent of each firm's total sales, respectively. Domestic fabricators *** fabricate DRAMs domestically, then case the dice outside of the United States. Cased DRAMs and/or

modules are imported by affiliated firms that may also import and sell dice fabricated elsewhere. Sales under contract for these firms were reported to be *** percent, respectively. Domestic producer Dominion produces DRAMs *** for Toshiba and IBM only. Most importers of DRAMs from Taiwan generally reported no sales under contract. The exceptions were ***, with *** percent of sales respectively under contract. Sales were generally quoted f.o.b. warehouse, with freight paid by the purchaser.

Sales Terms and Discounts

Sales terms were generally reported to be net 30 days, but some importers reported that some sales on the spot market were paid in advance of shipment, or on delivery. Both domestic producers and importers reported that prices were generally negotiated on a transaction-by-transaction basis rather than having fixed discounts.

PRICE DATA

Domestic producers and importers were asked to provide monthly price and quantity data on U.S. commercial sales of eight products to unrelated parties, from January 1996 through June 1999. Data on sales to OEM and non-OEM customers were collected separately. Products chosen include one 4 Mb DRAM, two 16 Mb DRAMs, three 64 Mb DRAMs, one 8 Mb SGRAM (a specialty DRAM), and one memory module, a 16 Megabyte SIMM. Quantities were reported in units, and sales volumes in dollars. The products chosen are as follows:

***Product 1*:** **4 Mb DRAM, 256 Kb x 16, EDO**

Product 2: **16 Mb DRAM, 4 Mb x 4, EDO**

***Product 3*:** **16 Mb SDRAM, 1 Mb x 16, Synchronous**

***Product 4*:** **64 Mb DRAM, 4 Mb x 16, EDO**

***Product 5*:** **64 Mb DRAM, 8 Mb x 8, Synchronous**

***Product 6*:** **64 Mb SDRAM, 4 Mb x 16, Synchronous**

***Product 7*:** **8 Mb SGRAM, 256 Kb x 32, Synchronous**

***Product 8*:** **16 Megabyte SIMM, 4 Mb x 32, EDO**

Five U.S. producers and 16 importers provided usable data on at least one product. There were sales of both U.S.-produced and Taiwan-fabricated product 1 throughout the period of investigation. There were some sales of products 2 and 3 in 1996 but the majority of sales of both domestic and Taiwan products 2 and 3 took place in 1997 and 1998. Sales of domestic products 4 and 5 began in 1997, with the first sales of product 6 in early 1998. Sales of Taiwan product 4 began in early 1998, and sales of products 5 and 6 began in late 1998. The first reported sales of domestic product 7 took place in late 1996, and the first reported sales of Taiwan product 7 were in July 1997. There was one reported sale of Taiwan-fabricated product 8 during the period of investigation, so data for this product are not included

in the analysis. The seven products for which price comparisons were possible accounted for 13.6 percent of total U.S. DRAM shipments by reporting producers on a value basis in 1998. Sales of these products by reporting importers accounted for 66.0 percent of total U.S. shipments of Taiwan-fabricated DRAMs by reporting importers in 1998. Coverage was much higher for imported DRAMs because the majority of Taiwan-fabricated DRAMs are sold as units rather than assembled into modules.

Price Trends

The prices of all products trended sharply down over the period of investigation, consistent with the DRAM life cycle noted in previous investigations.[2] Production costs and selling prices fall for each new generation of DRAMs as producers move along the learning curve, increasing production and yield. OEM sales were generally less volatile than non-OEM sales for all products. Prices for products 1, 2, and 3 increased slightly in mid-1997, then fell rapidly through mid-1998, and have since stabilized. Products 4, 5, and 6 were introduced during the period of investigation. All are 64 Mb DRAMs. Prices for these products generally fell through mid-1998, and have since stabilized. Prices for product 7 fell through the end of 1998, but have increased slightly in interim 1999.

Price Comparisons

Product 1 fabricated in Taiwan has generally been priced lower than product 1 fabricated domestically throughout the period of investigation, except for three months in 1996[3] (tables V-1 and V-8). The quantity of product 1 sold per month by domestic producers has declined since 1996. The quantity of Taiwan-fabricated product 1 sold per month reached a maximum in early 1998, and has since declined.

Sales of Taiwan-fabricated product 2 were first reported in January 1997. Average unit values on sales of Taiwan-fabricated product 2 to OEM customers have been below the average unit values for U.S.-produced product 2 sold to OEM customers in every month in which comparisons could be made. Margins for product 2 sold to non-OEM customers have been mixed, with Taiwan product 2 priced above domestic product 2 to non-OEM customers in 13 of 30 months for which comparisons could be made (tables V-2 and V-9). Taiwan-fabricated product 3 sold to OEM customers was priced below the price for U.S.-produced product 3 in 18 of 20 months for which prices could be compared. Taiwan-fabricated product 3 was sold to non-OEM customers at a higher average price than the domestic product in 12 of 21 months in which prices could be compared (tables V-3 and V-10).

Importer ***.

There were limited reported sales of Taiwan-fabricated products 4 and 5 (64 Mb DRAMs) to OEM customers in the period of investigation. Taiwan-fabricated products 4 and 5 sold to OEM customers undersold domestic products in every month for which comparisons could be made. Taiwan-fabricated product 6 sold to non-OEM customers was priced below domestic product 6 in two of five

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[2] *DRAMs of One Megabit and Above From the Republic of Korea*, Inv. No. 731-TA-556 (Final), p. 17, and *DRAMs of One Megabit and Above From the Republic of Korea (Views on Remand)*, Inv. No. 731-TA-556 (Remand), pp. 6-7.

[3] Importer *** was unable to provide monthly sales data on product 1 for 1996. Annual figures were used.

months for which prices could be compared. Sales of Taiwan-fabricated products 4, 5, and 6 to non-OEM customers showed mixed margins of underselling. Taiwan product 4 undersold the domestic product in 12 of 15 months in which comparisons could be made. Taiwan product 5 undersold the domestic product in 6 of 12 months for which prices could be compared. Taiwan product 6 was priced below domestic product 6 in 7 of 11 months for which sales of Taiwan-fabricated product 6 were reported (tables V-4 through V-6 and V-11 through V-13).

U.S. commercial sales of Taiwan-fabricated product 7 to OEM customers were reported in every month since July 1997, and sales to non-OEM customers were reported for the last seven months of 1998. From July 1997 through May 1998, the average unit value of Taiwan product 7 was above the average unit value of domestic product in 8 of 11 months for which comparisons could be made (all were sales to OEM customers). Since June 1998 the average unit value for all sales of Taiwan-fabricated product 7 to both OEM and non-OEM customers has been below the comparable U.S. average unit value (tables V-7 and V-14).

Annual reported U.S. sales of products 1 through 7, with instances and margins of under- or overselling are reported in tables V-1 through V-7. Monthly U.S. sales and average unit values of products 1 through 7 fabricated in the United States and in Taiwan, and margins of under- or overselling are reported in tables V-8 through V-14. Appendix H contains graphs of price trends and margins.

Table V-1
DRAMs: Volume of U.S. sales of product 1 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		***	***	***	***	***	***	***	***
Taiwan fabricated (1,000)		***	***	21,131	2,685	***	2,592	4,602	***
Underselling	Instances	9	9	12	12	12	12	6	3
	Margins	8.7-35.7	0.2-26.8	15.6-43.7	15.3-69.2	0.9-62.6	20.6-78.3	17.4-62.4	13.3-37.5
Overselling	Instances	3	3	0	0	0	0	0	0
	Margins	0.2-21.2	7.5-58.5	N/A	N/A	N/A	N/A	N/A	N/A

Source: Commission questionnaires.

Table V-2
DRAMs: Volume of U.S. sales of product 2 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		2,352	***	***	***	***	***	***	***
Taiwan fabricated (1,000)		0	0	***	***	***	***	0	***
Underselling	Instances	N/A	N/A	12	10	9	6	0	1
	Margins	N/A	N/A	0.5-35.1	0.1-162.9[1]	5.0-21.9	0.3-14.3	N/A	4.0
Overselling	Instances	N/A	N/A	0	2	0	6	0	5
	Margins	N/A	N/A	N/A	6.2-18.1	N/A	4.2-35.1	N/A	5.3-22.1

[1] Margin of over 100 percent reflects a negative average unit value of Taiwan-fabricated product.

Source: Commission questionnaires.

Table V-3
DRAMs: Volume of U.S. sales of product 3 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		0	0	***	***	***	***	4,384	***
Taiwan fabricated (1,000)		***	***	***	***	***	***	0	***
Underselling	Instances	0	0	10	4	8	4	0	1
	Margins	N/A	N/A	6.1-54.0	33.7-94.6	14.4-29.6	73.2-152[1]	N/A	3.7
Overselling	Instances	0	0	1	7	1	5	0	0
	Margins	N/A	N/A	20.5	2.0-53.6	42.0	0.6-37.8	N/A	N/A

[1] Margin of over 100 percent reflects a negative average unit value of Taiwan-fabricated product.

Source: Commission questionnaires.

Table V-4
DRAMs: Volume of U.S. sales of product 4 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		0	0	***	***	***	***	***	***
Taiwan fabricated (1,000)		0	0	0	0	***	2,263	***	***
Underselling	Instances	0	0	0	0	6	9	2	3
	Margins	N/A	N/A	N/A	N/A	20.7-47.9	5.1-50.0	2.2-3.2	0.3-15.8
Overselling	Instances	0	0	N/A	N/A	0	2	0	1
	Margins	N/A	N/A	N/A	N/A	N/A	6.4-10.7	N/A	3.5

Source: Commission questionnaires.

Table V-5
DRAMs: Volume of U.S. sales of product 5 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		0	0	***	***	***	***	***	3,654
Taiwan fabricated (1,000)		0	0	0	0	***	***	***	***
Underselling	Instances	0	0	0	0	4	3	5	3
	Margins	N/A	N/A	N/A	N/A	0.3-3.0	2.7-11.7	10.2-28.0	0.2-19.3
Overselling	Instances	0	0	0	0	0	3	0	3
	Margins	N/A	N/A	N/A	N/A	N/A	3.2-4.3	N/A	2.0-8.9

Source: Commission questionnaires.

Table V-6
DRAMs: Volume of U.S. sales of product 6 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		N/A	N/A	N/A	N/A	***	***	***	***
Taiwan fabricated (1,000)		N/A	N/A	N/A	N/A	0	***	***	***
Underselling	Instances	0	0	0	0	0	3	2	4
	Margins	N/A	N/A	N/A	N/A	N/A	2.3-20.3	1.4-5.3	0.4-18.7
Overselling	Instances	0	0	0	0	0	2	3	2
	Margins	N/A	N/A	N/A	N/A	N/A	2.1-24.6	1.8-30.0	7.4-80.4

Source: Commission questionnaires.

Table V-7
DRAMs: Volume of U.S. sales of product 7 fabricated in the United States and in Taiwan, and instances (number of months) and range of margins of under- and overselling to OEM and non-OEM customers, 1996-98 and Jan.-June 1999

Item		1996		1997		1998		Interim 1999	
		OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM	OEM	Non-OEM
U.S. fabricated (1,000)		0.1	0	4,571	***	4,626	***	***	***
Taiwan fabricated (1,000)		0	0	***	0	***	***	***	0
Underselling	Instances	0	0	2	0	8	7	6	0
	Margins	N/A	N/A	1.3-15.3	N/A	0.1-34.3	28.0-52.1	13.1-33.1	N/A
Overselling	Instances	0	0	4	0	4	0	0	0
	Margins	N/A	N/A	3.6-14.7	N/A	1.8-14.8	N/A	N/A	N/A

Source: Commission questionnaires.

Table V-8
DRAMs: Quantity and average selling price of product 1 fabricated in the United States and in Taiwan and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

Table V-9
DRAMs: Quantity and average selling price of product 2 fabricated in the United States and in Taiwan, and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

Table V-10
DRAMs: Quantity and average selling price of product 3 fabricated in the United States and in Taiwan and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

Table V-11
DRAMs: Quantity and average selling price of product 4 fabricated in the United States and in Taiwan and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

Table V-12
DRAMs: Quantity and average selling price of product5 fabricated in the United States and in Taiwan and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

Table V-13
DRAMs: Quantity and average selling price of product 6 fabricated in the United States and in Taiwan and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

Table V-14
DRAMs: Quantity and average selling price of product 7 fabricated in the United States and in Taiwan and percent margins of under- and overselling, by months, Jan. 1996-June 1999

* * * * * * *

LOST SALES AND LOST REVENUES

Domestic producers were asked if they had reduced prices or rolled back announced price increases to avoid losing sales to DRAMs from Taiwan, or had lost sales to imports from Taiwan since January 1, 1996. Producers were asked to provide information on specific instances of such lost revenues and sales. *** reported reducing prices on products sold on the spot market due to competition from Taiwan imports, but specific data were not available. *** reported reducing sales prices "to compete with world wide pricing levels" and reducing production to minimize losses. No data on specific sales were available. *** reported reducing prices, rolling back announced price increases, and losing sales because of imports from Taiwan. Specific data were not available. *** submitted a list of 23 sales involving 19 customers allegedly lost to DRAMs imported from Taiwan. The alleged lost sales totaled $***. Data on alleged lost sales are presented in table V-15. *** also submitted a list of 60 lost revenue allegations involving subject product on sales to nine firms (50 of these allegations concerned sales to ***). The lost revenue allegations totaled approximately $***. Data on specific instances are presented in table V-16.

Because many purchases and requests for quotation are handled over the telephone, many purchasers were unable to confirm or deny alleged instances of lost sales or revenue.[4] As a result, staff were unable to confirm many of these allegations.

Table V-15
DRAMs from Taiwan: Lost sales allegations

* * * * * * *

Table V-16
DRAMs from Taiwan: Lost revenue allegations

* * * * * * *

[4] *** response to Commission producer questionnaire, p. 40.

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

BACKGROUND

Ten producers[1] provided financial data on their DRAM operations.[2] One fabless[3] producer provided its results of operations (appendix I). Results of operations of two module assemblers[4] that provided usable data are presented in appendix J. Commission staff verified questionnaire data provided by Micron, resulting in changes to the financial data.

Financial data include cased and uncased DRAMs, modules containing DRAMs, and various densities of DRAMs. Because of the mix of products, quantities sold have little correlation with financial performance on a per-unit basis and thus were not requested in the financial section of the questionnaire.

OPERATIONS ON DRAMS

The results of the U.S. producers' DRAM operations are presented in table VI-1. The combined companies' net sales value decreased in each fiscal year, contributing to increasing operating losses in each year. The net sales value in interim 1999 more than doubled when compared to interim 1998, contributing to a substantial decrease in the operating loss in interim 1999 compared to interim 1998. The detail of net sales and company transfers is presented in table VI-2.

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[1] *** have fiscal yearends of Dec. 31. *** have fiscal yearends of Mar. 31; however, *** provided data on a calendar year basis. ***. *** has a fiscal yearend of Sept. 30.

[2] The companies were requested to report domestic and export sales and transfers of DRAMs and DRAM modules produced from wafers and dice fabricated in the United States, regardless of assembly location, plus third-country sourced dice assembled in the United States.

[3] Fabless producers are defined as U.S. firms that do not engage in actual wafer fabrication, but rather design the wafer and purchase the fabricated wafer product of DRAM foundries. ***.

[4] The module assemblers are ***.

Table VI-1
Results of U.S. producers on their DRAM operations, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Fiscal year			Jan.-June	
	1996	1997	1998	1998	1999
	Value (*$1,000*)				
Net sales:					
Trade sales	2,115,186	2,091,042	1,718,240	737,795	1,528,255
Company transfers	753,838	677,928	562,172	235,425	627,322
Total sales	2,869,024	2,768,970	2,280,412	973,220	2,155,577
Cost of goods sold	2,540,925	2,824,971	3,283,002	1,524,158	2,076,995
Gross profit	328,099	(56,001)	(1,002,590)	(550,938)	78,582
Operating expenses	396,198	503,696	526,344	290,407	260,697
Operating income or (loss)	(68,099)	(559,697)	(1,528,934)	(841,345)	(182,115)
Interest expense[1]	32,205	97,799	212,480	91,883	166,657
Other expense[1,2]	106,427	378,679	170,064	62,863	32,029
Other income items[1]	114,136	118,107	100,227	49,478	96,019
Net income or (loss)	(92,595)	(918,068)	(1,811,251)	(946,613)	(284,782)
Depreciation/amortization	714,897	844,302	1,068,021	463,839	673,472
Cash flow	622,302	(73,766)	(743,230)	(482,774)	388,690
	Ratio to net sales (*percent*)				
Cost of goods sold	88.6	102.0	144.0	156.6	96.4
Gross profit	11.4	(2.0)	(44.0)	(56.6)	3.6
Operating expenses	13.8	18.2	23.1	29.8	12.1
Operating income or (loss)	(2.4)	(20.2)	(67.0)	(86.5)	(8.4)
Net income or (loss)	(3.2)	(33.2)	(79.4)	(97.3)	(13.2)
	Number of firms reporting[3]				
Operating losses	7	8	9	9	3
Data	7	7	10	8	7

[1] Interest expense, other expense, and other income items may not be comparable from period to period because ***.
[2] The large other expense in 1997 is due primarily to a ***.
[3] The number of firms reporting data is based on net sales. ***.

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

Table VI-2
Detail of net trade sales and company transfers of U.S. DRAM producers, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

Table VI-3 presents selected financial data by firm. ***.[5] ***. *** of the remaining seven companies realized an operating income in interim 1999.

Table VI-3
Selected financial data of U.S. producers on their DRAM operations, by firm, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

DOMESTIC VALUE ADDED TO DRAMS

The producers that fabricated dice in the United States, the fabless producer, and the module assemblers were requested to provide the domestic value added to 16 Mb and 64 Mb DRAMs on a per-unit basis[6] for their last full year of production. The domestic value added as a percent of total processing costs is summarized in the following tabulation:

	Total domestic value added		Total domestic value added less SG&A	
	16 Mb	64 Mb	16 Mb	64 Mb
	Percent	*Percent*	*Percent*	*Percent*
Fabricators:				
***				
***				
***				
***				
***				
***				
Fabless producer:				
***				

	All DRAMs	All DRAMs
	Percent	*Percent*
Module assembler:[7]		
***		

[5] ***.

[6] *** provided its production cost in actual dollars rather than dollars per unit.

[7] ***.

The analysis is based on the source of the production process (domestic or foreign) that is added to the purchased materials. The fabless producer designs the dice and purchases fabrication from foreign companies, thereby obtaining a significantly lower value added than the fabricators, who typically do the fabrication in the United States and may have the assembly done by foreign sources.

The domestic value added by process for 64 Mb DRAMs by the three producers that provided the detail data are presented in table VI-4. The majority of the domestic value added is for the fabrication costs for each producer. See appendix K for the detail computations.

Table VI-4
Domestic value added, by production process, for 64 Mb DRAMs for selected U.S. producers, 1998

* * * * * * *

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

The U.S. producers' capital expenditures, research and development (R&D) expenditures, and the value of their fixed assets are presented in table VI-5. Capital expenditures increased in each comparative year but decreased in interim 1999 compared to interim 1998. R&D increased in each comparative period except 1998.

Table VI-5
Capital expenditures, research and development expenditures, and assets utilized by U.S. DRAM producers, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Fiscal year			Jan.-June	
	1996	1997	1998	1998	1999
	Value (*$1,000*)				
Capital expenditures[1]	2,067,157	2,488,458	2,589,114	1,425,262	706,185
R&D expenses[2]	***	***	***	***	***
Fixed assets:[3]					
Original cost	4,684,450	6,034,891	8,632,384	6,932,522	9,210,298
Book value	2,917,234	3,869,556	5,681,480	4,463,227	5,747,996

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

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

Four producers[8] provided capital expenditures for the stages of production. As shown in appendix L, the bulk of the capital expenditures were expended for the fabrication stage, ranging from 64.6 percent (in interim 1999) to 77.2 percent (in 1997) of total capital expenditures for the combined companies, followed by the assembly and test stage, which ranged from 17.6 percent (in 1997) to 31.0 percent (in interim 1999). Average expenditures for the design stage of production reported by two producers[9] ranged from *** percent in interim 1998 to *** percent in 1997.

The producers were requested to identify the source(s) of funds for their capital expenditures, the extent to which reported R&D expenditures are dependent on parent company approval, and the share of R&D that is undertaken by their parent company. *** did not respond; the responses of the other companies *** are as follows:

***[10] ***.
***.
***.
***.
***.[11]
***.
***[12] ***.
***.

CAPITAL AND INVESTMENT

The producers' comments regarding any actual or potential negative effects of imports of DRAMs from 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 M.

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[8] The producers are ***.

[9] ***.

[10] ***.

[11] ***'s response is from the preliminary phase of the investigation.

[12] ***. ***'s response is from the preliminary phase of the investigation.

PART VII: THREAT CONSIDERATIONS

The Commission analyzes a number of factors in making threat determinations (see 19 U.S.C. § 1677(7)(F)(I)). 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. Available 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 questionnaires, either directly or through counsel, to all Taiwan DRAM producers cited in the petition. Usable responses were received from eight producers in Taiwan and two firms identified as design houses.[1] The following profile on DRAM operations in Taiwan draws from questionnaire responses, materials received from the American Institute in Taiwan (AIT), and information from published sources.

THE INDUSTRY IN TAIWAN

The petition identified 11 firms fabricating DRAMs in Taiwan: Acer Semiconductor Manufacturing, Inc. (Acer); Macronix International Co., Ltd. (Macronix); Mosel-Vitelic, Inc.; Nan Ya Technology Corp. (Nan Ya); Powerchip Semiconductor Corp. (Powerchip); ProMOS Technologies (ProMOS); Taiwan Semiconductor Manufacturing Corp. (TSMC); United Microelectronics Corp. (UMC); United Semiconductor Corp. (USC); Vanguard International Semiconductor Corp. (Vanguard); and Winbond Electronics Corp. (Winbond).[2] The petitioner also identified the following four "fabless" design houses believed to be engaged in DRAM production through subcontract work placed with fabrication foundries[3] in Taiwan: Alliance Semiconductor Corp. (Alliance); Etron Technology, Inc. (Etron); G-Link Technology Corp. (G-Link); and Taiwan Memory Technology. In addition, the Commission staff identified another fabless producer, Integrated Silicon Solutions, Inc.

In a postconference brief submitted by the respondents, Mosel-Vitelic, Nan Ya, and Vanguard were distinguished as tier-two DRAM producers based on their indigenously developed designs and technology. Acer, Macronix, Powerchip, ProMOS, and Winbond were identified as tier-one manufacturers that fabricate dice on behalf of third parties based on the outside companies' designs and technology. *** were identified by the respondents as engaged in tier-one production, though the

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[1] For one design house, ***, the capacity and uncased production data provided were not used in tables VII-4, VII-5, or in app. N. This is because *** does not have its own fabrication or capacity, but instead uses that of companies that have already reported to the Commission.

[2] In its postconference brief, the petitioner further distinguished the following firms as "DRAM-dedicated facilities:" Acer, Macronix, Mosel-Vitelic, Nan Ya, Powerchip, ProMOS, Vanguard, and Winbond. The petitioner identified TSMC, UMC, and USC (a joint venture between UMC, Alliance, and S3 Inc.) as foundry producers of DRAMs. In its posthearing brief (p. 14), petitioner noted that a twelfth DRAM producer, Pacific Semiconductor Manufacturing Corp., had broken ground on a new facility.

[3] A foundry is a company whose primary business is to act as a contract producer by processing wafers on behalf of third parties, rather than offering their own products. As explained at the conference, Taiwan foundries process DRAMs with technology and designs supplied and owned by their foundry partners.

respondents noted that these companies may also be considered tier-two suppliers, as a portion of their production of DRAMs is reportedly based on Taiwan-developed designs. However, any distinguishing technology gap between tier-one and tier-two producers appears to be shrinking, as nearly all Taiwan fabricators are currently in production and/or technology partnerships with leading global DRAM producers. Table VII-1 lists the major Taiwan DRAM fabricators and their technology/production partners.

Table VII-1
Taiwan's DRAM fabricators, their technology/production partners, and year that partnership was established (if known)

Taiwan DRAM fabricator	Technology/production partner
Mosel-Vitelic/PROMOS	Infineon Technologies (est. 1996)
Winbond	Toshiba (est. 1995)
Powerchip	Mitsubishi (est. 1994)
Acer	Texas Instruments (partnership ceased in 1998) TSMC (est. 1999)
Nan Ya	IBM (est. 1998)
Vanguard	Etron Mitsubishi (est. 1999)
Macronix	Matsushita (est. ***)
TSMC	As a foundry producer, it uses its client's designs
UMC	As a foundry producer, it uses its client's designs
USC	As a foundry producer, it uses its client's designs

Source: "Taiwan DRAM Industry: A Global Perspective," Credit Suisse First Boston (Hong Kong) Limited, July 19, 1999, and telegram from AIT.

According to information obtained from the AIT, Taiwan's integrated circuit (IC), or semiconductor, industry developed in the early 1980s. The industry gained early technological and personnel support from Taiwan-based research organizations and later expanded upon a foundation of related industries in Taiwan, including personal computer manufacturers and other information technology producers. Initially focused on consumer electronics, Taiwan's semiconductor industry now primarily produces application-specific ICs and memory products such as DRAMs and SRAMs. In 1997, DRAM production reportedly rose by 44 percent and accounted for over one-half of the value of Taiwan's total semiconductor production.[4]

[4] A telegram from the AIT cited the ratio of the value of DRAMs to the value of total semiconductor production in 1997 as 48 percent, but the data included in the telegram indicate a ratio of 52 percent. U.S. Department of

(continued...)

During 1989-97, the number of semiconductor manufacturers in Taiwan grew from 6 to 20. Today, approximately 20 manufacturers, 3 mask-making firms, 23 assembly firms, and 16 firms involved in testing make up Taiwan's total semiconductor industry. With respect to exports, available data on shipments of DRAMs from Taiwan show Japan, the United States, and Hong Kong as Taiwan's primary export markets. According to sources in Taiwan, exports of DRAMs are not limited by tariff barriers or other restraint agreements.[5] Data pertaining to the global market shares of Taiwan's primary DRAM-producing companies are presented in table VII-2.

Estimates by Taiwan's Electronics Research and Service Organization (ERSO) indicate that the production capacity of Taiwan's semiconductor industry grew by 31 percent in 1997; ERSO estimated capacity growth in 1998 at 32 percent.[6] ERSO reports, however, that Taiwan's semiconductor industry has slowed plans for further expansion in the DRAM sector because of intense global competition in the DRAM market, and that Taiwan's semiconductor industry investment dropped by 40 percent from approximately $5.1 billion in 1997 to $3 billion in 1998. At the same time, according to the Taiwan Semiconductor Industry Association (TSIA), Taiwan's semiconductor industry plans to invest $53 billion over the next decade to construct 29 8-inch and 12-inch wafer fabrication plants to produce semiconductor products.[7] A report published in September 1998 by Taiwan's Ministry of Economic Affairs states that it is likely that until 2000 the average growth rate in the semiconductor industry will remain at the 15-20 percent level.

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[4] (...continued)
State telegram 4811 from the American Institute in Taiwan, Nov. 17, 1998.

[5] U.S. Department of State telegram 4811 from the American Institute in Taiwan, Nov. 17, 1998.

[6] Although the telegram from the AIT listed 1988 as the year in which Taiwan's semiconductor industry was expected to realize an estimated 32-percent growth in capacity, it is assumed to be a typographical error given the stated increase from the previous year, 1997.

[7] At the hearing, a representative of TSIA stated that the $53 billion figure was generated two years ago and that he had doubts about Taiwan's ability to achieve that level of investment. Transcript, p. 120.

Table VII-2
Estimated production and global market share of Taiwan's primary DRAM producers, 1996-2001

Company	1996	1997	1998	1999	2000	2001
	Production quantity in 64 Mb equivalent units *(millions)*					
ProMOS	-	1	35	104	186	256
Winbond	-	-	7	68	152	230
Powerchip	0	12	20	46	98	139
Vanguard	7	20	27	50	99	188
Nan Ya	0	6	17	28	91	224
UMC	-	-	17	32	23	30
Acer	15	28	25	54	47	19
Mosel Vitelic	7	9	9	7	3	-
Total	30	76	158	390	699	1,086
	Market share (*percent*)					
ProMOS	0	0	3	5	5	4
Winbond	0	0	1	3	4	4
Powerchip	0	2	2	2	3	2
Vanguard	2	3	2	2	3	3
Nan Ya	0	1	1	1	2	4
UMC	0	0	1	1	1	0
Acer	4	4	2	2	1	0
Mosel Vitelic	2	1	1	0	0	0
Total	9	11	12	17	18	17

Source: "Taiwan DRAM Industry: A Global Perspective," Credit Suisse First Boston (Hong Kong) Limited, July 19, 1999, p. 25.

Taiwan's semiconductor producers maintain wafer fabrication facilities that process wafers ranging from 5 inches to 8 inches, and most firms have the capacity to manufacture DRAMs using 0.21-0.35 micron process technology. A report published in July 1999 by Credit Suisse First Boston on Taiwan's DRAM industry suggests that several Taiwan DRAM facilities will be able to upgrade to higher process technologies in the near future, in part because of increased cooperation between Taiwan firms and established global producers.[8] Specifically, ProMOS, Winbond, Powerchip, Vanguard, Nan Ya, and Acer are expected to initiate 64 Mb SDRAM production using 0.18-0.22 micron process technology by the end of 1999.[9] While the introduction of advanced technologies is expected to boost the number of dice produced per wafer,[10] certain companies have already experienced sub-optimal yields due to difficulties during the transition stage, and it is anticipated that those facilities which have yet to introduce the most advanced production processes will experience diminished yield performance during the ramp-up period. Estimated yield rates for Taiwan producers range from 53 to 77 percent for full year 1999 and 63 to 81 percent for full year 2000.[11] Data pertaining to estimated monthly wafer capacities for selected firms are presented in table VII-3.

The petitioner argues that the threat of product-shifting is extremely high in this industry. Petitioner notes that a significant portion of Taiwan's semiconductor industry is foundry capacity. Foundries are not dedicated to the production of any particular product, but instead can manufacture a variety of products. Petitioner further states that Taiwan foundries can quickly and easily switch non-DRAM capacity to DRAMs. Petitioner specifically cites TSMC and UMC (and their related companies) as Taiwan foundry producers that already fabricate DRAMs with the potential to product shift.[12]

The respondents argue that Taiwan producers are not likely to shift production to DRAMs from other semiconductor devices. Respondents state that although Taiwan producers make a variety of semiconductor products, they are more likely to shift to the production of other products, rather than to DRAMs. Further, respondent notes that in the future, DRAM production will likely shift away from Taiwan, to third countries where technology partners are located.[13]

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[8] For example, IBM and Nan Ya recently concluded a cooperative agreement whereby IBM will transfer 0.20-0.175 micron process technology to the Taiwan firm. Winbond extended its relationship with Toshiba through a recent contract for 0.18-0.15 micron process technology transfer, and Vanguard has partnered with Taiwan design company Etron to develop advanced 64 Mb, 128 Mb, and 256 Mb DRAM products. Additional Taiwan firms involved in cooperative arrangements with foreign semiconductor firms include ProMOS (Infineon), Powerchip (Mitsubishi), and Macronix (Matsushita). Acer's partnership with Texas Instruments (TI) dissolved in 1998 when TI exited the industry.

[9] "Taiwan DRAM Industry: A Global Perspective," Credit Suisse First Boston (Hong Kong) Limited, July 19, 1999, p. 26. During his testimony, Kenneth Hurley of Nan Ya voiced some scepticism regarding whether or not Nan Ya would have concluded internal qualification for the production and shipments of 64 Mb SDRAMs by the end of 1999. Transcript, p. 146.

[10] For example, ProMOS' shift from 0.25 to 0.20 micron process technology is expected to result in a 44-percent increase in dice produced per wafer.

[11] Data refer to estimated yield rates for ProMOS, Winbond, Powerchip, Vanguard, Nan Ya, UMC, and Acer. "Taiwan DRAM Industry: A Global Perspective," Credit Suisse First Boston (Hong Kong) Limited, July 19, 1999, p. 29.

[12] Petitioner's prehearing brief, pp. 76-78.

[13] Respondents' prehearing brief, pp. 55-56.

Table VII-3
Estimated monthly wafer capacity of selected Taiwan DRAM producers, by quarters, 1999-2000

Company	1Q 1999	2Q 1999	3Q 1999	4Q 1999	1Q 2000	2Q 2000	3Q 2000	4Q 2000
	Wafers per month *(1,000)*							
ProMOS	21	25	28	32	31	32	32	32
Winbond	16	17	21	24	25	28	31	33
Powerchip	20	21	23	25	23	25	26	27
Vanguard	33	35	38	38	41	40	40	40
Nan Ya	22	22	25	25	30	30	37	42
UMC	25	20	15	13	10	10	10	10
Total	164	168	177	186	193	199	214	224

Source: "Taiwan DRAM Industry: A Global Perspective," Credit Suisse First Boston (Hong Kong) Limited, July 19, 1999, p. 29.

Table VII-4 presents Taiwan's inventories and shipments during January 1996-June 1999, as reported by respondents to the Commission's questionnaires. Information outlining Taiwan producers' future capacity for the production of DRAMs is included in appendix N. Additional questionnaire data are included in appendix O on Taiwan's production, capacity, and capacity utilization.

U.S. IMPORTERS' INVENTORIES

End-of-period inventories held by U.S. importers of uncased DRAMs, cased DRAMS, and DRAM memory modules are shown in table VII-5.

Report VII-4
DRAMS ≥1 Mb and DRAM modules: Taiwan's inventories and shipments (by volume), 1996-98, Jan.-June 1998, Jan.-June 1999, and projected 1999-2000

Item	Calendar years			January-June		Projected	
	1996	1997	1998	1998	1999	1999	2000
End of period inventories *(billion bits)*	70,655	449,208	487,351	675,757	1,127,956	997,212	***
Shipments *(billion bits)*							
Home market							
Company transfers	***	2,784,037	5,673,187	1,853,233	6,318,090	15,043,266	24,387,631
Other shipments	***	***	3,511,471	***	4,020,584	***	***
Total home market	***	***	9,184,658	***	10,338,674	***	***
Exports to							
The United States	***	***	1,656,166	489,695	1,561,988	***	***
All other markets	453,934	1,560,364	2,100,674	942,632	1,526,697	***	***
Total exports	***	***	3,756,840	1,432,328	3,088,685	***	***
Total shipments	***	***	12,941,497	***	13,427,359	***	***
Share of total quantity of shipments *(percent)*							
Home market							
Company transfers	***	***	43.84	***	47.05	***	***
Other shipments	***	***	27.13	***	29.94	***	***
Exports to							
The United States	***	***	12.80	***	11.63	***	***
All other markets	***	***	16.23	***	11.37	***	***
Inventories to all shipments	***	***	3.77	***	8.40	***	***

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

Table VII-5
DRAMs and DRAM modules: End-of-period inventories of U.S. "imports," by origin of dice, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar years			January-June	
	1996	1997	1998	1998	1999
Quantity *(billions of bits)*					
Subject Taiwan-fabricated dice	***	64,281	***	203,305	***
Nonsubject Taiwan-fabricated dice	0	0	0	0	0
Japan-fabricated dice	190,557	493,143	568,474	398,513	873,801
Korea-fabricated dice	450,276	***	***	1,108,614	***
All other 3rd-source fabricated dice	***	89,032	138,415	***	445,893
Total, all "imports"	832,421	***	1,650,631	***	2,580,924
Share of imports (*percent*)					
Subject Taiwan-fabricated dice	***	8.13	***	15.88	***
Nonsubject Taiwan-fabricated dice	0	0	0	0	0
Japan-fabricated dice	61.70	62.40	28.43	31.12	29.27
Korea-fabricated dice	20.92	***	***	15.29	***
All other 3rd-source fabricated dice	***	11.27	6.92	***	14.93
Total, all "imports"	18.13	***	7.61	***	8.39

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

APPENDIX A

FEDERAL REGISTER NOTICES

778 of the IFR was covered by the currently valid OMB control number associated with the prior rule.)

Even if the IFR's collections of information were material or substantive, OSM's current renewal effort relative to 30 CFR Part 778 will cure any procedural or technical defects by affording the respondent pool with the same notice and opportunity to comment that would have been provided had OSM submitted the IFR to the PRA's notice and comment procedures; the notice and comment provisions for renews are substantially identical to the provisions for collections for information contained in an interim final rule. 5 CFR 1320.10, 120.12. Furthermore, this renewal package reflects all changes in the IFR from the prior permit information rule, so the respondents will have a full and fair opportunity to comment on the collections of information embodied in the IFR. OSM believes that the collections of information contained in the IFR should in any case remain valid pending OMB's review of the approval package.

As required by the PRA, OSM will seek an additional 30-day comment period regarding this information collection activity upon OSM submission of this clearance request to OMB for review. All interested parties will have another opportunity in which to submit substantive comments on the following information collection activity:

Title: Permit Applications—Minimum Requirements for Legal, Financial, Compliance, and Related Information—30 CFR 778.

OMB Control Number: 1029–0034.

Summary: Section 507(b) of P.L. 95–87 provides persons conducting coal mining activities submit to the regulatory authority all relevant information regarding ownership and control of the property affected, their compliance status and history. This information is used to insure all legal, financial and compliance requirements are satisfied prior to issuance or denial of a permit.

Bureau Form Number: None.

Frequency of Collection: Once.

Description of Respondents: Surface coal mining permit applicants and State regulatory authorities.

Total Annual Responses: 420.

Total Annual Burden Hours: 16,261.

Send comments on the need for the collection of information for the performance of the functions of the agency; the accuracy of the agency's burden estimates; ways to enhance the quality, utility and clarity of the information collection; and ways to minimize the information collection burden on respondents, such as use of automated means of collection of the information, to the following address. Please refer to OMB control number 1029–0034 in all correspondence.

ADDRESSES: Office of Information and Regulatory Affairs, Office of Management and Budget, Attention: Department of Interior Desk Officer, 725 17th Street, NW, Washington, DC 20503, and to John A. Trelease, Office of Surface Mining Reclamation and Enforcement, 1951 Constitution Ave, NW, Room 210–SIB, Washington, DC 20240.

Dated: June 14, 1999.

Richard G. Bryson,

Chief, Division of Regulatory Support.

[FR Doc. 99–15400 Filed 6–16–99; 8:45 am]

BILLING CODE 4310–05–M

INTERNATIONAL TRADE COMMISSION

[Investigation No. 731–TA–811 (Final)]

Drams of One Megabit and Above From Taiwan

AGENCY: United States International Trade Commission.

ACTION: Scheduling of the final phase of an antidumping investigation.

SUMMARY: The Commission hereby gives notice of the scheduling of the final phase of antidumping investigation No. 731–TA–811 (Final) under section 735(b) of the Tariff Act of 1930 (19 U.S.C. 1673d(b)) (the Act) to determine whether 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 less-than-fair-value imports from Taiwan of dynamic random access memory semiconductors (DRAMs) of one megabit and above, provided for in subheadings 8542.13.80 and 8473.30.10 through 8473.30.90 of the Harmonized Tariff Schedule of the United States.[1]

For further information concerning the conduct of this phase of the investigation, hearing procedures, 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 C (19 CFR part 207).

EFFECTIVE DATE: May 28, 1999.

[1] Uncased and cased DRAMs are provided for in subheading 8542.13.80, while DRAM modules are provided for in subheadings 8473.30.10 through 8473.30.90. For Department of Commerce scope language, see 64 FR 28983, May 28, 1999.

FOR FURTHER INFORMATION CONTACT: Bob Carr (202–205–3402), 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*).

SUPPLEMENTARY INFORMATION:

Background

The final phase of this investigation is being scheduled as a result of an affirmative preliminary determination by the Department of Commerce that imports of DRAMs from Taiwan are being sold in the United States at less than fair value within the meaning of section 733 of the Act (19 U.S.C. 1673b). The investigation was requested in a petition filed on October 22, 1998, by Micron Technology, Inc., Boise, Idaho.

Participation in the Investigation and Public Service List

Persons, including industrial users of the subject merchandise and, if the merchandise is sold at the retail level, representative consumer organizations, wishing to participate in the final phase of this investigation as parties must file an entry of appearance with the Secretary to the Commission, as provided in § 201.11 of the Commission's rules, no later than 21 days prior to the hearing date specified in this notice. A party that filed a notice of appearance during the preliminary phase of the investigation need not file an additional notice of appearance during this final phase. The Secretary will maintain a public service list containing the names and addresses of all persons, or their representatives, who are parties to the investigation.

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 the final phase of this investigation available to authorized applicants under the APO issued in the investigation, provided that the application is made no later than 21 days prior to the hearing date specified in this notice. Authorized applicants must represent interested

parties, as defined by 19 U.S.C. 1677(9), who are parties to the investigation. A party granted access to BPI in the preliminary phase of the investigation need not reapply for such access. A separate service list will be maintained by the Secretary for those parties authorized to receive BPI under the APO.

Staff Report

The prehearing staff report in the final phase of this investigation will be placed in the nonpublic record on October 5, 1999, and a public version will be issued thereafter, pursuant to § 207.22 of the Commission's rules.

Hearing

The Commission will hold a hearing in connection with the final phase of this investigation beginning at 9:30 a.m. on October 19, 1999, at the U.S. International Trade Commission Building. Requests to appear at the hearing should be filed in writing with the Secretary to the Commission on or before October 8, 1999. A nonparty who has testimony that may aid the Commission's deliberations may request permission to present a short statement at the hearing. All parties and nonparties desiring to appear at the hearing and make oral presentations should attend a prehearing conference to be held at 9:30 a.m. on October 14, 1999, at the U.S. International Trade Commission Building. Oral testimony and written materials to be submitted at the public hearing are governed by §§ 201.6(b)(2), 201.13(f), and § 207.24 of the Commission's rules. Parties must submit any request to present a portion of their hearing testimony *in camera* no later than 7 days prior to the date of the hearing.

Written Submissions

Each party who is an interested party shall submit a prehearing brief to the Commission. Prehearing briefs must conform with the provisions of § 207.23 of the Commission's rules; the deadline for filing is October 13, 1999. Parties may also file written testimony in connection with their presentation at the hearing, as provided in § 207.24 of the Commission's rules, and posthearing briefs, which must conform with the provisions of § 207.25 of the Commission's rules. The deadline for filing posthearing briefs is October 26, 1999; witness testimony must be filed no later than three days before the hearing. In addition, any person who has not entered an appearance as a party to the investigation may submit a written statement of information pertinent to the subject of the investigation on or before October 26, 1999. On November 10, 1999, the Commission will make available to parties all information on which they have not had an opportunity to comment. Parties may submit final comments on this information on or before November 15, 1999, but such final comments must not contain new factual information and must otherwise comply with § 207.30 of the Commission's rules. All written submissions must conform with the provisions of § 201.8 of the Commission's rules; any submissions that contain BPI must also conform with the requirements of § 201.6, § 207.3, and § 207.7 of the Commission's rules. The Commission's rules do not authorize filing of submissions with the Secretary by facsimile or electronic means.

In accordance with §§ 201.16(c) and § 207.3 of the Commission's rules, each document filed by a party to the investigation must be served on all other parties to the investigation (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

This investigation is being conducted under authority of title VII of the Tariff Act of 1930; this notice is published pursuant to § 207.21 of the Commission's rules.

By order of the Commission.

Issued: June 14, 1999.

Donna R. Koehnke,

Secretary.

[FR Doc. 99-15439 Filed 6-16-99; 8:45 am]

BILLING CODE 7020-02-P

INTERNATIONAL TRADE COMMISSION

[Investigation No. 337-TA-422]

Notice of Investigation

In the Matter of: Certain Two-Handle Centerset Faucets and Escutcheons, and Components Thereof.

AGENCY: U.S. International Trade Commission.

ACTION: Institution of investigation pursuant to 19 U.S.C. 1337.

SUMMARY: Notice is hereby given that a complaint was filed with the U.S. International Trade Commission on May 12, 1999, under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, on behalf of Moen Incorporated of North Olmsted, Ohio. A supplement to the complaint was filed on May 27, 1999. The complaint, as supplemented, alleges violations of section 337 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain two-handle centerset faucets and escutcheons and components thereof by reason of infringement of U.S. Patent Des. 347,466. The complaint further alleges that an industry in the United States exists as required by subsection (a)(2) of section 337.

The complainant requests that the Commission institute an investigation and, after a hearing, issue a permanent general exclusion order and permanent cease and desist orders.

ADDRESSES: The complaint, as supplemented, except for any confidential information contained therein, is available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Room 112, Washington, D.C. 20436, telephone 202-205-2000. Hearing-impaired individuals are advised that information on this matter can be obtained 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).

FOR FURTHER INFORMATION CONTACT: Anne M. Goalwin, Esq., Office of Unfair Import Investigations, U.S. International Trade Commission, telephone 202-205-2574.

Authority: The authority for institution of this investigation is contained in section 337 of the Tariff Act of 1930, as amended, and in § 210.10 of the Commission's Rules of Practice and Procedure, 19 CFR 210.10 (1998).

Scope of Investigation: Having considered the complaint, the U.S. International Trade Commission, on June 11, 1999, ordered that—

(1) Pursuant to subsection (b) of section 337 of the Tariff Act of 1930, as amended, an investigation be instituted to determine whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain two-handle centerset faucets and escutcheons and components thereof by reason of infringement of U.S. Patent Des. 347,466, and whether an industry in the

Monitoring; (2) February Regional PAC Meeting; (3) Umpqua National Forest Restoration Strategy Briefing; (4) Forest Service Draft Planning Rule Briefing; (5) Potential Implications of Recent Court Rulings; and (6) Public Comment.

FOR FURTHER INFORMATION CONTACT: Direct questions regarding this meeting to Roger Evenson, Province Advisory Committee Coordinator, USDA, Forest Service, Umpqua National Forest, 2900 NW Stewart Parkway, Roseburg, Oregon 97470, phone (541) 957-3344.

Dated: October 12, 1999.

Don Ostby,

Designated Federal Official.

[FR Doc. 99-27191 Filed 10-18-99; 8:45 am]

BILLING CODE 3410-11-M

DEPARTMENT OF COMMERCE

Foreign-Trade Zones Board

[Docket 45-99]

Foreign-Trade Zone 27—Boston, MA, Application for Subzone, J. Baker, Inc. (Distribution of Apparel, Footwear and Accessories) Canton, MA; Correction

The **Federal Register** notice (64 FR 49440, September 13, 1999) describing the application submitted to the Foreign-Trade Zones Board (the Board) by the Massachusetts Port Authority, grantee of FTZ 27, requesting special-purpose subzone status for the apparel, footwear and accessories warehousing/distribution facilities of J. Baker, Inc., located in Canton, MA, is corrected as follows. Paragraph 2, sentence 1, describing the square footage and acreage for each facility should be changed to "The Baker facilities are located at 330 Turnpike Street (45,850 sq. ft. on 4.16 acres) and at 555 Turnpike Street (750,000 sq. ft. on 30.7 acres)." In paragraph 2, sentence 4, the percentage of exports should be changed from "over 5 percent" to "less than 5 percent."

Dated: October 8, 1999.

Dennis Puccinelli,

Acting Executive Secretary.

[FR Doc. 99-27292 Filed 10-18-99; 8:45 am]

BILLING CODE 3510-DS-P

DEPARTMENT OF COMMERCE

International Trade Administration

[A-122-601]

Antidumping Administrative Review of Brass Sheet and Strip from Canada: Time Limit

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

ACTION: Notice of extension of time limit for preliminary results of review.

SUMMARY: The Department of Commerce (the Department) is extending the time limit for the preliminary results of the administrative review of the antidumping duty order on Brass Sheet and Strip from Canada. The review covers one manufacturer/exporter of the subject merchandise to the United States for the period January 1, 1998 through December 31, 1998.

EFFECTIVE DATE: October 19, 1999.

FOR FURTHER INFORMATION CONTACT: Paige Rivas or Jim Terpstra, Group II, Office IV, AD/CVD Enforcement, Import Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, NW, Washington, DC 20230, telephone: (202) 482-0651, or (202) 482-3965, respectively.

SUPPLEMENTARY INFORMATION: Because it is not practicable to complete the preliminary results of this review within the initial time limit established by the Uruguay Round Agreements Act (245 days after the last day of the anniversary month), pursuant to section 751(a)(3)(A) of the Tariff Act of 1930, as amended (the Act), the Department is extending the time limit for completion of the preliminary results until January 31, 2000. *See* 19 CFR 351.213(h)(2) and the Memorandum from Bernard T. Carreau to Robert S. LaRussa, on file in the Central Records Unit located in room B-099 of the main Department of Commerce building.

This extension is in accordance with section 751(a)(3)(A) of the Act (19 U.S.C. 1675(a)(3)(A)).

Dated: October 4, 1999.

Bernard T. Carreau,

Deputy Assistant Secretary for Import Administration.

[FR Doc. 99-27162 Filed 10-18-99; 8:45 am]

BILLING CODE 3510-DS-P

DEPARTMENT OF COMMERCE

International Trade Administration

[A-583-832]

Notice of Final Determination of Sales at Less Than Fair Value: Dynamic Random Access Memory Semiconductors of One Megabit and Above ("DRAMs") From Taiwan

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

EFFECTIVE DATE: October 19, 1999.

FOR FURTHER INFORMATION CONTACT: Thomas Futtner at (202) 482-3814, Alexander Amdur at (202) 482-5346 (Etron), Ronald Trentham at (202) 482-6320 (MVI), Nova Daly at (202) 482-0989 (Nanya), or John Conniff at (202) 482-1009 (Vanguard), Group II, Office 4, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, N.W., Washington, D.C. 20230.

The Applicable Statute

Unless otherwise indicated, all citations to the Tariff Act of 1930, as amended ("the Act"), are references to the provisions effective January 1, 1995, the effective date of the Uruguay Round Agreements Act ("URAA"). In addition, unless otherwise indicated, all citations to the Department's regulations are to the regulations at 19 CFR Part 351 (1998).

Final Determination

We determine that DRAMs from Taiwan are being, or are likely to be, sold in the United States at less than fair value ("LTFV"), as provided in section 733 of the Act. The estimated margins of sales at LTFV are shown in the "Suspension of Liquidation" section of this notice.

Case History

The preliminary determination in this investigation was issued on May 21, 1999. *See Notice of Preliminary Determination of Sales at Less Than Fair Value and Postponement of Final Determination: Dynamic Random Access Memory Semiconductors of One Megabit and Above ("DRAMs") from Taiwan*, 64 FR 28983 (May 28, 1999) (*"Preliminary Determination"*). Since the preliminary determination, the following events have occurred:

On May 24 and 27, 1999, we received information from the petitioner, Micron Technology, on possible circumvention of a future antidumping duty order. On June 1, 1999, we received a submission from Vanguard International

Semiconductor Corporation ("Vanguard") alleging that the Department made ministerial errors in the preliminary determination. In response to Vanguard's ministerial error allegations, we issued an amended preliminary determination on June 11, 1998. *See Notice of Amended Preliminary Determination of Sales at Less Than Fair Value: Dynamic Random Access Memory Semiconductors of One Megabit and Above ("DRAMs") from Taiwan*, 64 FR 32480 (June 17, 1999).

In May and June 1999, we received responses to supplemental questionnaires from Mosel-Vitelic, Inc. ("MVI") and Vanguard.

In June, July and August, 1999, we verified the sales and cost questionnaire responses of Etron Technology, Inc. ("Etron"), MVI, Nan Ya Technology Corporation, ("Nanya"), and Vanguard (hereinafter "respondents").

In July, August, and September 1999, the respondents submitted revised sales and cost databases.

On July 26, 1999, Etron submitted information requested by the Department at the sales verification. On August 6 and 9, 1999, the Department issued supplemental questionnaires to Etron. On August 18, 1999, Etron submitted a letter to the Department stating that it would not be filing a response to the Department's August 6 and 9, 1999 supplemental questionnaires, and that it would not allow the verification that the Department scheduled at Caltron Technology ("Caltron"), Etron's affiliate in the United States.

The petitioner and the respondents submitted case briefs on September 1, 1999 and rebuttal briefs on September 8, 1999. At the Department's direction, Etron submitted amended case and rebuttal briefs on September 7 and 10, 1999, eliminating new factual information that the Department considered untimely. We held a public hearing on September 13, 1999.

Amendment to Scope

The Department is amending the scope of this investigation in order to require importers of motherboards that contain removable DRAM memory modules to certify to U.S. Customs that such modules will not be removed. This amendment follows the precedent set forth in *DRAMs from the Republic of Korea, Antidumping Duty Order and Amended Final Determination*, 58 FR 27520 (May 10, 1993) (*"DRAMs from Korea Order"*), and is in response to the petitioner's concerns about the circumvention of any antidumping duty order issued in this proceeding. *See* Comment 1 in the "Interested Party Comments" section of this notice.

Scope of Investigation

The products covered by this investigation are DRAMs from Taiwan, whether assembled or unassembled. Assembled DRAMs include all package types. Unassembled DRAMs include processed wafers, uncut die and cut die. Processed wafers fabricated in Taiwan, but packaged or assembled into finished semiconductors in a third country, are included in the scope. Wafers fabricated in a third country and assembled or packaged in Taiwan are not included in the scope.

The scope of this investigation includes memory modules. A memory module is a collection of DRAMs, the sole function of which is memory. 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 DRAMs whether mounted or unmounted on a circuit board. Modules that contain other parts that are needed to support the function of memory are covered. Only those modules that contain additional items that alter the function of the module to something other than memory, such as video graphics adapter ("VGA") boards and cards, are not included in the scope. Modules containing DRAMs made from wafers fabricated in Taiwan, but either assembled or packaged into finished semiconductors in a third country, are also included in the scope.

The scope includes, but is not limited to, video RAM ("VRAM"), Windows RAM ("WRAM"), synchronous graphics RAM ("SGRAM"), as well as various types of DRAMs, including fast page-mode ("FPM"), extended data-out ("EDO"), burst extended data-out ("BEDO"), synchronous dynamic RAM ("SDRAMs"), and "Rambus" DRAMs ("RDRAMs"). The scope of this investigation also includes any future density, packaging or assembling of DRAMs. Also included in the scope of this investigation are removable memory modules placed on motherboards, with or without a central processing unit (CPU), unless the importer of the motherboards certifies with Customs that neither it, nor a party related to it or under contract to it, will remove the modules from the motherboards after importation. The scope of this investigation does not include DRAMs or memory modules that are re-imported for repair or replacement.

The DRAMs subject to this investigation are currently classifiable under subheadings 8542.13.80.05 and 8542.13.80.24 through 8542.13.80.34 of the Harmonized Tariff Schedule of the United States ("HTSUS"). Also included in the scope are Taiwanese DRAM modules, described above, entered into the United States under subheading 8473.30.10 through 8473.30.90 of the HTSUS or possibly other HTSUS numbers. Although the HTSUS subheadings are provided for convenience and customs purposes, the written description of the scope of this investigation is dispositive.

Period of Investigation

The period of investigation ("POI") is October 1, 1997 to September 30, 1998.

Facts Available

Section 776(a)(2) of the Act provides that "if an interested party or any other person—(A) withholds information that has been requested by the administering authority; (B) fails to provide such information by the deadlines for the submission of the information or in the form and manner requested, subject to subsections (c)(1) and (e) of section 782; (C) significantly impedes a proceeding under this title; or (D) provides such information but the information cannot be verified as provided in section 782(i), the administering authority shall, subject to section 782(d), use the facts otherwise available in reaching the applicable determination under this title."

The statute requires that certain conditions be met before the Department may resort to the facts available. Where the Department determines that a response to a request for information does not comply with the request, section 782(d) of the Act provides that the Department will so inform the party submitting the response and will, to the extent practicable, provide that party the opportunity to remedy or explain the deficiency. If the party fails to remedy the deficiency within the applicable time limits, the Department may, subject to section 782(e), disregard all or part of the original and subsequent responses, as appropriate. Briefly, section 782(e) provides that the Department "shall not decline to consider information that is submitted by an interested party and is necessary to the determination but does not meet all the applicable requirements established by (the Department)" if the information is timely, can be verified, is not so incomplete that it cannot be used, and if the interested party acted to the best of its ability in providing the information. Where all of these conditions are met, and the Department can use the information without undue

difficulties, the statute requires it to do so.

In addition, section 776(b) of the Act provides that, if the Department finds that an interested party "has failed to cooperate by not acting to the best of its ability to comply with a request for information," the Department may use information that is adverse to the interests of the party as the facts otherwise available. Adverse inferences are appropriate "to ensure that the party does not obtain a more favorable result by failing to cooperate than if it had cooperated fully." *See* Statement of Administrative Action (SAA) accompanying the URAA, H.R. Doc. No. 103–316 at 870 (1994).

Furthermore, "an affirmative finding of bad faith on the part of the respondent is not required before the Department may make an adverse inference." *Antidumping Duties; Countervailing Duties; Final Rule*, 62 FR 27296, 27340 (May 19, 1997) ("*Final Rule*"). Section 776(b) of the Act notes, in addition, that in selecting from among the facts available the Department may, subject to the corroboration requirements of section 776(c), rely upon information drawn from the petition, a final determination in the investigation, or any previous administrative review conducted under section 751 (or section 753 for countervailing duty cases). Under Section 776(b), in selecting from among the facts available, the Department may also rely on any other information on the record.

Etron

Based on our verification and independent research, we have determined that Etron withheld a significant amount of information from the Department, including information concerning its relationship with its U.S. customers. We were also unable to verify certain information and found numerous accounting irregularities in Etron's records. We have further determined, based on documents obtained from the U.S. Customs Service, that Etron provided the Department with altered sales documents. Due to the proprietary nature of these issues, for further discussion, *see* Memorandum from Holly Kuga to Bernard Carreau on Whether to Determine the Margin of Etron Technology, Inc. for the Final Determination Based on the Facts Otherwise Available dated October 12, 1999 ("*Etron FA Memorandum*"). Also *see* Comment 3 in the "Interested Party Comments" section of this notice.

After the sales verification in Taiwan, the Department scheduled a verification of Etron's U.S. sales affiliate, Caltron. The Department also issued additional supplemental questionnaires to Etron to provide it with yet another opportunity to explain and clarify the deficiencies revealed at verification. After receiving an extension of time to answer these questionnaires, and after two extensive conversations with the Department regarding these questionnaires,[1] Etron eventually refused to answer them, and did not allow the verification of Caltron.

Because Etron withheld information that had been requested by the Department, failed to provide such information in a timely manner, significantly impeded this investigation, and provided information which cannot be verified, section 776(a)(2) of the Act directs the Department, subject to sections 782(d) and (e), to use facts otherwise available for Etron in reaching the final determination of this investigation.

In accordance with section 782(d) of the Act, the Department issued numerous supplemental questionnaires to Etron regarding its initial sales and cost responses. Furthermore, as discussed above, after the sales verification in Taiwan, on August 6 and 9, 1999, the Department sent to Etron two additional supplemental questionnaires addressing certain deficiencies in the company's questionnaire response that the Department found at the sales verification. Etron refused to submit a response to these questionnaires. Thus, despite numerous opportunities granted to Etron to remedy the serious deficiencies in its responses, Etron failed to do so within the meaning of section 782(d) of the Act.

The application of facts available under section 776(a) is also subject to the provisions of section 782(e) of the Act regarding whether to decline to consider information submitted by the respondent despite identified deficiencies. In this case, Etron failed to meet all of the requirements enunciated under section 782(e) of the Act. Although Etron generally submitted its questionnaire responses by the established deadlines, with the exception of the responses to the August 6 and 9, 1999 questionnaires, these responses could not be properly verified, as required by section 782(e)(2). Furthermore, the information that we independently obtained and the results of verification demonstrate that Etron's responses are so incomplete that they cannot serve as reliable bases for reaching the final determination. The gaps in Etron's responses, which the Department unsuccessfully attempted to address in the August supplemental questionnaires, and Etron's refusal to allow the verification of Caltron, all raise serious questions about the reliability and accuracy of Etron's entire U.S. sales database. Additionally, Etron failed to demonstrate that it has acted to the best of its ability under section 782(e)(4) of the Act. Etron withheld a significant amount of information from the Department, and subsequently completely ceased cooperating in this investigation. Furthermore, it also appears that Etron attempted to deceive the Department by providing altered documents at verification, and by making misleading statements to Department officials. Finally, the Department cannot use Etron's submitted information without undue difficulties under section 782(e)(5) of the Act in light of the numerous questions surrounding Etron's entire U.S. sales database. For a detailed proprietary discussion of these issues, *see Etron FA Memorandum*As a result, the Department determines that, pursuant to section 776(a) of the Act, the use of facts available is appropriate.

Section 776(b) of the Act provides that adverse inferences may be used in selecting from the facts available if a party has failed to cooperate by not acting to the best of its ability to comply with a request for information. As explained above, and in the *Etron FA Memorandum*; Etron withheld a significant amount of information from the Department. Moreover, Etron impeded the Department's efforts to clarify information concerning its relationships with its U.S. customers, refused verification of its U.S. subsidiary, and provided the Department with false information. For these reasons, the Department finds that Etron did not act to the best of its ability to provide the information requested. Therefore, we have determined to use an adverse inference in selecting the facts available to determine Etron's margin.

As adverse facts available, we have assigned Etron a margin of 69 percent, the highest margin alleged in the petition,[2] as stated in the notice of initiation (*see Initiation of Antidumping Duty Investigation: Dynamic Random Access Memory Semiconductors From Taiwan*, 63 FR 60404 (November 18, 1998) ("*Notice of Initiation*")). Furthermore, as adverse facts available,

[1] *See* Memoranda dated August 11 and August 17, 1999 from Alexander Amdur to the File.

[2] *See* Antidumping Petition: Dynamic Random Access Memory Semiconductors of One Megabit and Above from Taiwan, submitted by Micron Technology, Inc., October 22, 1998; and DRAMs from Taiwan: Supplement to Petition, November 5, 1998 (which includes recalculated margins).

we applied the 69 percent margin to Etron's reported U.S. prices, and using the company's total reported product densities, calculated a specific rate for Etron of $0.40 per megabit. We calculated the per megabit rate in this manner because we believe that it would be inappropriate to base Etron's specific rate on any other margin, including a calculated margin, that is lower than 69 percent. Furthermore, while we consider Etron's data unreliable, we believe that applying the 69 percent margin to Etron's U.S. database is the most appropriate means to calculate a facts available per megabit rate for this company.

Section 776(c) of the Act provides that, when the Department relies on secondary information in using the facts otherwise available, it must, to the extent practicable, corroborate that information from independent sources that are reasonably at its disposal. The SAA clarifies that "corroborate" means that the Department will satisfy itself that the secondary information to be used has probative value (*see* SAA at 870). The SAA also states that independent sources used to corroborate may include, for example, published price lists, official import statistics and customs data, as well as information obtained from interested parties during the particular investigation (*see Id.*).

In accordance with section 776(c) of the Act, we sought to corroborate the data contained in the petition. We reviewed the adequacy and accuracy of the information in the petition during our pre-initiation analysis of the petition, to the extent appropriate information was available for this purpose (*e.g.*, import statistics and foreign market research reports). *See Notice of Initiation*, 63 FR at 64041. To further corroborate the information in the petition, for the final determination, we reexamined the highest margin in the petition in light of information obtained during the investigation to the extent it is practicable, and determined it has probative value. For further discussion, *see Etron FA Memorandum.*

Fair Value Comparisons

To determine whether sales of DRAMs from Taiwan to the United States were made at LTFV, we compared the constructed export price ("CEP") to the normal value ("NV"). Our calculations followed the methodologies described in the preliminary determination, except as noted below and in company-specific analysis memoranda dated October 12, 1999.

In making our comparisons, in accordance with section 771(16) of the Act, we considered all products sold in the home market, fitting the description specified above in the "Scope of Investigation" section of this notice to be foreign like products for purposes of determining appropriate product comparisons to U.S. sales. Where there were no sales of identical merchandise in the home market to compare to U.S. sales, we compared U.S. sales to the next most similar foreign like product, based on the characteristics listed in Sections B and C of the Department's antidumping questionnaire. We made product comparisons based on the same characteristics and in the same general manner as that outlined in the preliminary determination.

Constructed Export Price

We used CEP, in accordance with section 772(b) of the Act, for MVI, Nanya and Vanguard, when the subject merchandise was first sold in the United States by or for the account of the producer or exporter of such merchandise, or by a seller affiliated with the producer or exporter, to an unaffiliated purchaser. We calculated CEP for MVI, Nanya and Vanguard based on the same methodology used in the preliminary determination, with the following exceptions:

We corrected for certain clerical errors found during verification, including corrections that MVI, Nanya, and Vanguard identified in their responses in the course of preparing for verification.

MVI

1. We recalculated MVI's reported marine insurance expense by allocating the reported expense over the amount of the total DRAM sales of MVI's U.S. affiliate, Mosel Vitelic Corporation ("MVC").

Vanguard

1. We recalculated Vanguard's reported royalty expense by including those royalties which were inappropriately included in sales expenses in Vanguard's cost of production ("COP").

2. We recalculated Vanguard's reported international freight expense by allocating this expense by quantity, as the expense was incurred.

Normal Value

We used the same methodology to calculate NV as that described in the preliminary determination, with the following exceptions:

We corrected for certain clerical errors found during verification, including corrections that MVI, Nanya, and Vanguard identified in their responses in the course of preparing for verification. For Vanguard, we also recalculated its reported sales duty tax using the rates charged for this tax by the authorities in Taiwan, and adjusted certain freight expenses by attributing these charges only to the sales that incurred these expenses.

Cost of Production

In accordance with section 773(b)(3) of the Act, we calculated a quarterly weighted-average COP based on the sum of each respondent's cost of materials and fabrication for the foreign like product, plus amounts for selling, general, and administrative ("SG&A") expenses and packing costs. We determined that research and development ("R&D") related to semiconductors benefits all semiconductor products, and that allocation of R&D on a product-specific basis was not appropriate.

We relied on the submitted COP except in the following specific instances where the submitted costs were not appropriately quantified or valued:

MVI

1. We disallowed MVI's startup adjustment (*see* comment 14 in the "Interested Party Comments" section of this notice).

2. We included ProMOS Technologies Inc.'s ("ProMOS's") R&D expenses and G&A expenses in ProMOS's COP (*see* comment 11 in the "Interested Party Comments" section).

3. We recalculated ChipMOS Technologies, Inc.'s ("ChipMOS's") COP to include R&D and selling expenses from its 1998 audited financial statements.

4. Pursuant to section 773(f)(3) of the Act, and section 351.407(b) of the Department's regulations, we adjusted both ChipMOS's and ProMOS's reported costs to the higher of transfer price or COP.

5. We valued MVI's stock bonus to its employees as of the date the shareholders' approval of the stock bonus (*see* comment 13 in the "Interested Party Comments" section).

6. We added MVI's non-operating expenses to, and subtracted marine insurance from, its total G&A expenses used in the calculation of the G&A expense ratio (*see* comments 17 and 18 in the "Interested Party Comments" section). We also subtracted MVI's packing expense from the unconsolidated cost of goods sold ("COGS") used in the denominator of this calculation.

7. We combined MVI's reported allocation rates for general and product-

specific R&D to determine one R&D allocation rate to apply to MVI's COM.

8. To make the denominator consistent with the COM to which it is applied, we adjusted MVI's financial expense ratio by subtracting packing and the stock bonus from the denominator of the allocation ratio. We also excluded foreign exchange gains from investments as an offset to net consolidated financial expenses from the numerator. *See Cost Calculation Memorandum for MVI* dated October 12, 1999.

Nanya

1. Pursuant to section 773(f)(2) of the Act, and section 351.407(b) of the Department's regulations, for assembly and test services performed by affiliates, we used the higher of cost, transfer price, or market price.

2. We adjusted Nanya's reported R&D rate to include all of Nanya's semiconductor R&D expenses divided by the company-wide COGS.

3. We reclassified expenses incurred by Genesis Semiconductor, Inc., a U.S. affiliate of Nanya that performs DRAM R&D, as R&D expense.

4. We adjusted Nanya's reported G&A expense to include certain "other revenue" items and exchange losses. *See* comments 21 and 22 in the "Interested Party Comments" section.

5. We recalculated Nanya's reported production-related royalty expense ratio by dividing the total expense incurred by the COGS for DRAMs.

6. Since wafers processed in a country other than Taiwan are not subject to this investigation, we have excluded the costs and sales of fully-processed wafers purchased from a third country.

7. We have included interest expenses in the calculation of financial expense. *See* comment 20 in the "Interested Party Comments" section. *See Cost Calculation Memorandum for Nanya* dated October 12, 1999.

Vanguard

1. We revised the submitted COP to include the cost of obsolete materials written off, and the standard cost and "lower of cost or market" revaluations associated with raw materials and work-in-process ("WIP") inventories (*see* comments 24 and 25 in the "Interested Party Comments" section).

2. We revised COP for back-end (assembly) services performed by an affiliate to include selling expenses.

3. Pursuant to section 773(f)(2) and (3) of the Act, and section 351.407(b) of the Department's regulations, for DRAM assembly performed by an affiliate, we adjusted the reported cost to the highest of cost, transfer price, or market price (*see* comment 26 in the "Interested Party Comments" section).

4. We revised the submitted COP to include certain royalty expenses which were inappropriately included in selling expenses. *See Cost Calculation Memorandum for Vanguard* dated October 12, 1999.

We conducted our sales below-cost test in the same manner as that described in our preliminary determination. We found that, for MVI, Nanya, and Vanguard, for certain models of DRAMs, more than 20 percent of the home market sales within an extended period of time were at prices less than COP. Further, the prices did not permit the recovery of costs within a reasonable period of time. We therefore disregarded the below-cost sales and used the remaining sales as the basis for determining NV, in accordance with section 773(b)(1). For those U.S. sales of DRAMs for which there were no comparable home market sales in the ordinary course of trade, we compared CEPs to CV in accordance with section 773(a)(4) of the Act.

Constructed Value

In accordance with section 773(e) of the Act, we calculated CV based on the sum of the respondent's cost of materials, fabrication, G&A, U.S. packing costs, direct and indirect selling expenses, interest expenses, and profit. We relied on the submitted CVs except for the specific changes described above in the "Cost of Production" section of the notice. In accordance with section 773(e)(2)(A) of the Act, we based SG&A expenses and profit on the amounts incurred and realized by each respondent in connection with the production and sale of the foreign like product in the ordinary course of trade, for consumption in Taiwan. Where respondents made no home market sales in the ordinary course of trade (*i.e.*, all sales failed the cost test), we based profit and SG&A expenses on the weighted-average of the profit and SG&A data computed for those respondents with home market sales of the foreign like product made in the ordinary course of trade in accordance with section 773(e)(2)(B)(ii) of the Act.

Price-to-Price and Price-to-CV Comparisons

We made price-to-price and price-to-CV comparisons using the same methodology as that described in the preliminary determination.

Currency Conversion

As in the preliminary determination, we made currency conversions into U.S. dollars based on the exchange rates in effect on the dates of the U.S. sales as certified by the Federal Reserve Bank in accordance with section 773(A) of the Act.

Interested Party Comments

General Issues

Comment 1: Certification for Modules on Motherboards. The petitioner argues that the respondents have made plans to avoid the antidumping duty order to be issued in this case. The petitioner states that it previously submitted to the Department news articles from the Taiwan press in which the respondents discussed plans to avoid any antidumping duty order by shipping subject merchandise to intermediate countries for assembly or further processing, including placing memory modules on motherboards. The petitioner also notes that the preliminary determination in this investigation, as well as the Customs instructions issued by the Department after the preliminary determination, do not contain the scope language that is standard in the DRAMs from Korea antidumping proceeding. Specifically, this scope language, as stated in *DRAMs from Korea: Amended Final Results of Administrative Review*, 63 FR 56905, 56907 (October 23, 1998), requires importers of motherboards that contain removable memory modules to certify to Customs that "neither it, nor a party related to it or under contract to it, will remove the modules from the motherboards after importation." The petitioner contends that, because Taiwan is the world's leading producer of motherboards, it is therefore "essential" that this certification requirement be applied to importers of motherboards containing DRAMs from Taiwan.

No other parties commented in their case or rebuttal briefs with respect to this issue.

DOC Position: We agree with the petitioner's comments regarding the potential for circumvention resulting from the importation of DRAMs on motherboards. In order to avoid the possibility that an order on DRAMs would be evaded in such a manner, the Department will follow the precedent, set forth in *DRAMs from Korea Order*, 58 FR at 27520. As a consequence, if a party imports motherboards that contain removable DRAMs memory modules, we will require the importer to certify with Customs that such modules will not be removed by them, a party under contract to them, or a party related to them, after importation. Such certification will apply regardless of

whether the host product contains a CPU.

Comment 2: CEP Offset. The petitioner argues that, in the preliminary determination, the Department failed to perform a level of trade analysis based on unadjusted starting prices for CEP sales for MVI, Nanya, and Vanguard. The petitioner states that the Department analyzed the level of trade of CEP sales based on the level of the constructed sale from the exporter to the affiliated importer, *i.e.*, the prices after adjustment for U.S. related selling expenses. Concurrently, the Department analyzed the level of trade of the home market sales based on the unadjusted starting prices of those sales. The petitioner states that this methodology conflicts with the requirements of the statute and the decisions established in *Borden Inc.* v *United States*, 4 F. Supp. 2d 1221 CIT 1998) ("*Borden*") and *Micron Technology, Inc.* v. *United States*, 40 F. Supp. 2d 481, 485–86 (CIT 1999) ("*Micron*"). The petitioner argues that the Department should conduct a level of trade analysis based on unadjusted starting prices in both the U.S. and the comparison markets. The petitioner states that the results of this analysis will demonstrate that the comparison market sales made by MVI, Vanguard, and Nanya were not made at a more advanced level of trade than their sales in the U.S., and that, therefore, there is no basis for granting either a level of trade adjustment or a CEP offset to MVI, Nanya or Vanguard.

MVI, Nanya, and Vanguard disagree with the petitioner. They state that the Department's established practice of analyzing the CEP level of trade for purposes of determining whether a CEP offset is warranted is consistent with the statute and legislative history. They argue that section 773(a)(7)(A) of the Act specifies that a level of trade analysis must examine the price difference between the "constructed" export price ("EP") and NV, and that any price difference must be due to differences in the selling functions and expenses, other than a difference for which allowance is otherwise made, *i.e.*, other than the selling expenses in the U.S. market that already are deducted. They further state, citing *Antifriction Bearings (other than Tapered Roller Bearings) and Parts Thereof from France, et al.*, 62 FR 54043, 54055 (October 17, 1997), that the Department correctly based the CEP level of trade on the "constructed" price, *i.e.*, on the price in the United States after making the CEP deductions.

DOC Position: The Department agrees with the respondents. We have consistently stated that the statute and the SAA support analyzing the level of trade of CEP sales at the constructed level, after expenses associated with economic activities in the United States have been deducted, pursuant to section 772(d) of the Act. In the preamble to our proposed regulations, we stated

> With respect to the identification of levels of trade, some commentators argued that, consistent with past practice, the Department should base level of trade on the starting price for both export price EP and CEP sales * * * The Department believes that this proposal is not supported by the SAA. If the starting price is used for all U.S. sales, the Department's ability to make meaningful comparisons at the same level of trade (or appropriate adjustments for differences in levels of trade) would be severely undermined in cases involving CEP sales. As noted by other commentators, using the starting price to determine the level of trade of both types of U.S. sales would result in a finding of different levels of trade for an EP sale and a CEP sale adjusted to a price that reflected the same selling functions. Accordingly, the regulations specify that the level of trade analyzed for EP sales is that of the starting price, and for CEP sales it is the constructed level of trade of the price after the deduction of U.S. selling expenses and profit.

See Antidumping Duties; Countervailing Duties; Notice of Proposed Rule Making and Request for Public Comments, 61 FR 7308, 7347 (February 27, 1996).

Consistent with the above position, in those cases where a level of trade comparison is warranted and possible, the Department normally evaluates the level of trade for CEP sales based on the price after adjustments are made under section 772(d) of the Act. *See, e.g., Large Newspaper Printing Presses and Components Thereof, Whether Assembled or Unassembled, From Japan: Notice of Final Determination of Sales at Less Than Fair Value*, 61 FR 38139, 38143 (July 23, 1996). We note that, in every case decided under the revised antidumping statute, we have consistently adhered to this interpretation of the SAA and of the Act. *See, e.g., Aramid Fiber Formed of Poly Para-Phenylene Terephthalamide from the Netherlands; Preliminary Results of Antidumping Duty Administrative Review*, 61 FR 15766, 15768 (April 9, 1996); *Certain Stainless Steel Wire Rods from France; Preliminary Result of Antidumping Duty Administrative Review*, 61 FR 8915, 8916 (March 6, 1996); and *Antifriction Bearings (Other Than Tapered Roller Bearings) and parts Thereof from France, et al., Preliminary Results of Antidumping Duty Administrative Review*, 61 FR 25713, 35718–23 (July 8, 1996).

In this case, in accordance with the above precedent, our instructions in the questionnaire issued to respondents stated that constructed level of trade should be used. All respondents adequately documented the differences in selling functions in the home and in the U.S. markets. Therefore, the Department's decision to grant a CEP offset to Nanya, MVI, and Vanguard was consistent with the statute and the Department's practice, and was supported by substantial evidence on the record.

We disagree with the petitioner's interpretation of *Borden* and of its impact on our current practice. In *Borden*, the court held that the Department's practice to base the level of trade comparisons of CEP sales after CEP deductions is an impermissible interpretation of section 772(d) of the Act. *See Borden*, 4 F. Supp. 2d at 1236–38; *see also Micron*, 40 F. Supp. 2d at 485–86. The Department believes, however, that its practice is in full compliance with the statute, and that the court decision does not contain a persuasive statutory analysis. Because *Borden* is not a final and conclusive decision, the Department has continued to follow its normal practice of adjusting CEP under section 772(d) of the Act, prior to starting a level of trade analysis, as articulated in the regulations at section 351.412. Accordingly, consistent with the *Preliminary Determination*, we will continue to analyze the level of trade based on adjusted CEP prices, rather than the starting CEP prices.

Company-Specific Issues

A. Etron

Comment 3: Facts Available. The petitioner argues that the Department must determine Etron's dumping margin based on facts otherwise available, and apply the highest margin calculated by the Department from the information provided in the petition. The petitioner states that Etron's actions in this investigation meet all the criteria for the application of facts available under section 776(a)(2) of the Act. The petitioner argues that: (1) Etron withheld information originally requested by the Department; (2) Etron refused to provide requested information in accordance with the Department's supplemental questionnaires; (3) Etron significantly impeded the Department's investigation by providing erroneous information and by refusing to allow verification of critical information; and (4) the Department found that critical aspects of the information that Etron did provide were unreliable and unverifiable. The petitioner states that, in general, the information on the record

reveals a web of undisclosed relationships that taints the reliability of the U.S. sales data reported by Etron, while the numerous accounting irregularities found in Etron's own records undermine the integrity of Etron's entire response.

Specifically, the petitioner argues that Etron failed to disclose essential facts concerning its relationship with one of its U.S. customers, as required by the Department's questionnaire. The petitioner states that information gathered by the Department, in combination with Etron's refusal to provide clarifying information in a response to a request for information from the Department, establishes an undisclosed affiliation between Etron and this customer. The petitioner states that this customer appears to be nothing more than a shell for Etron's U.S. subsidiary, Caltron, given certain facts, including the absence of any proof confirming a separate corporate existence for this customer. The petitioner also states that a sample sale examined at verification indicates that Etron's transactions with this customer were not made on an arm's length basis.

The petitioner further argues that the information gathered by the Department indicating undisclosed affiliations between Etron and its customers renders Etron's questionnaire response inherently unreliable. The petitioner adds that this unreliability is compounded by Etron's refusal to provide critical, clarifying information on these relationships, and its refusal to allow verification at its U.S. subsidiary, Caltron. The petitioner states that, in particular, the evidence that Etron had reported U.S. sales to an affiliate instead of sales from the affiliate to the first unrelated customer means that the submitted U.S. sales listing is fatally incomplete. To support its argument, the petitioner cites to *Hot-Rolled Flat-Rolled Carbon-Quality Steel Products from Japan*, 64 FR 24329, 24367–68 (May 6, 1999) (*"Hot-Rolled Steel from Japan"*), in which the Department stated that "information possessed by a U.S. affiliate * * * is essential to the dumping determination."

The petitioner further indicates that the Department's sales verification uncovered numerous other discrepancies that by themselves justify rejection of Etron's entire questionnaire response. The petitioner states that the Department discovered that Etron submitted incomplete and erroneous financial statements, and had accounting irregularities in its financial statement. Citing *Antifriction Bearings (Other than Tapered Roller Bearings)* from Germany, 56 FR 31692 (July 11, 1991) (*"Bearings from Germany"*), the petitioner states that these problems jeopardize the integrity of Etron's entire questionnaire response. The petitioner also states that Etron employed highly irregular procedures and intentionally misleading accounting practices in connection with its U.S. sales operations and with respect to Etron and its U.S. affiliate, EiC Corporation. The petitioner further states that Etron's attempt to report fictitious home market sales prices throws additional doubt on the accuracy and completeness of all of its reported sales.

The petitioner also argues that the application of facts available is justified in light of other factors, such as Etron's failure to report certain purchases in its response, Etron's failure to provide a page of its 1998 consolidated financial statement in its response, and the Department's inability to reconcile Etron's total DRAMs purchases to Etron's financial statement. Citing again *Bearings from Germany*the petitioner notes that a significant aspect of the Department's verification procedures is to reconcile the company's reported data to its financial statements. The petitioner adds that the findings at verification are more than simple oversights: they demonstrate Etron's untruthfulness in responding to direct questions from the Department.

The petitioner concludes that Etron's actions, including its refusal to provide requested information and blocking the verification of Caltron Technology, establish that Etron has not cooperated to the best of its ability in this investigation and has impeded the Department's investigation. The petitioner concludes that the numerous errors and omissions in Etron's submitted financial statements and the accounting irregularities discovered by the Department at verification render Etron's questionnaire response as a whole unreliable and unusable.

The petitioner notes that, in other instances involving similarly uncooperative respondents, such as in *Welded Carbon Steel Pipes and Tubes from Thailand*, 62 FR 53808 (October 16, 1997) (*"Pipe from Thailand"*), the Department has imposed total adverse facts available. Citing *Emulsion Styrene-Butadiene Rubber from Brazil*, 64 FR 14683 (March 29, 1999) (*"Rubber from Brazil"*), *Stainless Steel Bar from Spain*, 59 FR 66931 (December 28, 1994) (*"Bar from Spain"*), and *Circular Welded Non-Alloy Steel from Venezuela*, 57 FR 42962 (September 17, 1992) (*"Welded Steel from Venezuela"*), the petitioner also notes that the Department should base Etron's margin on the highest margin listed in the petition in accordance with its standard practice in dealing with uncooperative respondents.

In its rebuttal brief, the petitioner further points out that Etron, in its case brief, offers no explanation or justification for: evidence of an affiliation between Etron and a U.S. customer; critical discrepancies that the Department found at verification in U.S. sales documentation; and Etron's refusal to respond to the Department's request for supplemental information and to permit verification at Caltron. The petitioner also argues that Etron's attempt to minimize the numerous errors the Department found at Etron's sales verification is not credible, and that these problems confirm the total unreliability of Etron's questionnaire data.

Etron disagrees with the petitioner's claim that the Department should apply total adverse facts available to Etron based on the highest petition rate. Etron claims that the application of total adverse facts available in this case would be improper and inappropriate. Specifically, Etron states that it did not report any fictitious sales to one of its U.S. customers. Etron maintains that various documents on the record demonstrate that Etron had business dealings and significant sales with this company. Etron adds that there would be no reason for Etron to hide such a small portion of sales and jeopardize its overall position in the dumping case.

Etron further argues that a failure to disclose certain information about EiC Corporation is irrelevant because Etron had acknowledged from the start of this case that EiC Corporation is an affiliated party. Etron claims that there was nothing irregular in its accounting records for a sale involving EiC Corporation, and that Etron, due to its inexperience, incorrectly identified this sale as a CEP sale.

Etron argues that the warehouse sales were properly reported and verified. Etron further states that the discrepancies between the U.S. warehouse sales ledger and the source documents described by the Department are readily explained from examination of the relevant sales verification exhibit itself.

Etron notes that the vast majority of the errors in its auditor's translation of its financial statement are minor. Etron states that, among these errors, the inadvertent submission of the income statement of its unconsolidated financial statement as that of its consolidated financial statement cannot invalidate an entire record, nor constitute a basis for applying total adverse facts available. Furthermore, in

regards to the incorrect home market prices that Etron reported for certain sales, Etron states that the impact of Etron's error is minor at most, especially given that Etron provided the Department with both the actual and incorrect prices.

Etron additionally asserts that the Department was able to verify Etron's purchases from Vanguard to the relevant accounting documents. Etron states that, as it explained and documented at verification, its outside auditors had presented an incorrect figure in the financial statement for Etron's purchases from Vanguard. Etron also states that it reported in the response the details of a purchase that the petitioner claims Etron failed to report. Etron further claims that it correctly eliminated a U.S. sale from the sales listing.

Etron further contends that the cases the petitioner cites to support its argument that the Department should use total facts available to determine Etron's margin present facts different from the situation at issue. Etron states that, in *Pipe from Thailand*, the respondent, Saha Thai, refused to provide information relating to what parties controlled Saha Thai, and thereby impeded the Department's affiliation analysis. Etron states that, in the instant case, the issue at hand does not relate to control of Etron itself, and Etron's inability to respond to the supplemental questionnaire and participate in a U.S. verification does not distort the entire dumping analysis in the same manner as in *Pipe from Thailand*.

Etron argues that other cases cited by the petitioner (*i.e., Rubber from Brazil, Stainless Bar from Spain* and *Welded Steel from Venezuela)* involve respondents who refused to allow any verification at all of any information. Etron states that, in contrast, it participated in a full two weeks of cost and sales verifications in Taiwan, and responded to multiple deficiency questionnaires. Etron also states that *Static Random Access Memory Semiconductors from Taiwan* 63 FR 8909 (February 23, 1998) (*"SRAMs from Taiwan"*) is also distinguishable from the instant case because, in that case, the Department applied total adverse facts available to parties who refused to participate at all in the Department's investigation.

Etron further claims that, if the Department decides that total adverse facts available is warranted, it should, consistent with its authority and past practice, apply adverse facts available only to the volume and value of sales to the U.S. customer at issue. Citing the preamble of the Department's regulations (*Final Rule* 62 FR at 27340), Etron states that the use of adverse inferences in the selection of facts available is discretionary, and not mandatory. As such, this issue should be decided on a fact and case-specific basis. Etron also states that the Department has the authority, as affirmed by the CIT in *National Steel Corporation* v. *United States* 870 F. Supp. 1130, 1335 (CIT 1994), to apply adverse facts available on a partial or total basis.

Etron specifically argues that the only direct implication of any failure by Etron to disclose a possible affiliation with a customer could only impact sales to that customer. According to Etron, if the Department deems it appropriate to apply adverse facts available to sales by Caltron, the Department should limit the application of adverse facts available to only the volume and value of Caltron's sales, which Etron claims were verified by the Department in Taiwan. Etron also argues that, in any case, there is no basis for applying adverse facts available to the sale involving EiC Corporation.

Etron contends that the Department has applied partial, rather than total, adverse facts available in other similar circumstances. To support its position, Etron cites *DRAMs from the Republic of Korea*, 61 FR 20216 (May 6, 1996), 64 FR 30481 (June 8, 1999) (*"DRAMs from Korea 1996 and 1999"*, respectively), *Steel Sheet and Strip in Coils from Italy* 64 FR 30750 (June 8, 1999) (*"Steel Sheet and Strip from Italy"*), *Industrial Nitrocellulose from the United Kingdom*, 59 FR 66902 (December 28, 1994), *Certain Hot-Rolled Carbon Steel Flat Products, et al, from Canada* 58 FR 37099, 37100 (July 9, 1993), and *Hot-Rolled Steel from Japan*.

Citing *Antifriction Bearings (Other than Tapered Roller Bearings) and Parts Thereof from France* 62 FR 2081, 2088 (January 15, 1997) and *Extruded Rubber Thread from Malaysia* 63 FR 12752, 12762 (March 16, 1998) (*"Thread from Malaysia"*), Etron further states that the Department takes into account the respondent's degree of experience in antidumping proceedings when determining the extent to which adverse facts available should be applied. According to Etron, in the instant case, the Department should take into account Etron's lack of experience in dumping proceedings when determining what margins to impose.

Etron further contends that, if the Department incorrectly determines that it should impose total adverse facts available on Etron, the Department should apply the highest calculated rate for any respondent in this proceeding, and not the petition rates. Etron states that the rates alleged in the petition have not been corroborated, and are therefore invalid, given that they were calculated for Nanya and Vanguard. Etron also states the petition rates are wildly out of line with the rates that the Department calculated in its preliminary determination, which are likely to remain the same for the final determination. Etron also argues that the petition rates do not reflect Etron's true range of margins because Etron sells a significant percentage of DRAMs that are high-priced, specialty graphic DRAMs, and Etron made a profit during the period of investigation.

In support of this position, Etron points out that, in *D&L Supply Co.* v. *United States*, 113 F. 3d 1120, 1223 (Fed. Cir. 1997), *Sigma Corp.* v. *United States*, 117 F.3d 1401, 1410 (Fed. Cir. 1997), *Pulton Chain Co., Incv. United States*, No. 96–12–02877, Slip Op. 97–162 (CIT December 2, 1997), *Borden*, 4 F. Supp. 2d at 1221, and *Ferro Union, Inc.* v. *United States*, 44 F. Supp.2d 1310 (CIT 1999), the courts have held that the Department may not use, as adverse facts available, a rate, including a petition rate, that was subsequently determined to be invalid. Etron also states that the Department itself, in *Melamine Institutional Dinnerware from Indonesia*, 62 FR 1719, 1720 (January 13, 1997), determined that uncorroborated petition data for one respondent should not be used as the basis for adverse facts available for other respondents. Citing *Frozen Concentrated Orange Juice from Brazil*, 64 FR 5767, 5768 (February 5, 1999), Etron further argues that the Department's standard practice in administrative reviews is to use, as adverse facts available, the highest calculated margin for other respondents in the proceeding.

DOC Position: We agree with the petitioner. The record evidence in this case amply demonstrates that Etron withheld crucial information necessary to substantiate Etron's representations regarding its affiliations with its U.S. customers. This, coupled with other inconsistencies and irregularities in Etron's database, as well as Etron's refusal to undergo a mandatory verification of the information requested by the Department, indicate that Etron failed to cooperate to the best of its ability under section 776(b) of the Act. Thus, we have determined that the application of total adverse facts available is warranted. *See Etron FA Memo* for a detailed evaluation of Etron's submissions and the Department's findings.

We disagree with Etron that its actions in this proceeding do not justify the application of total adverse facts available because Etron cooperated to the best of its ability under section 776(b) of the Act. As explained in detail in the *Etron FA Memo*, although the Department explicitly requested in the initial questionnaire, supplemental questionnaires, and subsequently at verification, that Etron disclose all of its affiliations, Etron failed to comply with these repeated requests. Following the verification, when Etron's failure to disclose all affiliations became apparent, and in light of other irregularities and omissions in Etron's responses (*see Etron FA Memo*), the Department issued additional supplemental questionnaires to provide Etron with yet another opportunity to explain and clarify these issues. In addition, the Department scheduled a verification at Etron's U.S. subsidiary, Caltron. As the record reveals, although Etron initially asked for an extension to respond to these supplemental questionnaires, it eventually refused to answer them in their entirety, and informed the Department that it would not undergo the scheduled verification. As a result of Etron's actions, the Department was unable to confirm the reliability and accuracy of Etron's submissions. In fact, the Department's independent efforts to corroborate Etron's affiliations revealed that the company indeed provided the Department with false and incomplete information. Therefore, as explained in detail in the *Etron FA Memo*, given that the necessary information is not available for purposes of reaching the final determination, section 776(a)(2) of the Act mandates that the Department apply total facts available to Etron. Moreover, because Etron's actions, as described above and in the *Etron FA Memo*, demonstrate that the company failed to cooperate by not acting to the best of its ability, section 776(b) authorizes the Department to use an adverse inference.

We disagree with Etron that the facts in the instant case differ from those in *Pipe from Thailand*, where the Department applied total adverse facts available. In both cases, the respondents at issue failed to disclose essential information concerning affiliations with their customers, and the Department discovered information establishing affiliation late in the proceeding. We also note that, unlike *Pipe from Thailand*, Etron has not submitted responses to all of the Department's questionnaires, while Saha Thai, the respondent in the latter case, submitted responses to all of the Department's questionnaires. Moreover, Etron refused to allow some verifications scheduled by the Department, while in *Pipe from Thailand*, Saha Thai allowed all verifications.

We further disagree with Etron that this case can be distinguished from other cases, such as *Rubber from Brazil*, *Bar from Spain*, *Welded Steel from Venezuela*, and *SRAMs from Taiwan*, where the Department applied total adverse facts available to uncooperative respondents. Although the Department determined to apply total adverse facts available based on the particular facts in each of these cases, each respondent failed to cooperate with the Department to the best of its ability. For example, in *Rubber from Brazil*, 64 FR at 14683–84, the respondent at issue did not participate in any verification, and in *SRAMs from Taiwan*, 63 FR at 8910–11, the respondents did not respond to any of the Department's requests for information. In this case, as explained above, Etron simply refused to cooperate with the Department by withholding essential information that appeared to be readily at its disposal, not to mention its refusal to cure other deficiencies in its responses and undergo verification. The totality of facts in this case thus demonstrate, as in other cases cited by Etron, that Etron did not cooperate to the best of its ability within the meaning of section 776(b) of the Act.

We further disagree with Etron that the facts in the instant case merit the application of partial adverse facts available only to missing or unverified information. Contrary to Etron's position, in the cases cited by Etron, the information submitted by respondents was usable, and there was no question with respect to the veracity of the submissions. For example, in *DRAMs from Korea 1999*, 64 FR at 30482, *Steel Sheet and Strip from Italy*, 64 FR at 30755, and *Hot-Rolled Steel from Japan*, 64 FR at 24367–69, the Department applied partial adverse facts available to certain isolated subsets of U.S. sales, such as sales through U.S. affiliates, that respondents failed to report. These omissions, unlike Etron's omissions, did not affect the usability of the other information submitted by respondents.

In contrast to other cases involving cooperative respondents, here the record demonstrates that, despite our repeated requests, Etron purposely withheld information necessary to confirm the reliability of its questionnaire responses. Contrary to Etron's assertion, this information did not pertain only to a small portion of Etron's U.S. sales, but to a large part of Etron's U.S. database, and calls into question the veracity of Etron's entire U.S. database. Etron's refusal to undergo the U.S. verification at Caltron raises further questions with respect to the accuracy of the information and increases the Department's concerns that Etron purposely may have provided false data. This, in turn, undermines the reliability of Etron's submissions as a whole, regardless of whether the company appeared to cooperate with the Department during part of the proceeding. *See Stainless Steel Sheet and Strip in Coils from Germany*, 64 FR 30710, 30740 (June 8, 1999) (during verification, where "errors are identified in the sample transactions, the untested data are presumed to be similarly tainted absent satisfactory explanation and quantification on the part of the respondent").

We agree with Etron that, in determining whether the respondent cooperated to the best of its ability, the Department considers the general experience of the respondent in antidumping duty proceedings, which, in turn, dictates the extent to which facts available should be applied. *See Thread from Malaysia*, 63 FR at 12762. However, the deficiencies in Etron's responses, for the most part, have not resulted from a lack of experience, but from Etron's willful attempts, as discussed above and in the *Etron FA Memo*, to conceal and withhold information from the Department.

Finally, we disagree with the respondent that the Department may not use, as adverse facts available, a rate from the petition, where different, company-specific rates are subsequently calculated in the LTFV final determination. As explained in the "Facts Available" section of this notice, when selecting adverse facts available, the Department may rely upon, *inter alia*, secondary information drawn from the petition, subject to the corroboration requirements of section 776(c) of the Act. As explained in detail in the *Etron FA Memo*, given that the information in the petition in this case has probative value, we have determined to use, as adverse facts available, the highest margin alleged in the petition. Our determination is consistent with the Court of Appeals for the Federal Circuit's recent holding that it is reasonable for the Department to rely on the petition rate as adverse facts available, even though this rate differs from the rates calculated in the Department's subsequent LTFV investigation. Such a petition rate would not be appropriate only where it has been judicially invalidated, which does not apply in the instant case. *See*

D&L Supply Co. v United States, Consol. Court No. 92-06-00424, Slip Op. 98-81 (CIT June 22, 1998), aff'd in *Guangdong Metals & Minerals v. United States*, Court Nos. 98-1497, 98-1549, 1999 U.S. App. LEXIS 21650 (Fed. Cir. Sept. 10, 1999).

Comment 4: Affiliation Between Etron and Vanguard. The petitioner argues that the Department's sales verification report provides previously undisclosed facts that confirm the existence of an affiliation between Etron and Vanguard. The petitioner states that the Department discovered that Etron failed to report certain purchases from Vanguard and other companies, which underscores the extent to which Etron relied on Vanguard as a source of supply. The petitioner further contends that the Etron sales verification report discloses additional evidence of the Lu family's extensive, collective control over Etron. The petitioner argues that this evidence supports the conclusion that C.Y. Lu, as a member of the Lu family, the brother of Etron's CEO, and as President of Vanguard, was in a position to exercise restraint or direction over Etron. The petitioner additionally argues that Etron's purchase of Vanguard stock, and purchase and sale of its own stock (which are listed on the page of Etron's 1998 consolidated financial statement that Etron had failed to submit to the Department), further support a finding of affiliation between Etron and Vanguard.

According to Etron, the Department confirmed during verification the central elements that the Department relied upon in its preliminary determination to demonstrate that Etron and Vanguard are not affiliated. Etron states that, contrary to the petitioner's claims, certain of Etron's purchases demonstrate the dynamic nature of the market, and that Etron is able to purchase products from multiple sources. Etron adds that the fact that certain parties owned small shareholdings in Etron is irrelevant to the affiliation issue, and no information in the verification reports in any way undercuts the conclusion that the brother of C.C. Lu, the CEO and Chairman of Etron, was not in a position of "control" over Vanguard. Etron further argues that, simply because a portion of Taiwan Semiconductor Manufacturing Company's ("TSMC's") purchases of Etron stock was made in a certain way, rather than entirely on the open market, in no way supports a finding of affiliation between Etron and Vanguard, particularly since all the transactions took place after the POI.

Etron finally claims that it was under no obligation to identify a certain other company as an affiliated party because this company was not involved in the sale or production of the subject merchandise.

DOC Position: For purposes of the preliminary determination, the Department determined that Etron and Vanguard were not affiliated within the meaning of section 771(33)(F), given that the Lu family was not in a position of legal or operational control over Vanguard. *See* Memorandum on Whether Etron Technology, Inc. and Vanguard International Semiconductor Corporation are Affiliated Under Section 771(33) of the Act, dated May 21, 1999. At verification, we carefully examined Vanguard's corporate and financial records. While family members occupied positions in Vanguard and Etron, we found no evidence of the Lu family's control over Vanguard's daily operations that would contradict our preliminary finding. Accordingly, consistent with our preliminary determination, we continue to find that during the POI, no member of the Lu family was in a position of legal and operational control over Vanguard within the meaning of section 771(33)(F) of the Act. *See* Vanguard's Sales Verification Report at 3-4. We note, however, if we issue an order in this case, we intend to reexamine the relationship between these two companies in any future administrative review.

Comment 5: Research and Development Expenses. Etron argues that its offset to R&D expenses for R&D revenues was in accordance with the Department's practice and that the Department erroneously excluded the offset in its preliminary determination.

The petitioner contends that the Department was correct in its preliminary determination to deny Etron's offset to its R&D expense for revenues received from R&D projects.

DOC Position: Given that the Department is rejecting Etron's reported sales and cost information to calculate Etron's margin, and is applying total facts available, the issue of whether the Department should allow an offset to Etron's R&D expenses is moot.

Comment 6: Stock Bonus Distributions to Employees Etron argues that, in its preliminary determination, the Department erroneously included the stock bonus provided to employees in Etron's COP.

The petitioner counters that the Department appropriately included Etron's 1998 employee stock bonus and cash payments to supervisors in the reported costs in its preliminary determination.

DOC Position: As with comments 5, the question of how to treat the stock distribution to Etron's employees is moot in light of our decision to apply total facts available to Etron.

B. MVI

Comment 7: Collapsing MVI and ProMOS. MVI states that the Department's preliminary determination not to collapse MVI and ProMOS and to treat ProMOS as a non-producing subcontractor was made in contravention of the law, the regulations, and the Department's established practice. According to MVI, ProMOS and MVI should be collapsed, the major input rule should not apply, and consequently, the cost of DRAMs produced at ProMOS should be valued using ProMOS's actual COP.

MVI claims that, under section 351.401(h) of the regulations, the Department should treat DRAM semiconductor foundries as producers unless the foundry: (1) Does not acquire ownership of the subject merchandise, and (2) does not control the relevant sale of the subject merchandise. According to MVI, in *SRAMs from Taiwan*, the Department stated that, even though the foundries owned the processed wafer, they did not own the crucial SRAM design, and therefore were not "producers." MVI maintains that this same logic does not apply in this case because ProMOS has ownership rights in the proprietary designs of the DRAMs it manufactures, similar to the design houses in *SRAMs from Taiwan*. Therefore, MVI contends that ProMOS must be deemed a producer of subject merchandise.

Further, MVI states that, under section 351.401(f)(1) of the Department's regulations, the Department must collapse MVI and ProMOS because they are: (1) Affiliated producers of subject merchandise; (2) they have production facilities in Taiwan for similar or identical products that would not require substantial retooling of either facility in order to restructure manufacturing priorities; and (3) there is a significant potential for the manipulation of price or production. According to MVI, because MVI and ProMOS should be collapsed and treated as a single entity under the regulations, the major input rule is inapplicable to them. Therefore, the Department should value ProMOS die using ProMOS's actual costs of production.

The petitioner states that, under the totality of facts, ProMOS is no different from the other semiconductor

fabricators that the Department has, in other cases, found to be simply foundries for the respondents. According to the petitioner, because there is no dispute that ProMOS is affiliated with MVI, and because there is no dispute that a fabricated wafer is a "major input" to a finished DRAM, the Department properly used the highest of cost or transfer price to determine the cost of DRAM die purchased by MVI from ProMOS.

The petitioner further argues that, if the Department were to find that ProMOS is a producer, it must collapse ProMOS and MVI, and calculate a single dumping margin, including margins on the sales of ProMOS DRAMs made through Siemens. In such a case, the petitioner contends that, because MVI did not report the sales through Siemens, the Department must make an adverse inference in applying facts available, and recommends that the Department should apply to the unreported volume of sales made through Siemens the highest individual dumping margin calculated for any other sale.

DOC Position: We disagree with MVI's contention that ProMOS should be considered a "producer", and that MVI and ProMOS should be collapsed for the purposes of the final determination. In response to the comments filed by MVI and the petitioner, we have reexamined the terms of the agreements between MVI and Siemens, and MVI, Siemens, and ProMOS. Based on this analysis, we stand by our preliminary determination that ProMOS is not a "producer" of the subject merchandise within the meaning of section 771(28) of the Act. *See Preliminary Determination,* 64 FR at 28986. Rather, the terms of the agreements indicate that ProMOS did not acquire ownership of the relevant subject merchandise and did not control the sale of relevant subject merchandise. Moreover, ProMOS did not control the sale of any merchandise. Therefore, we determine that, under 19 CFR 351.401(h), ProMOS served as a subcontractor to MVI and should be treated as such in our analysis. *See Memorandum on Whether ProMOS Technologies, Inc. ("ProMOS") is a Producer of Subject Merchandise and as Such Should be Collapsed with Mosel Vitelic, Inc. ("MVI"),* dated October 8, 1999. Thus, for the final determination, we have not collapsed MVI and ProMOS. We, therefore, have continued to apply the major input rule, pursuant to section 773(f)(2) and (3) of the Act and section 351.407(b) of the Department's regulations, to MVI's purchase of inputs from ProMOS. We note, however, that should we issue an order in this case, we intend to revisit this issue if any of the facts of this situation change in any future administrative review.

Comment 8: Unreported Home Market Sales. MVI argues that, if the Department concludes that certain sales shipped to destinations within Taiwan, and invoiced to North American customers by MVI's U.S. affiliate, MVC, should be treated as home market sales, then the Department should exclude them from the home market sales listing. MVI states that these sales are relatively few in number and were made outside the ordinary course of business. MVI also argues that, if the Department decides to include these sales in MVI's home market sales listing, it should use all of the data from MVC's Verification Exhibit 22, which contains all the invoices as well as a complete sales listing, including adjustments, for these sales.

The petitioner points out that no documentation was provided by MVC at verification indicating that the sales with bill-to addresses in North America but ship-to addresses in Taiwan were in fact destined for North America. According to petitioner, these sales should have been included in the home market database.

The petitioner argues that, because MVI 's submitted home market sales listing is incomplete, and thus not verified, the Department must rely on facts available. For this purpose, the petitioner states, the Department should add the sales listed in Verification Exhibit 22 to the home market sales database, using the listed gross unit price for the calculation of normal value. The petitioner claims that, because MVI did not submit in its response the transaction-specific data required to make adjustments to gross unit price, the unadjusted prices must be used as facts available. This, the petitioner maintains, represents a measured response that avoids the application of total facts available, yet it is a sufficiently adverse consequence for MVI's failure to provide a complete and accurate sales listing.

In rebuttal, MVI argues that the petitioner's suggestion for facts available should be rejected because MVC has been a cooperative respondent in this investigation and its reporting methodology for U.S. sales was fully disclosed and adopted in good faith. Further, MVI contends that the petitioner is incorrect in arguing that MVI did not submit in its response the transaction-specific data that is required to make adjustments to gross unit price. According to MVI, the necessary adjustments are allocations that were reported in full in MVI's Section B and C responses and supplemental responses of February 26, 1999 and March 24, 1999, which all were subject to verification.

DOC Position: We disagree with the petitioner that we should apply facts available for these unreported sales. An examination of the information collected at verification reveals that MVI should have reported these sales, but the amount of the sales in question is relatively insignificant, both in terms of quantity and value of MVI's total home market sales. Thus, we are disregarding those sales discovered during verification because the volume of unreported sales is relatively insignificant.

The Department has, in the past, disregarded sales inadvertently omitted from the home market database when such reported sales were of insignificant quantity and value. See *Final Determination of Sales at Less Than Fair Value: Oil Country Tubular Goods from Austria,* 60 FR 33553 (June 28, 1995); *Notice of Final Determinations of Sales at Less Than Fair Value: Certain Hot-Rolled Carbon Steel Flat Products, Certain Cold-Rolled Carbon Steel Flat Products, Certain Corrosion-Resistant Carbon Steel Flat Products, and Certain Cut to Length Carbon Steel Plate from France,* 58 FR 37125 (July 8, 1993).

Further, based on our analysis of information collected at verification, including invoices and sales listing (including adjustments), the inclusion of these sales in home market sales database would lower MVI's weighted-average dumping margin. Thus, the record indicates that the omission of these unreported sales is in fact, adverse to MVI's interests. Accordingly, no further adverse action is warranted.

Comment 9: Manufacturing Costs Capitalized in ProMOS's Construction in Progress Accounts MVI argues that the manufacturing costs capitalized in ProMOS's construction in progress ("CIP") accounts should not be included in ProMOS's reported production costs. MVI states that ProMOS's records are kept in accordance with Taiwanese GAAP and reasonably reflect the costs associated with the production of the subject merchandise. MVI cites Accounting Principles Board ("APB") Opinion number 4, which calls for the deferral to future accounting periods of those costs associated with future revenue. MVI argues that the costs booked in ProMOS's CIP accounts are costs associated with the testing and approval of production machinery used in the future production of various types of DRAM products. MVI argues that these costs are therefore related to future

revenue, and are properly capitalized under both U.S. and Taiwanese GAAP. As such, they should not be added to ProMOS's COP. MVI further argues that, if the increase in the CIP account for SDRAM DRAM wafers is added to ProMOS's COP, then the decrease in the CIP account for EDO DRAM products should be subtracted from ProMOS's COP.

The petitioner argues that it is very unusual for a wafer fabrication facility to have large amounts of manufacturing expenses in a CIP account. According to the petitioner, even though MVI considers its treatment of capitalized expenses reasonable, it makes no attempt to show how the capitalization of such unusually large amounts of manufacturing expenses is reasonable. The petitioner asserts that it is not the increase in the amount of CIP account as a whole that is of concern, but rather the capitalization of extraordinarily large amounts of non-fixed assets in the CIP account. Also, the petitioner states that the Department has incomplete information as to the amount of fixed assets in the CIP account for EDO DRAM products. The petitioner points out that this was a relatively mature production process by the end of the POI, and that much of the equipment for this product should have come online during the POI. Thus, even though there is no evidence on the record of such, the petitioner indicates that there was probably a great increase in the manufacturing CIP for EDO DRAMs over the POI, and that the Department should add an amount to ProMOS's EDO production costs.

DOC Position: We agree with MVI that ProMOS's manufacturing costs capitalized in its CIP accounts should not be included in full in ProMOS's COP for the POI. Section 773(f)(1)(A) of the Act states that costs "shall normally be calculated based on the records of the exporter or producer of the merchandise, if such records are kept in accordance with the generally accepted accounting principles of the exporting country (or the producing country, where appropriate) and reasonably reflect the costs associated with production and sale of the merchandise." In its ordinary books and records, ProMOS capitalized manufacturing costs incurred during the testing phase of operations at its new production lines. Even though these cost items are normally expensed as incurred for commercial operations, Taiwanese GAAP allows companies to capitalize these costs to CIP during the testing phase of operations. In accordance with its normal books and records and Taiwanese GAAP, ProMOS reported only the amortized portion of the capitalized costs. We agree with MVI that it was appropriate to report only the amortized portion of the manufacturing because the capitalization of these expenses during the testing phase of production is reasonable and the amortization of these expense reasonably reflects the per-unit cost of producing the subject merchandise. In other words, deferring some of the testing costs by capitalizing them and only reflecting the amortized portion in the per-unit COP through depreciation of the associated fixed assets is reasonable.

We agree with MVI that Taiwanese GAAP requires immediate recognition of manufacturing costs in mature production facilities but allows for capitalization and amortization of costs for production lines still involved in the testing phase of operations. As a result of the continuous testing of the SDRAM production line, SDRAM production activity during the period in which manufacturing costs were capitalized was relatively low when compared to the post-capitalization production period activity. In addition, we disagree with the petitioner's statement that the capitalized manufacturing costs were extraordinarily high. We find that, when compared to the manufacturing costs incurred during the testing phase, the manufacturing costs incurred and capitalized in aggregate during the test phase appear neither extraordinarily high nor unreasonable. *See* MVI cost verification exhibits 17 and 41.

The SAA at 834 states that "[t]he exporter or producer will be expected to demonstrate that it has historically utilized such allocations, particularly with regard to the establishment of appropriate amortization and depreciation periods and allowances for capital expenditures and other development costs." In this case, we verified that the company had capitalized and amortized manufacturing costs incurred during the test phase of production at its new production lines prior to the inception of this case. *See* MVI cost verification exhibit 41. In addition, we note that ProMOS's treatment of these manufacturing costs incurred during the test phase of production is consistent with the CIT's remand in *Micron Technology, Inc., v. United States*, 893 F. Supp. 21 (CIT 1995). In this case, the court stated that, "to the extent test production and related construction provide a benefit to current and future production, such costs are properly capitalized and amortized over the periods in which the benefits accrue." 893 F. Supp. at 25.

Comment 10: ProMOS's R&D Expenses. MVI argues that the entire amount of R&D expenses capitalized in the CIP accounts at the end of the POI should not be added to ProMOS's R&D expenses. Instead, MVI maintains that only the R&D expenses incurred during the POI should be included in the R&D allocation calculation. MVI points out that a portion of the R&D expense capitalized prior to the POI was amortized during the POI, and it was included in the R&D expense on MVI's financial statements. MVI reasons that, given that these R&D costs were not actually incurred during the POI, they should not be included in the allocation calculation.

The petitioner argues that no R&D should be deferred in a CIP account because capitalizing R&D is distortive of costs. The petitioner cites *DRAMS from Korea 1999*, 64 FR at 30484–85, which states that "capitalizing R&D expenditures is distortive of costs." The petitioner also cites U.S. GAAP which requires "all R&D costs to be expensed in the year incurred," as support for its position that no R&D be deferred in a CIP account.

DOC Position: We disagree with both MVI and the petitioner. While we agree that R&D costs should be expensed as incurred, the current situation is different. As explained in comment 9, ProMOS capitalized current manufacturing costs related to testing costs. In this instance, ProMOS classified some of these manufacturing costs as R&D incurred during the testing phase of operations. Although ProMOS classified these costs as R&D, they actually are costs from the testing phase of operations. Consistent with our position on the capitalized manufacturing costs that ProMOS incurred during the testing phase of operations, we consider it appropriate, under Taiwanese GAAP, for ProMOS to capitalize and amortize operating costs incurred during this testing phase. Following this approach, all testing expenses amortized during the POI should be recognized as a POI cost of production, regardless of whether it was originally incurred and capitalized prior to or during the POI.

Comment 11: Allocation of ProMOS's R&D expenses. MVI argues that, in following the cross-fertilization principle, the Department should allocate ProMOS's R&D expenses to all products sold by MVI. MVI cites *SRAMS from Taiwan*, 63 FR at 8925, where the Department concluded that "where expenditures benefit more than one product, it is the Department's practice to allocate those costs to all of the products which are benefitted." MVI

states that, under the cross-fertilization principle, MVI products could benefit from ProMOS's R&D expenditures and, therefore, ProMOS's R&D expenses should be allocated over all MVI's semiconductor products. Furthermore, MVI states that, if the Department continues to allocate ProMOS's R&D expenses exclusively to ProMOS's production, then MVI's R&D expenses should only be applied to merchandise produced at MVI.

The petitioner argues that ProMOS's R&D should only be allocated to ProMOS, which is consistent with the Department's treatment of ProMOS as a subcontractor.

DOC Position: We agree with the petitioner. ProMOS is an affiliated subcontractor of MVI that provides a specific input to MVI for the production of subject merchandise. As a subcontractor, ProMOS's R&D expenses should be connected with the merchandise ProMOS produced, which, in this case, is the input provided to MVI, whereas MVI's R&D costs should be allocated to all of the merchandise it produced. Moreover, we normally calculate G&A and R&D on an entity-specific level, not on a consolidated level. *See Notice of Final Determination of Sales at Less Than Fair Value: Stainless Steel Round Wire From Canada,* 64 FR 17324, 17334 (April 9, 1999) ("*Stainless Steel Round Wire From Canada*"). In the present case, respondent's reference to *SRAMS from Taiwan* is not applicable because that case refers to R&D cross-fertilization between different semiconductor products produced by the same company, and not between semiconductor products of the respondent and an affiliated subcontractor supplier, as in this case.

Comment 12: MVI's R&D expenses. MVI points out that MVC's R&D expenses are included in MVI's R&D expenses in its unconsolidated financial statements. However, MVC's COGS is not included in MVI's unconsolidated financial statements, thereby distorting MVI's R&D allocation ratio. MVI states that the numerator and the denominator used in the R&D expense allocation should be calculated using data from the same companies.

The petitioner claims that MVI's COGS used in the R&D ratio calculation was taken from MVI's financial statements and included the cost of products sold by MVI to MVC for resale to the U.S. market. The petitioner states that, if the Department were to add MVC's COGS to MVI's COGS, it would result in double-counting.

DOC Position: We agree with the petitioner that MVI's R&D rate computation should be based on the R&D costs and the cost of sales amounts as reported on MVI's audited financial statements. The fact that MVI may have performed some R&D for the benefit of MVC does not mean that MVI did not derive any benefit from that R&D. Consistent with our position that all semiconductor R&D benefits all semiconductor products (*see SRAMS from Taiwan,* 63 FR at 8925), we computed MVI's R&D rate as the ratio of MVI's company-wide R&D over company-wide cost of sales. Moreover, we note that MVI's cost of sales as reported on its financial statements already includes the cost of sales for those products which were sold to MVC and then resold in the U.S. market. *See* MVI cost verification exhibit 15. To include MVC's cost of sales in MVI's R&D rate calculation, as MVI argues, would double-count these cost of sales.

Comment 13: Employee Stock Bonuses. MVI states that the employee stock bonuses paid by MVI should be valued at the market price of MVI's stock on the date of the distribution of the shares. MVI points out that the Department's preference is that stocks be valued as of the grant date, based on the Financial Accounting Standards Board's Statement of Financial Accounting Standard ("SFAS") No. 123. MVI argues that SFAS 123 is not appropriate in this circumstance because SFAS 123 applies to stock options awarded as compensation, whereas MVI has awarded actual stock shares as compensation. MVI asserts that, with stock options, the company has no way of predicting when employees will choose to exercise the option. Consequently, the company has no immediate way to measure the value of the stock provided. However, in this instance, MVI knows the value of the shares provided and the actual cost to the company on the day the shares are distributed to the employees.

MVI continues that, even though it is not applicable, SFAS No. 123's definition of grant date as "the date on which the employer and employee come to a mutual understanding of the terms of a stock-based compensation award" further supports their argument for the use of the distribution date. MVI claims that the mutual understanding of the value of the employees' profit-sharing bonus does not occur until the date on which the stock is issued because the value of the stock is not determined until that date.

MVI states that, in calculating a company's actual costs, the Department should use the share distribution costs that best reflects the known costs to the company. MVI points out that, in *SRAMs from Taiwan*, 63 FR at 8922, the Department reasoned that the cost of stock bonuses to the company "is foregoing the opportunity to acquire capital by issuing or selling those shares to investors at the market price." MVI argues that, in this case, the opportunity cost is not incurred upon the announcement of the bonus, but rather upon the distribution of the bonus. Furthermore, MVI states that the employees' ownership rights to the shares are vested upon distribution, and not upon declaration.

MVI maintains that if the market value of the stock shares is determined by using the value of the shares on the date of declaration, the Department should consider the dilution effect of the share distribution. MVI states that the actual market value is diminished by the quantity of shares issued over shares outstanding. MVI points out that MVI's stock value declined as a result of the declaration of the stock bonuses, and that the Department should therefore adjust the market price used for the valuation of the stock shares by the dilution effect of the declaration.

MVI contends that, if the Department uses the date of the shareholder meeting to value employee stock bonuses, the Department should calculate an offset to the bonus given that the company did not issue shares until the date of distribution. MVI reasons that, if the Department attributes a cost to MVI that the company did not incur, then the Department should attribute to MVI the corresponding benefit that would inure to MVI because of the delay in the distribution of shares.

The petitioner argues that the Department should adhere to the policy it adopted in *SRAMs from Taiwan* and value MVI's stock bonus at the fair market value on the date the bonus was authorized. In particular, the petitioner cites *SRAMs from Taiwan,* 63 FR at 8922–23, in which the Department stated that "[a]s to the determination of fair market value, because the employee stock bonuses were authorized by UMC and Winbond shareholders at the annual shareholders' meetings, our preference would be to value the stock at the market price on those dates. However, since the dates of those meetings are not on the case record, we have valued the stock distributions on the date of issuance."

The petitioner asserts that the terms of MVI's stock bonus were clearly settled on the date MVI's shareholders authorized the stock bonus and specified the number of shares to distribute. The petitioner points out that the number of shares to be distributed was in no sense dependent on the

market value of the stock on the issue date or MVI's number of employees. The petitioner states that, using the declaration date is supported by the Accounting Principles Board ("APB") Opinion 25, which states that the measurement date is the earliest date on which both the number of shares to which an individual employee is entitled is known, and the option price is fixed. The petitioner argues that, in *SRAMs from Taiwan,* the Department had to resort to the market value on the date of issuance as a reasonable surrogate because the necessary information was not available in the record. The petitioner states that the opportunity cost forgone by MVI by issuing the stock as compensation to employees, rather than by selling it to investors on the open market, is better measured by the share value on the declaration date, and not the distribution date. The petitioner contends that, on the authorization date, the company obligated itself to issue a certain number of shares as a bonus to its employees, and that number of shares was fixed and did not vary with the fluctuations in the market value of the stock. The petitioner claims that MVI's examples of the stock bonus's dilution effect are not accurate because those examples involve stock splits and dividends, which constitute a distribution of additional shares to existing shareholders, and not the issuance of additional shares as compensation for services provided to the company. The petitioner concludes that MVI's theoretical benefit from delaying the issuance of the stock shares to employees would be a non-operating investment gain, and would not be allowed as an offset had such a gain been realized.

DOC Position: We agree with the petitioner that the employee stock bonuses should be recorded at fair market value on the date of the shareholders' approval. Our determination is based on the standards prescribed by SFAS 123 along with the precedent set forth in *SRAMs from Taiwan,* 63 FR at 8923. We recognize that Taiwanese GAAP allows stock bonuses to be recorded at par value as a reduction in stockholders' equity. However, in *SRAMS from Taiwan,* we determined that the treatment of stock bonuses under Taiwanese GAAP is distortive and does not reasonably reflect the cost of the subject merchandise, and, accordingly, we decided to rely on U.S. GAAP. While the Department acknowledges that SFAS 123 primarily addresses stock options, the standard actually stipulates that it applies "to [both] stock options and other stock-based compensation arrangements." *Interpretation and Application of Generally Accepted Accounting Principles 1998* by Patrick Delaney, *et al.* (John Wiley and Sons 1998) at 638. Thus, SFAS 123 would encompass the stock bonuses awarded by MVI to its employees and, as such, the shares of stock awarded to employees should be valued at fair market value on the grant date.

We disagree with MVI's claim that a "mutual understanding" of the value or opportunity cost of the stock bonus is not known until the date of distribution. A review of the record clearly indicates that the terms of the bonus were outlined in the minutes of the meeting where shareholder approval was granted. *See* MVI cost verification exhibit 47. As noted in *SRAMs from Taiwan,* 63 FR at 8923, SFAS 123 directs that "[i]f an award is for past services, the related compensation cost shall be recognized in the period in which it is granted." In the instant case, the stock distributed by MVI in the current year was for service of the prior year. Under U.S. GAAP, it is appropriate to recognize the compensation cost, and thus value the compensation, when the stock bonus was granted, which was as of the date of the shareholders' approval.

We also disagree with MVI's argument as to the dilution effect the stock bonus will have on market price. There are many complex factors, such as investor predictions of future company performance, changes in a company's management or changes in a company's business plan, which influence the stock market price of a publicly traded company. To speculate that there is a direct correlation between the authorization of the stock bonus and the market price, which can be quantified in a simple mathematical formula, is therefore not reasonable.

In addition, we disagree with MVI that the company should be granted an offset to account for any benefit accrued due to the delay in the issuance of the shares to employees. Once shareholder approval is obtained, a legal obligation exists requiring immediate recognition. There is no indication on the record that MVI derived a benefit from the delay in the distribution of the shares. Therefore, in order to avoid speculation as to the impact of dilution or the value of any lost future benefit, the Department adheres to its previously stated practice of using the declaration date for the valuation of stock bonuses.

Comment 14: Startup Adjustment. MVI argues that the Department should grant MVI's request for a startup adjustment for the ProMOS facility. MVI states that the Department should use the number of wafers out and good die out, as well as the number of wafers entering production, to determine whether ProMOS reached commercial levels of production. MVI asserts that the precedent established in *SRAMs from Taiwan* of determining commercial levels of production based on wafer starts during the period is not an accurate measure. MVI claims that, during ProMOS's startup period, wafer starts are not relevant to the number of units processed because ProMOS used many wafers during the POI for engineering and other test purposes that were unrelated to the production of finished goods. MVI claims that commercial levels of production should be measured by volumes of wafers out, volumes of good chips, rated monthly capacity, yields at a commercially feasible level, commercial levels of depreciation, and commercial levels of employees. MVI contends that it was not until the third quarter of 1998 that ProMOS ended its startup period.

MVI asserts that the Department failed to explain why a relative escalation in wafer starts is indicative of commercial levels of production, or how this escalation is characteristic of the merchandise, producer or industry concerned. MVI provides examples of other wafer fabrication facilities' capacity levels during the POI to emphasize the point that ProMOS was operating below normal industry capacity levels during the POI. Finally, MVI states that the October 21, 1997 news release declaring commercial availability of 64 Megabit ("meg") DRAMs produced by ProMOS should not be confused with the level of commercial production characteristic of the industry. MVI explains that the former is indicative of having merchandise, even the smallest amount, available for sale; the latter is indicative of having reached a particular level of production such that period costs reasonably reflect the normal COP.

The petitioner argues that ProMOS's startup period appears to have ended prior to the beginning of the POI. The petitioner cites section 773(f)(1)(C)(ii) of the Act, which states that "the statute permits a startup adjustment to be made only if: a producer is using new production facilities or producing a new product that requires substantial new investment, and production levels are limited by technical factors associated with the initial phase of commercial production." The petitioner states that, while ProMOS was using a new production facility, any technical factors that may have initially limited

production levels ceased to be at issue in October 1997, when ProMOS achieved commercial production levels that are characteristic of the DRAM industry.

The petitioner claims that, in the October 21, 1997 press release, ProMOS announces commercial availability of 64 meg DRAMs. In the press release, ProMOS held itself out to be a facility producing at self-proclaimed high volumes, and offering commercial production. It also provided to customers detailed information with respect to its full product line and price data. This, according to petitioner, indicates that ProMOS had surpassed the threshold of initial commercial production. The petitioner asserts that the information ProMOS provided at verification regarding wafer starts further contradicts MVI's claim for a startup adjustment, pointing out that ProMOS's wafer starts remained constant throughout most of the POI.

The petitioner contends that ProMOS's achievement of its rated capacity is not the proper benchmark for determining when the startup period ends. The petitioner cites the SAA at 836, which states that "[t]he attainment of peak production levels will not be the standard for identifying the end of the startup period, because the startup period may end well before a company achieves optimum capacity utilization."

The petitioner argues that the number of units going into finished goods inventory is not a good measure of the achievement of commercial levels of production. The petitioner states that the number of good die resulting from the production process reflects not only the output of the process but also, and more important, the yield achieved in the production process. The petitioner cites *SRAMs from Taiwan,* 63 FR at 8930, where the Department focused on a similar product and determined the beginning of commercial production levels (and the end of the startup period) based on the number of wafer starts, and notes that the Department found this represented the best measure of the facility's ability to produce at commercial production levels.

Furthermore, the petitioner notes that in *SRAMs from Taiwan,* where a similar product was examined, the Department, citing the SAA at 836, which directs the Department to examine the units processed in determining the claimed startup period, rejected respondent's argument that the Department examine production yields as a measure of when commercial production begins. The petitioner points out that yields improve constantly throughout the life cycle of a semiconductor product. The petitioner cites the SAA at 836, which directs the Department to not extend the startup period so as to cover improvements and cost reductions that may occur over the entire life cycle of a product.

The petitioner asserts that the other factors, which MVI claims are a measure of commercial production, are without merit. The petitioner states that investment in DRAM facilities is ongoing and continues beyond the initial startup period. Finally, the petitioner argues that the wafer production data for other Taiwanese producers are not appropriate measures because fabrication facilities can, and are, designed to handle different capacity levels.

DOC Position: We disagree with MVI that a startup adjustment is warranted in this case. Section 773(f)(1)(C)(ii) of the Act authorizes adjustments for startup operations "only where (I) a producer is using new production facilities or producing a new product that requires substantial additional investment, *and* (II) production levels are limited by technical factors associated with the initial phase of production" (emphasis added). In light of the information contained in the administrative record, we consider ProMOS's facilities to be "new" within the meaning of section 773(f)(1)(C)(ii)(I) of the Act because the record indicates that these production facilities have been built for the purpose of producing DRAM products not produced by MVI's other fabrication facility. *See* January 25, 1999 section A response. However, we do not consider ProMOS's production levels to have been limited by technical factors associated with the initial phase of production during the POI within the meaning of section 773(f)(1)(C)(ii)(II) of the Act. Section 773(f)(1)(C)(ii) states that "the initial phase of commercial production ends at the end of the startup period." Since, as explained below, the startup period has ended, we have determined that any technical factors that may have limited ProMOS's production ceased to be an issue when the facility reached what we consider to be commercial levels of production in October 1997, the beginning of the POI.

In determining whether commercial levels have been achieved, section 773(f)(1)(C)(ii) directs the Department to consider factors unrelated to the startup operations that might affect the volume of production processed, such as demand, seasonality or business cycles. Moreover, the SAA at 836 directs the Department to examine the units processed in determining the claimed startup period. In *SRAMs from Taiwan,* 63 FR at 8930, we stated that "our determination of the startup period was based, in a large part, on a review of the wafer starts at the new facility during the POI, which represents the best measure of the facility's ability to produce at commercial production levels." Consistent with the SAA and *SRAMs from Taiwan,* in this case, we continue to believe that wafer starts provide the best measure of the facility's ability to produce at commercial production levels because the increase in wafer starts is indicative of ProMOS's resolution of technical problems that had initially restricted production. Based on this measure, we have determined that ProMOS reached commercial levels of production prior to the start of the POI. Due to the proprietary nature of this analysis, *see Cost Calculation Memorandum for MVI* dated October 12, 1999 for a more detailed explanation regarding the startup adjustment. Because section 773(f)(1)(C)(ii) of the Act establishes that both prongs of the test must be met before a startup adjustment is warranted, we have denied MVI's startup claim.

We agree with the petitioner's argument that units going into finished goods inventory are not a good measure of the achievement of commercial levels of production, given that they are more a reflection of the quality of the product produced and the yields achieved in the production process. In addition, we do not consider a industry-wide comparative yield approach appropriate for determining the end of the startup period because the respondent may never reach yields comparable to other producers. Furthermore, because yields improve constantly throughout the life cycle of a semiconductor product, based on yields, we might improperly find that some respondents may appear to never leave the startup period.

Additionally, commercial levels of depreciation, number of employees, and a commercially feasible yield are not appropriate measures of commercial levels of production because they do not measure the units processed as mandated by the SAA at 836. The SAA does not refer to quality of merchandise produced, the efficiency of production operations, or the number of employees, as criteria for measuring the length of the startup period. Rather the SAA at 836 relies strictly on the number of units processed, rather than output yields, as a primary indicator of the end of the startup period.

Regarding the October 21, 1997, press release, we disagree with MVI's statement that commercial availability is indicative of having the smallest amount of merchandise available for sale. We agree with the petitioner that,

because the press release provided product line information and pricing data, ProMOS held itself out to its customers as a high volume producer. This further supports our finding that the startup period ended by the beginning of the POI.

Finally, MVI's comparison of ProMOS's capacity to production data of other wafer fabrication facilities is without merit. We agree with the petitioner that each fabrication facility is designed to handle different capacity levels, which makes such a comparison incongruous. Moreover, even if production levels were limited, MVI failed to provide the Department with sufficient evidence of technical factors that may have limited ProMOS's new facility production levels during the POI.

Comment 15: Reconciliation Adjustment to ProMOS's Costs. MVI claims that ProMOS's costs should not be adjusted for the unreconciled difference reported by the Department. MVI explains that, because ProMOS is an affiliated producer of subject merchandise, it reported ProMOS's actual per-unit costs of manufacturing the subject merchandise instead of the transfer price recorded in its normal books and records. MVI states that, because the reconciliation assumes that all merchandise sold by ProMOS was fabricated in the same quarter in which it was sold, the timing difference between products going to ProMOS's finished goods inventory and output going to COGS accounts for the unreconciled difference reported in the cost verification report.

The petitioner argues that MVI has not provided a credible explanation for the unreconciled difference, and that the Department should increase ProMOS's costs by the amount of the unreconciled difference. The petitioner points out that MVI speculates that the discrepancy may be due to differences between the time a product was produced and the time it was sold, but MVI does not provide specific explanations identifying the differences. The petitioner asserts that ProMOS should have easily been able to show how its costs were allocated to subject merchandise, and to the extent that there is a discrepancy between the financial statements and the response, the amount of the discrepancy should be added to ProMOS's COP.

DOC Position: We agree with MVI's claim that ProMOS's costs should not be adjusted for the unreconciled difference. After reviewing certain verification exhibits, we have determined that the reconciling difference is eliminated when accounting for different valuations between the quarter the input merchandise was produced by ProMOS, and the quarter the merchandise was sold by ProMOS. *See Cost Calculation Memorandum for MVI* dated October 12, 1999 for a detailed explanation.

Comment 16: Back End Costs. MVI states that, in making an adjustment for MVI's affiliated back-end (*i.e.*, assembly and test) costs, the Department should ensure that the quarterly back-end costs and transfer prices of different products within the same control number are weight-averaged.

The petitioner did not comment on this issue.

DOC Position: We agree with MVI. In calculating the adjustment for MVI's affiliated back-end costs, the Department utilized information from the verification exhibits and MVI's June 24, 1999 submission to ensure that costs for multiple products within the same control number were weight-averaged.

Comment 17: Marine Insurance. MVI states that it double-counted marine insurance expenses in its responses. MVI requests that the Department adjust the reported G&A expenses to correct for this duplication.

The petitioner did not comment on this issue.

DOC Position: We agree with MVI that marine insurance expenses have been double-counted as both a sales expense in its sales response and as a G&A expense in its cost response. For the final determination, the Department will deduct the marine insurance amount from MVI's G&A expenses to correct for this duplication.

Comment 18: Non-operating Expenses. MVI states that it is the Department's long standing policy not to include non-operating expenses that are unrelated to the production of subject merchandise. MVI argues that the dormitory depreciation and G&A building depreciation are clearly not related to production activities: the dormitory is used for housing students, interns, and guests, and the administrative building was dedicated to non-subject activities.

The petitioner asserts that it is appropriate for the Department to include MVI's non-operating expenses relating to the production of subject merchandise (*i.e.*, depreciation of the G&A building, and depreciation relating to the R&D building) to MVI's G&A expenses. The petitioner also claims that it is appropriate to include ProMOS's costs from the other miscellaneous expenses account that appear to be related to the production of subject merchandise.

DOC Position: In calculating the G&A rate, the Department's practice is to include certain expenses and revenues that relate to the general operations of the company as a whole, as opposed to including only those expenses that directly relate to the production of the subject merchandise. *See Notice of Final Determination of Sales at Less Than Fair Value: Stainless Steel Round Wire from Taiwan*, 64 FR 17336, 17339 (April 9, 1999) ("*Wire from Taiwan*"); and *Notice of Final Results and Partial Recission of Antidumping Duty Administrative Review: Certain Pasta From Italy*, 64 FR 6615, 6627 (February 10, 1999) ("*Pasta From Italy*"). The CIT agreed with the Department that "G&A costs, by definition, are period costs that relate to the company as a whole." *U.S. Steel Group v. United States*, 998 F. Supp. 1151 (CIT 1998). Accordingly, the G&A category covers a diverse range of items. Consequently, in determining whether it is appropriate to include or exclude a particular item from the G&A calculation, the Department reviews the nature of the G&A activity and the relationship between this activity and the general operations of the company. *See Wire from Taiwan*, 64 FR at 1733, and *Pasta From Italy*, 64 FR at 6627. The items at issue for both MVI and ProMOS, which include depreciation on the G&A and R&D buildings and losses on the sales of fixed assets, relate to the general operations of the respective company, and the Department has, therefore, included these expenses in MVI's and ProMOS's G&A expenses.

Comment 19: Clerical Errors. MVI notes an error in the Department's margin calculation program for the preliminary determination. In the cost test portion of the normal value calculation, the margin calculation program first attempts to match a given home market sale to the COP for that product for the same quarter. If there is no match in the COP file for that quarter, the margin calculation program searched for a match in the most recent previous quarter and the home market sale was designated as made in the earlier quarter. According to MVI, the error occurred when, at the end of the cost test, the designation was not changed back to the original quarter so that the appropriate sales price to sales price comparison could be made.

The petitioner does not dispute the presence of the error, but notes that the same problem exists in the matching of U.S. sales with CV.

DOC Position: We agree with MVI and petitioner and have made the necessary changes to the margin calculation program for the final determination so that the appropriate comparisons are made. We also discovered the same error in Vanguard's margin calculation

program and have made appropriate changes for the final determination so that the appropriate comparisons are made.

C. Nanya

Comment 20: Interest Income. Nanya states that its consolidated financial statement does not specifically address the nature of interest income on its income statement. Therefore, the company was unable to specifically identify the interest income which was short-term. As an alternative, Nanya suggests that the Department should calculate a short-term rate by comparing Nanya's liquid assets to total assets, and apply this ratio to Nanya's total interest income. Citing *Stainless Steel Sheet and Strip in Coils From the United Kingdom* 64 FR 30688, 30710 (June 8, 1999) (*"Sheet and Strip From the United Kingdom"*), Nanya states that when a respondent is unable to specifically identify short-term interest income, it is the Department's practice to offset interest expenses by an amount of interest income equivalent to the ratio of current assets to total assets, given that the relationship of current assets to total assets is representative of the relationship of short-term interest income to total interest income.

The petitioner argues that Nanya's reliance on *Sheet and Strip From the United Kingdom* for the calculation of short-term interest expense is misplaced. The petitioner argues that this case did not involve a complete failure to verify submitted data. Rather, the respondent in that case demonstrated to the Department that it did not have access to that company's underlying interest income data. The petitioner argues that Nanya has made no claim that it could not obtain access to the relevant supporting information to calculate the actual amount of its parent's short-term interest income, and that Nanya, instead, stonewalled the Department's request for this specific information at verification. The petitioner requests that the Department make an adverse inference in selecting facts otherwise available regarding Nanya's financial expense. The petitioner further requests that the Department calculate Nanya's financial expense ratio by using all of its reported financial expenses, without any offset for short-term interest income.

DOC Position: We agree with the petitioner that Nanya failed to substantiate its claim that some of its interest income on its consolidated financial statement was from short-term sources. The Department specifically requested, in section VII of the Cost Verification Outline, that Nanya demonstrate how it arrived at its figures for short-term interest income. Although Nanya was well aware of the Department's requests at verification, the company did not provide any supporting documentation to substantiate its reported figures for short-term interest expense or income. As we noted in Nanya's Cost Verification Report at page 18, the company did not submit material at verification supporting its claim that some of its interest income on its consolidated financial statement was from short-term sources, and did not offer the Department supporting documentation for any other amounts claimed as financial expense offsets. The Department agrees with the petitioner that when a company cannot support the data reported in its response, the information is unverified and cannot be used to support a determination. Furthermore, we disagree with Nanya that *Sheet and Strip From the United Kingdom* supports its argument. In *Sheet and Strip From the United Kingdom*, the Department agreed to make an adjustment to the respondent's interest income figure because the respondent demonstrated that it did not have access to its parent company's underlying interest income data. Unlike that case, Nanya has made no claim that it could not obtain access to the relevant supporting information to calculate the actual amount of its parent's short-term interest income.

Given that Nanya was aware of the Department's request prior to verification, but did not demonstrate how it arrived at its reported figures, we have determined not to grant the short-term offset to its financial expenses. Rather, the Department has calculated Nanya's financial expense ratio using all of its reported financial expense, without any offset for interest income. *See Nanya Cost Calculation Memorandum* dated October 12, 1999. Consequently, the application of facts available does not apply because we are not allowing this offset, as the petitioner, in any case, requested.

Comment 21: Exchange Gains and Losses. The petitioner argues that Nanya was unable to provide any supporting documentation to verify its reported classification of its foreign exchange gains and losses. The petitioner believes that, in the context of this verification failure, the Department cannot rely on the amounts submitted by Nanya, and must, instead, apply facts available. The petitioner further argues that the Department should apply certain adverse assumptions concerning the nature of the reported foreign exchange gains and losses by treating all of Nanya's foreign exchange losses as related to production, and by treating all of the reported foreign exchange gains as unrelated to production, and not allowing any part of such gains to offset Nanya's general expenses.

Nanya explains that it was unable to demonstrate at verification that it correctly distributed the foreign exchange gains and losses to the proper cost elements because there was insufficient time to verify all elements of Nanya's cost response. Nanya argues that, although the Department did not examine Nanya's foreign exchange gains and losses, this should not lead the Department to question the validity of Nanya's categorization of those items. Nanya states that, even if the Department were to resort to facts available for the categorization of these items, the application of adverse inferences proposed by the petitioner is not justified in light of Nanya's cooperation in this proceeding and at verification. Nanya states that, when a party is cooperative, the Department will make its determinations by weighing the record evidence to determine what is most probative of the issue under consideration. *See* SAA at 869. Therefore, Nanya urges the Department that, even if it were necessary for the Department to resort to facts available, the most probative and accurate information on the record is the categorization of foreign exchange gains and losses reported by Nanya in its response.

DOC Position: We agree with the petitioner that Nanya failed to provide documentation substantiating its submitted figures for exchange gains and losses to the Department at verification. Sections VI and VII of the Nanya Cost Verification Outline specifically requested that Nanya provide documents necessary to reconcile the company's reported figures for exchange gains and losses, as noted in exhibit 20 of Nanya's April 14, 1999 submission. At Nanya's cost verification, the Department twice requested that Nanya account for its submitted figures for exchange gains and losses. *See Nanya Cost Verification Report* at 17–18. Moreover, to provide sufficient time to verify Nanya's cost responses, the Department officials agreed to extend the time period devoted to address this issue. Despite this opportunity, Nanya failed to substantiate, at verification, these reported figures.

In light of Nanya's failure to support its submitted figures for exchange gains and losses, the Department is required to treat these figures as unverified and,

as such, this data cannot be used for purposes of the final determination. Therefore, the Department is treating all of Nanya's foreign exchange losses as related to production, and all of the reported foreign exchange gains as unrelated to production or the general activities of the company as a whole, and thus we are not allowing any part of such gains to offset Nanya's G&A expenses. For a more detailed explanation, *see Cost Calculation Memorandum for Nanya* dated October 12, 1999.

Comment 22: Other Revenue. The petitioner states that it supports the Department's decision in the *Preliminary Determination* to adjust Nanya's reported G&A to exclude certain other revenue items as offsets to cost. These other revenue items include: other revenue-over estimated, material income, adjustment credits-claims income, gains on physical inventory and cash, gains on overseas employees' aids, returns on loss on price decline in inventory, and others.

Nanya disagrees with the petitioner. Nanya believes that excluding this revenue would be contrary to the Department's established practice, which permits offsets to G&A expenses for certain income earned from the company's production operations. As support for its position, Nanya cites *Circular Welded Non-Alloy Steel Pipe from the Republic of Korea; Final Results of Antidumping Duty Administrative Review*, 63 FR 32832, 32838 (June 16, 1998) ("*Circular Welded Pipe from Korea*").

DOC Position: We agree with Nanya that the Department permits offsets to G&A expenses for miscellaneous income earned from a company's general production operations. As we explained in *Circular Welded Pipe from Korea*, 63 FR at 32832, we permit offsets to G&A expenses for income earned from the company's production operations. Therefore, we have allowed, in part, the other revenue items listed in exhibit 16 of Nanya's April 14, 1999, response as an offset to G&A expenses because these revenue items are considered income earned from the company's general operations. We note, in particular, that the item listed "return on loss on price decline in inventory" represents the company's normal accounting treatment for the lower of cost or market provision adjustment to raw materials, WIP and finished goods inventory. In its normal books and records, Nanya includes the lower of cost or market write-down of its raw material, WIP and finished goods inventories as an element on its income statement and records a provision account on its balance sheet. In the following period, when items are used in production or are sold, the provision and the historical cost of those items are reflected on the income statement of that year. Because both raw material and WIP inventories are inputs into the cost of manufacturing the subject merchandise, any inventory write-downs or recognition of inventory write-down provisions should be included in determining the reported costs. *See Notice of Final Determination of Sales Less Than Fair Value: Stainless Steel Wire Rod from Italy*, 63 FR 40422, 40430, (July 29, 1998). We did not include the write-down of finished goods, which is, conversely, more closely associated with the sale of the merchandise rather than the production of the merchandise. For the computation of this specific item, we included only the provision associated with raw materials and WIP inventories. Therefore, we allowed, in part, the other revenue items in Nanya's submission as an offset to G&A expenses.

D. Vanguard

Comment 23: Misreported and Unreported Home Market Sales. The petitioner asserts that the Department's discovery of numerous errors by Vanguard in the reporting of its home market sales at verification warrants an adverse inference in the application of facts otherwise available. The petitioner states that, as adverse facts available, the Department should leave certain home market sales that, in fact, are export sales, in Vanguard's home market database, and use the unadjusted gross unit price of these sales in the calculation of NV. The petitioner further states that, as adverse facts available, the Department should allocate the value of an unreported home market sale over all of Vanguard's sales to this customer, which results in an increase in the gross unit price of these sales.

Vanguard refutes the petitioner's argument, stating that the Department should not apply facts available because Vanguard may have misreported certain sales with ultimate destinations in third countries as home market sales. Vanguard states that it reported all sales that it shipped to addresses in Taiwan as home market sales. Vanguard states that it does not know whether the merchandise shipped to customers in Taiwan would be sold domestically or consumed in Taiwan before exportation, adding that the sales at issue could have been substantially transformed in Taiwan before reshipment. Vanguard further argues that it cannot be expected to have investigated all of the potential ultimate destinations for its many home market transactions. Vanguard states that its cooperation in this investigation does not meet the standard for the application of adverse facts available, and if the Department determines that certain sales shipped to customers in Taiwan should not be designated as home market sales, the Department should simply eliminate the sales in question from the home market database.

DOC Position: We agree with Vanguard that Vanguard's misreporting of home market sales does not warrant the application of adverse facts available. Vanguard's actions in this investigation do not meet any of the criteria for the application of facts available under section 776(a) of the Act. Vanguard simply reported the sales of all merchandise that it produced and shipped to customers in Taiwan as home market sales, and thereby inadvertently included certain third country sales in its database. We also note that, as reported, these sales raise Vanguard's dumping rate, a result that appears to support Vanguard's claim that the inclusion of these sales was an oversight.

At verification, the Department discovered that Vanguard knew, or should have known, at the time of sale that certain sales that Vanguard shipped to customers in Taiwan were ultimately destined, without further processing, for customers in third countries (due to the proprietary nature of this issue, for further details, *see* Memorandum on Whether Certain Sales that Vanguard International Semiconductor Corporation Reported as Home Market Sales are Export Sales dated October 12, 1999).

Section 773(a)(1)(B)(i) of the Act, and section 351.404(c)(i) of the Department's regulations, provides that, if the exporting country constitutes a viable market, normal value shall be based on the price in the exporting country. Since, in this investigation, we are basing normal value for Vanguard on the price in the exporting country, Taiwan, we are excluding from the calculation of NV those sales that Vanguard knew, or should have known, at the time of sale were ultimately destined for customers outside of Taiwan and inadvertently included in its home market sales database. *See Final Determination of Sales at Less Than Fair Value: Canned Pineapple Fruit From Thailand*, 60 FR 29553 (June 5, 1995) and *Final Determination at Sales at Less than Fair Value: Stainless Steel Plate in Coil from Belgium*, 64 FR 15476, 15482 (March 31, 1999) (The Department excluded third country sales that the respondent inadvertently included in its home market database).

We also disagree with the petitioner that we should apply adverse facts available to an unreported home market sale. Although Vanguard failed to report this sale, even if properly reported, this sale would not be used as a match for any of Vanguard's U.S. sales, and has an insignificant effect on our calculations.

We also note that our exclusion of the third country sales from our calculation of normal value does not call into question the completeness of Vanguard's sales reporting. We verified that Vanguard reported all sales that it produced and shipped to destinations in Taiwan as home market sales. Vanguard only failed to report two insignificant sales of subject merchandise that it purchased from other companies, and shipped to customers in Taiwan.

Comment 24: Lower of Cost or Market

Vanguard contends that its inventory adjustment for the lower of cost or market should not be included in the company's reported cost of manufacturing. Citing *Antifriction Bearings (Other Than Tapered Roller Bearings) and Parts Thereof from France et al.*, 62 FR 2081, 2117–18 (Jan. 15, 1997) ("*Antifriction Bearings from France*") in support of its argument, Vanguard presents the adjustment as a "provisional reduction-in-inventory value" in anticipation of lower sales revenues which should not be regarded as an actual or realized cost.

Vanguard states that the lower of cost or market adjustment is recorded on an aggregate basis and is not reflected in the unit standard costs. Therefore, according to Vanguard, the full cost of manufacturing the subject merchandise was reported as products entered the finished goods inventory. Vanguard further contends that the recognition of the loss in the COGS portion of the income statement reflects the loss in value of a balance sheet item, not the occurrence of a realized cost. Vanguard stresses that these adjustments are "post-production" and including them in the reported costs would, in effect, double-count the costs of manufacturing.

The petitioner counters that the lower of cost or market adjustments excluded from the cost of manufacturing in *Antifriction Bearings from France* were "not a realized expense, and were not reflected in their accounting of costs of goods in inventory." The petitioner suggests that the inclusion of Vanguard's COGS on its financial statements indicates that the adjustment also should be included in Vanguard's reported costs. The petitioner argues that the revaluation of inventory is an early recognition of the loss the company expects to experience on the future sale of the product due to the changes in market conditions. The fact that the write-down of inventory costs arose "post-production," the petitioner states, does not eliminate it as an actual COP.

DOC Position: We agree in part with the petitioner that the lower of cost or market adjustments made by Vanguard during the period of investigation should be included in the reported costs. Consistent with section 773(f)(1)(A) of the Act, it is the Department's practice to rely upon a company's normal books and records where they are prepared in accordance with the home country's GAAP and reasonably reflect the cost of producing and selling the subject merchandise. We found that Vanguard includes, in its normal books and records, the write-downs of its raw material, WIP and finished goods inventories as an element of its current costs per its financial statements. However, we discovered that these adjustments were not reflected in Vanguard's reported costs.

Additionally, because both raw material and WIP inventories are inputs into the cost of manufacturing the subject merchandise, any write-downs of these amounts should be included in determining the reported costs. *See Notice of Final Determination of Sales Less Than Fair Value: Stainless Steel Wire Rod from Italy* 63 FR 40422, 40430 (July 29, 1998). The write-down of finished goods, conversely, is more closely associated with the sale of the merchandise, rather than the production of the merchandise. When finished goods are written down, the merchandise has already been fully manufactured and fully costed in the COM statement. The inventory valuation is simply being adjusted to reflect a market value which is below COP. Thus, the company is currently expensing the anticipated loss in revenues from the future sale of these goods. Since the full cost of the finished goods has already been included in COM prior to the adjustments, it is appropriate to exclude the write-down for finished goods from the reported costs. Therefore, for our cost calculations, we included only the write-down provision associated with raw materials and WIP inventories.

Comment 25: Standard Cost Revaluation.

Vanguard states that the standard cost revaluations constitute adjustments to the standard costs only and do not affect the actual manufacturing costs recorded on the books. Vanguard emphasizes that the manufacturing variance (*i.e.*, actual cost less standard cost) absorbs the differences resulting from the revalued standards. Because the revaluation adjustment is reflected in a more favorable or unfavorable variance being applied to the standard costs in obtaining actual costs, Vanguard argues that adding the adjustment to the derived actual costs would inflate the cost of manufacturing.

Vanguard acknowledges that, under a standard cost system, the inclusion of the standard cost revaluation is necessary to compute the actual COGS on the income statement, but maintains that the adjustment is not a component of the actual cost of manufacturing. Vanguard contends that the standard COGS must be adjusted by both the manufacturing variance and the revaluation amount to derive the actual COGS. However, Vanguard continues, the revaluations are not adjustments to actual costs and including them in the actual cost of manufacturing would overstate actual costs.

The petitioner argues that the standard cost revaluations should be included in the reported costs, and points to the fact that the revaluation amount appears on Vanguard's financial statements. The petitioner further comments that deducting the revaluation amount from the COGS to derive the actual cost of manufacturing is in effect saying that the costs on the financial statements were overstated to Vanguard's shareholders. The petitioner emphasizes that because the standard cost revaluations are added to standard COGS in achieving actual COGS, these costs constitute an element of actual cost and should not be excluded from reported costs. The petitioner concludes that, in performing the overall cost reconciliation, the COGS presented on Vanguard's financial statements should only be adjusted for changes in inventory, costs reported in the sales files, non-subject merchandise and "third-country-only" sales in arriving at total reported costs.

DOC Position: We agree in part with the petitioner that the standard cost revaluation should be included in the reported costs. Due to expected cost decreases, Vanguard revalues its standard costs of production on a quarterly basis. The new standards are employed not only for the current product-specific manufacturing costs, but also for revaluation of the raw materials inventories and the WIP and finished goods inventories manufactured in previous quarters. Because the new standards are utilized in current production, this revaluation has no impact on the computation of the variance (*i.e.*, current standard costs of manufacturing minus current actual

costs). Therefore, the production costs incurred currently, which have been reported at standard plus variance, result in an actual cost. However, current actual manufacturing costs must be adjusted for beginning and ending WIP inventory values in deriving a period's COMs. Along with raw materials, beginning WIP is essentially a "raw material" or input into the finished products manufactured during the period and, as a result, must be included in the cost of manufacturing the goods produced during the POI. This is why there is a reconciliation difference between costs reflected on the company's audited financial statements and those reported to the Department. Based on the record evidence, the ending WIP for each quarter is revalued at the beginning of the ensuing quarter. Because WIP and raw materials have been "revalued," the values for these inputs are incorrectly stated. As noted previously, the restatement of WIP is not factored into the variance computation and was not noted elsewhere in the submitted costs for COP and CV. Thus, the writedown of WIP and raw materials must be included in the respective beginning inventory values to result in the actual cost of the inputs consumed (*i.e.*, the beginning WIP and raw material inventory amounts). Regarding the standard cost revaluation adjustments to the finished goods inventories, we agree with Vanguard that these adjustments are made post-production and should not be included in the reported costs.

Comment 26: Use of Higher of Cost or Transfer Price for Affiliated Subcontractor. The petitioner states that the Department's rule for valuing major inputs from affiliated suppliers at the higher of cost or transfer price should be exercised for the transactions involving Vanguard's affiliated assembly contractor. Vanguard did not address this issue in its briefs.

DOC Position: We agree with the petitioner that the transactions involving Vanguard's affiliated assembly contractor should be reported in accordance with the major input rule, pursuant to section 773(f)(3) of the Act and section 351.407(b) of the Department's regulations. Accordingly, for the final determination, we valued the assembly transactions between Vanguard and the affiliated supplier at the highest of the transfer price between the affiliates, the affiliated supplier's actual COP, or the market price.

Continuation of Suspension of Liquidation

In accordance with section 735(c)(1)(B) of the Act, we are directing the Customs Service to continue to suspend liquidation of all entries of subject merchandise from Taiwan that are entered, or withdrawn from warehouse, for consumption on or after May 28, 1999 (the date of publication of the preliminary determination in the **Federal Register**). The Customs Service shall continue to require a cash deposit or posting of a bond equal to the estimated amount by which the normal value exceeds the U.S. price as shown below. These suspension of liquidation instructions will remain in effect until further notice. The weighted-average dumping margins are as follows:

Exporter/manufacturer	Weighted-average margin (percent)	Weighted-average per megabit rate
Etron Technology, Inc	69.00	$0.40
Mosel-Vitelic, Inc.	35.58	0.12
Nan Ya Technology Corporation	14.18	0.02
Vanguard International Semiconductor Corp.	8.21	0.01
All Others	21.35	0.04

Pursuant to section 735(c)(5)(A) of the Act, the Department has excluded any margins determined entirely under section 776 of the Act from the calculation of the "All Others Rate."

ITC Notification

In accordance with section 735(d) of the Act, we have notified the International Trade Commission (ITC) of our determination. As our final determination is affirmative, the ITC will, within 45 days, determine whether these imports are materially injuring, or threaten material injury to, the U.S. industry. If the ITC determines that material injury, or threat of material injury does not exist, the proceeding will be terminated and all securities posted will be refunded or canceled. If the ITC determines that such injury does exist, the Department will issue an antidumping duty order directing Customs officials to assess antidumping duties on all imports of the subject merchandise entered for consumption on or after the effective date of the suspension of liquidation.

This determination is issued and published pursuant to sections 735(d) and 777(i) of the Act.

Dated: October, 12, 1999.

Robert S. LaRussa,

Assistant Secretary for Import Administration.

[FR Doc. 99-27294 Filed 10-18-99; 8:45 am]

BILLING CODE 3510-DS-P

DEPARTMENT OF COMMERCE

International Trade Administration

[A-331-602]

Certain Fresh Cut Flowers From Ecuador: Final Results of Changed-Circumstances Antidumping Duty Administrative Review; Revocation of Order; Termination of Administrative Reviews

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

ACTION: Notice of final results of changed-circumstances antidumping duty administrative review, revocation of antidumping duty order, and termination of administrative reviews.

SUMMARY: On September 9, 1999, the Department of Commerce published a notice of initiation of a changed-circumstances antidumping duty administrative review and preliminary results of review with intent to revoke the order on certain fresh cut flowers from Ecuador. We are now revoking this order, retroactive to March 1, 1997, based on the fact that domestic interested parties no longer have an interest in maintaining the antidumping duty order.

EFFECTIVE DATE: October 19, 1999.

FOR FURTHER INFORMATION CONTACT: Suzanne Flood or Edythe Artman, Office of AD/CVD Enforcement, Import Administration, International Trade Administration, U.S. Department of Commerce, 14th Street and Constitution Avenue, NW, Washington, DC 20230; telephone (202) 482-0665 or (202) 482-3931, respectively.

SUPPLEMENTARY INFORMATION:

APPENDIX B

LIST OF WITNESSES THAT APPEARED AT THE HEARING

CALENDAR OF PUBLIC HEARING

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

Subject:	DRAMS of One Megabit and Above from Taiwan
Inv. No.:	731-TA-811 (Final)
Date and Time:	October 19, 1999 - 9:30 a.m.

Sessions were held in connection with this investigation in the Main Hearing Room, 500 E Street, SW, Washington, DC.

OPENING REMARKS

Petitioner (**Gilbert B. Kaplan**, Hale and Dorr LLP)
Respondents (**David P. Houlihan**, White & Case LLP)

In Support of the Imposition of Antidumping Duties:

Hale and Dorr LLP
Washington, D.C.
on behalf of

Micron Technology, Incorporated

Michael W. Sadler, Vice President, Sales, Micron Technology, Incorporated

Linda Turner, International Sales Manager, Micron Technology, Incorporated

Mark W. Love, Senior Vice President, Economic Consulting Services, Incorporated

Bonnie B. Byers, Economist, Hale and Dorr LLP

Gilbert B. Kaplan)
Michael D. Esch)--OF COUNSEL
Paul W. Jameson)

In Opposition to the Imposition of Antidumping Duties:

White & Case LLP
Washington, D.C.
on behalf of

Taiwan Semiconductor Industry Association (and its member companies)

Ken Hurley, Vice President and General Manager, Nan Ya USA

Genda Hu, President, Taiwan Semiconductor Industry Association

John G. Reilly, Vice President, Nathan Associates, Incorporated

David P. Houlihan)
Christopher F. Corr)
)--OF COUNSEL
Adams C. Lee)
Lyle B. Vander Schaaf)

CLOSING REMARKS

Petitioner (**Gilbert B. Kaplan**, Hale and Dorr LLP)
Respondents (**David P. Houlihan**, White & Case LLP)

APPENDIX C

SUMMARY TABLE

Table C-1
DRAMs and DRAM Modules: Summary data concerning the U.S. market, 1996-98, Jan.-June 1998, and Jan.-June 1999

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

Item	Reported data			January - June		Period changes			Jan.-June
	1996	1997	1998	1998	1999	1996-98	1996-97	1997-98	1998-99
U.S. consumption quantity:									
Amount	6,617,524	14,152,900	31,095,534	12,042,398	***	369.9	113.9	119.7	***
"Domestic" product share (1)	30.6%	29.0%	30.2%	28.9%	***	-0.4%	-1.6%	1.2%	***
"Imported" product share (1)									
Subject Taiwan dice	4.7%	5.6%	6.4%	5.3%	***	1.7%	0.9%	0.8%	***
Nonsubject Taiwan dice	***	***	***	***	***	***	***	***	***
Korea dice	37.5%	35.6%	40.4%	41.0%	***	2.9%	-1.9%	4.8%	***
Japan dice	19.6%	21.1%	17.5%	19.4%	***	-2.1%	1.5%	-3.6%	***
3rd-source dice	***	***	***	***	***	***	***	***	***
Total, all imports	69.4%	71.0%	69.8%	71.1%	***	0.4%	1.6%	-1.2%	***
U.S. consumption value:									
Amount	6,879,128	6,057,443	4,891,387	2,245,536	***	-28.9	-11.9	-19.2	***
"Domestic" product share (1)	30.3%	29.2%	27.9%	26.3%	***	-2.4%	-1.1%	-1.3%	***
"Imported" product share (1)									
Subject Taiwan dice	4.3%	6.2%	7.1%	6.5%	***	2.8%	1.9%	0.9%	***
Nonsubject Taiwan dice	***	***	***	***	***	***	***	***	***
Korea dice	40.0%	37.2%	39.4%	40.9%	***	-0.6%	-2.8%	2.2%	***
Japan dice	20.9%	22.6%	19.4%	20.9%	***	-1.5%	1.7%	-3.2%	***
3rd-source dice	***	***	***	***	***	***	***	***	***
Total, all imports	69.7%	70.8%	72.1%	73.7%	***	2.4%	1.1%	1.3%	***
"Imported" product made from--									
Subject Taiwan dice:									
U.S. shipments quantity	308,845	790,243	1,999,687	640,190	1,492,901	547.5	155.9	153.0	133.2
U.S. shipments value	292,617	373,225	347,195	145,410	241,687	18.7	27.5	-7.0	66.2
Unit value	$0.95	$0.47	$0.17	$0.23	$0.16	-82.1	-50.5	-63.8	-30.4
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Nonsubject Taiwan dice:									
U.S. shipments quantity	***	***	***	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Japan dice:									
U.S. shipments quantity	1,294,468	2,985,429	5,447,620	2,334,476	4,300,720	320.8	130.6	82.5	84.2
U.S. shipments value	1,439,694	1,367,170	950,063	469,463	650,830	-34.0	-5.0	-30.5	38.6
Unit value	$1.11	$0.46	$0.17	$0.20	$0.15	-84.3	-58.8	-61.9	-24.7
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Korea dice:									
U.S. shipments quantity	2,483,144	5,038,307	12,549,440	4,940,664	7,590,515	405.4	102.9	149.1	53.6
U.S. shipments value	2,748,647	2,253,739	1,927,374	918,667	1,067,463	-29.9	-18.0	-14.5	16.2
Unit value	$1.11	$0.45	$0.15	$0.19	$0.14	-86.1	-59.6	-65.7	-24.4
Ending inventory quantity	***	***	***	***	***	***	***	***	***
All other 3rd source dice:									
U.S. shipments quantity	***	***	***	***	***	***	***	***	***
U.S. shipments value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Ending inventory quantity	***	***	***	***	***	***	***	***	***
Total, all imports:									
U.S. shipments quantity	4,591,659	10,055,323	21,696,846	8,556,177	15,385,725	372.5	119.0	115.8	79.8
U.S. shipments value	4,793,554	4,291,275	3,528,914	1,654,080	2,211,178	-26.4	-10.5	-17.8	33.7
Unit value	$1.04	$0.43	$0.16	$0.19	$0.14	-84.4	-59.1	-61.9	-25.7
Ending inventory quantity	***	***	***	***	***	***	***	***	***

Table continued on next page.

Table C-1--Continued
DRAMs and DRAM Modules: Summary data concerning the U.S. market, 1996-98, Jan.-June 1998, and Jan.-June 1999

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

Item	Reported data			January - June		Period changes			Jan.-June
	1996	1997	1998	1998	1999	1996-98	1996-97	1997-98	1998-99
"Domestic" product made from U.S. dice or from 3rd source dice assembled in the U.S.:									
U.S. shipments:									
Quantity	2,025,864	4,097,577	9,398,687	3,486,221	***	363.9	102.3	129.4	***
Value	2,085,574	1,766,168	1,362,474	591,457	***	-34.7	-15.3	-22.9	***
Unit value	$1.03	$0.43	$0.14	$0.17	***	-86.4	-58.3	-67.4	***
Export shipments:									
Quantity	***	***	***	***	***	***	***	***	***
Exports/shipments (1)	***	***	***	***	***	***	***	***	***
Value	***	***	***	***	***	***	***	***	***
Unit value	***	***	***	***	***	***	***	***	***
Uncased DRAMs:									
Capacity (1,000 wafers)	1,694	2,041	2,309	1,126	1,351	36.3	20.5	13.1	20.0
Wafer starts (1,000 wafers)	1,650	1,925	2,162	977	1,307	31.0	16.7	12.3	33.8
Capacity utilization (1)	97.4%	94.3%	93.6%	86.7%	96.7%	-3.8%	-3.1%	-0.7%	10.0%
Cased DRAMs:									
Capacity (1,000 units)	***	***	***	***	***	***	***	***	***
Assembly (1,000 units)	***	***	***	***	***	***	***	***	***
Capacity utilization (1)	***	***	***	***	***	***	***	***	***
DRAM modules:									
Capacity (billion bits)	***	***	***	***	***	***	***	***	***
Production (billion bits)	***	***	***	***	***	***	***	***	***
Capacity utilization (1)	***	***	***	***	***	***	***	***	***
Employment data (all DRAM products):									
Production workers	***	***	***	***	***	***	***	***	***
Hours worked (1,000s)	***	***	***	***	***	***	***	***	***
Wages paid ($1,000s)	***	***	***	***	***	***	***	***	***
Hourly wages	***	***	***	***	***	***	***	***	***
Financial data:									
Net sales value	2,869,024	2,768,970	2,280,412	973,220	2,155,577	-20.5%	-3.5%	-17.6%	121.5%
Cost of goods sold (COGS)	2,540,925	2,824,971	3,283,002	1,524,158	2,076,995	29.2%	11.2%	16.2%	36.3%
Gross profit or (loss)	328,099	(56,001)	(1,002,590)	(550,938)	78,582	(2)	(2)	-1690.3%	(2)
Operating expenses	396,198	503,696	526,344	290,407	260,697	32.8%	27.1%	4.5%	-10.2%
Operating income or (loss)	(68,099)	(559,697)	(1,528,934)	(841,345)	(182,115)	2145.2%	721.9%	173.2%	-78.4%
Capital expenditures	2,067,157	2,488,458	2,589,114	1,425,262	706,185	25.2%	20.4%	4.0%	-50.5%
COGS/sales (1)	88.6%	102.0%	144.0%	156.6%	96.4%	55.4%	13.4%	42.0%	-60.2%
Operating income or (loss)/ sales (1)	-2.4%	-20.2%	-67.0%	-86.4%	-8.4%	-64.6%	-17.8%	-46.8%	78.0%

(1) "Reported data" are in percent and "period changes" are in percentage points. (2) Value not calculated due to zero or negative quantity.
Note.--Financial data are reported on a fiscal year basis and may not necessarily be comparable to data reported on a calendar year basis.
Source: Compiled from data submitted in response to Commission questionnaires.

APPENDIX D

GLOSSARY OF TERMS

GLOSSARY OF TERMS[1]

Access time.--Time interval between the instant that a piece of information is sent and the instant it returns.

Assembly.--The series of operations after fabrication in which the wafer is separated into individual chips and mounted and connected to a package.

Bit.--Short for "Binary Digit." The smallest piece of data (a "1" or "0") that a computer recognizes. Combinations of 1s and 0s are used to represent characters and numbers.

Byte.--A number of bits, usually eight, that represent one numeric or alphabetic character.

Cased DRAM.--DRAMs that have undergone both the fabrication and assembly/test stages. At this point, the individual DRAMs have been separated from the wafer, electrically tested, and encapsulated into a package. The package is usually of molded plastic and includes a lead frame and metal leads which will allow the DRAM to be physically attached to a printed circuit board with other components to form a finished product.

Chip.--A single piece of semiconductor material onto which specific electrical circuits have been fabricated; refers to a semiconductor that has not yet been packaged. Also called a "die."

CMOS (complementary metal oxide semiconductor).--Negative and positive channel MOS transistors on the same chip.

CPU (central processing unit) or microprocessor.--The computer module in charge of retrieving, decoding, and executing instructions.

CVD (chemical vapor deposition).--A method for depositing some of the layers which function as dielectrics, conductors, or semiconductors. A chemical containing atoms of the material to be deposited reacts with another chemical, liberating the desired material, which deposits on the wafer while by-products of the reaction are removed from the reaction chamber.

Deposition.--Process in which layers are formed as the result of a chemical reaction in which the desired layer material is formed and coats the wafer surface.

Die.--A single piece of semiconductor material onto which specific electrical circuits have been fabricated; refers to a semiconductor that has not yet been packaged. Also called a "chip."

Diffusion.--A process used in semiconductor production which introduces minute amounts of impurities (dopants) into a substrate material such as silicon or germanium and permits the impurity to spread into the substrate. The precess is very dependent on temperature and time.

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[1] Sourced principally from: Peter Van Zant, *Microchip Fabrication: A Practical Guide to Semiconductor Processing* (New York, NY: McGraw-Hill, 1997), pp. 587-605; Commission publications; and Neil Randal, "A RAM Primer," *PC Magazine*, Oct. 21, 1997, pp. 267-268.

Dopant.--An element that alters the conductivity of a semiconductor by contributing either a hole or electron to the conduction process.

DRAM (dynamic random access memory).--Memory device for the storage of digital information. DRAMs store information in a volatile state and require constant electrical refreshing or the information will be lost.

DRAM addressing mode.--The technology used by a specific DRAM device to access its storage cells. Examples are fast page mode (FPM), extended data out (EDO), burst extended data out (BEDO), synchronous (SDRAM), and Rambus (RDRAM). In succession, each of these products has been an improvement over its predecessors in reducing access time and improving communication with the microprocessor.

EDO (extended data out).--A DRAM addressing mode technology. In the DRAM market, EDO replaced fast page mode (FPM) and is currently being supplanted by synchronous DRAMs as well as other newer technologies. See: DRAM addressing mode.

Etch.--A process for removing material in a specific area through a wet or dry chemical reaction or by physical removal, such as by sputter etch.

"Fabless" firms.--"Fabless" companies concentrate on the semiconductor design stage. The fabrication stage is contracted out by the fabless company to a "foundry" producer. The foundry producer fabricates the DRAM, including any prototyping and test run, using the fabless companies' design. The assembly stage is also contracted out by the fabless company and can be conducted by the foundry or by a third party.

Fabrication.--Integrated circuit manufacturing processes.

FPM (fast page mode).--FPM is a DRAM addressing mode. It was replaced in the DRAM market by extended data out (EDO). See: DRAM addressing mode.

Ion implantation.--Introduction of selected impurities (dopants) by means of high-voltage ion bombardment to achieve desired electronic properties in defined areas.

Kilobit.--One thousand (actually 1,024) bits of information.

Lithography.--Process of pattern transfer: when light is utilized, it is termed photolithography; and when patterns are small enough to be measured in microns, it is referred to as microlithography.

Logic.--The circuits used to control operation of integrated circuit devices.

Mask.--A glass plate covered with an array of patterns used in the photomasking process. Each pattern consists of opaque and clear areas that respectively prevent or allow light through. Masks are aligned with existing patterns on silicon wafers and used to expose photoresist. Mask patterns may be formed in emulsion, chrome, iron oxide, silicon, or a number of other opaque materials.

Megabit.--One million (actually 1,048,576) bits of information.

Memory module.--A packaging arrangement consisting of chips mounted on a printed circuit board. Modules are less susceptible to damage during installation than individual chips and require less board space. DRAM modules can easily be "plugged" into and removed from sockets in electronic applications such as desktop computers. In contrast, individual cased DRAMs need to be soldered to a main circuit board in applications and then cannot be easily removed or replaced. Various types of modules include single in-line packages (SIPs), single in-line memory modules (SIMMs), and dual in-line memory modules (DIMMs).

Overall yield.--The percentage of functioning packaged chips from a wafer related to the number of dice mapped onto the wafer. Overall yield is the product of fabrication yield, sort yield, and assembly yields.

Package.--Protective container for a semiconductor chip (generally plastic or ceramic) having electrical leads for external connections.

Photomask.--See definition of Mask.

Photoresist.--The light-sensitive film spun onto wafers and exposed using high-intensity light through a mask. The exposed (or unexposed, depending on its polarity) photoresist is dissolved with developers, leaving a pattern of photoresist which allows etching to take place in some areas while preventing it in others.

RAM (random access memory).--A type of circuitry used in memory integrated circuits. Compared with other types of memory circuitry, RAM provides the fastest capabilities for storing and retrieving digital information. However, RAM circuits are not suited to certain applications because, unlike circuits based on read only memory (ROM) circuitry, they need to be connected to a source of electrical power to retain stored information. They are thus characterized as "volatile" memory circuits. RAM devices temporarily store information.

Reticle.--An exposure mask with only a portion of a complete die pattern.

ROM (read only memory).--A type of circuitry used in memory integrated circuits. ROM circuits are designed only to give back prestored information. This information is specifically designed into the chip memory array during fabrication. Unlike random access memory (RAM) circuitry, ROM circuits store information permanently and do not need to be recharged. They are thus characterized as "nonvolatile" memory circuits. However, they provide slower capabilities for storing and retrieving information than RAM circuits.

Semiconductor.--An electronic device whose main functioning part is made from a material (usually silicon, the "semiconductor") whose conductivity ranges between that of a conductor and that of an insulator. Semiconductor devices achieve amplification and rapid on-off switching by moving electronic charges along controlled paths inside a solid block of semiconductor material (hence the name "solid state").

SGRAM (synchronous graphics RAM).--A specialty variety of DRAM. SGRAM is DRAM optimized for use in graphics applications. It is constructed with a "dual bank" feature which allows it to access two memory pages simultaneously, thereby speeding performance.

Silicon.--A nonmetallic element used in the semiconductor industry as a substrate for multiple layers of material, built to form electrical circuits. Silicon is grown from a crystal to form a cylinder-shaped "log." Slicing the logs into sections about 1/40 of an inch thick creates bare wafers.

SRAM (static random access memory).--Fast read-write memory cell based on transistors that is volatile in nature but does not require constant electrical refreshing.

Substrate.--The underlying material upon which a device, circuit, or epitaxial layer is fabricated.

Transistor.--A semiconductor device that uses a stream of charge carriers to produce active electronic effects. The name was coined from the electrical characteristic of "transfer resistance."

Uncased DRAM.--DRAMs that have completed the fabrication stage but have not yet undergone assembly and final testing. Uncased DRAMs may still be incorporated on a wafer or may have been separated into individual chips. Many companies that perform fabrication, which is extremely capital intensive, contract out the more labor intensive assembly and test stages to locations in Southeast Asia.

Video graphics adapter (VGA).--A board or card that plugs into a computer which allows the computer's software to communicate display information to the monitor. Typical video adapters include VGA, super VGA, and Hercules.

Volatile memory circuit.--A memory circuit that loses its data when power to the chip is lost.

VRAM (video RAM).--VRAM is a specialty variety of DRAM. VRAM is optimized for use in video applications. VRAM is constructed with two access ports (regular DRAM has only one), which allows for faster memory performance.

Wafer.--A thin, usually round slice of a semiconductor material, from which chips are made.

Wafer fabrication.--The series of manufacturing operations in which the circuit or device is put in and on the wafer.

WRAM (Windows RAM).--WRAM is a specialty variety of DRAM. WRAM is optimized in graphics applications. WRAM is constructed with a second access port (regular DRAM has only one) and a double-buffering data system, which allows for faster performance.

APPENDIX E

ADDITIONAL QUESTIONNAIRE DATA ON U.S. PRODUCTION, SHIPMENTS, IMPORTS, AND CONSUMPTION OF DRAMS AND DRAM MODULES, BY SOURCE OF DICE

Table E-1
Uncased DRAMs: U.S. capacity, wafer starts, production, and capacity utilization, by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-2
Uncased 16 and 64 Mb DRAMs: Production, capacity, and capacity utilization, by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-3
Cased DRAMs: U.S. capacity, assembly, production, and capacity utilization, by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-4
DRAM modules: U.S. capacity, production and capacity utilization, by firms, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-5:
DRAMs and DRAM modules: U.S. imports, by sources and by origin of dice, 1996-98, Jan-June 1998, and Jan-June 1999

* * * * * * *

Table E-6
DRAMs and DRAM modules: U.S. shipments of "domestic" product, U.S. shipments of "imported" product, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-7
DRAMs and DRAM modules: Apparent U.S. consumption and market shares for "domestic" and "imported" products, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-8
One megabit cased commodity DRAMs: Domestic commercial shipments of "domestic" and "imported" product, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-9
One megabit cased commodity DRAMs: Apparent U.S. consumption and market shares for "domestic" and "imported" products, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-10
Four megabit cased commodity DRAMs: Domestic commercial shipments of "domestic" and "imported" products, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-11
Four megabit cased commodity DRAMs: Apparent U.S. consumption and market shares for "domestic" and "imported" products, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-12
Sixteen megabit cased commodity DRAMs: Domestic commercial shipments of "domestic" and "imported" products, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-13
Sixteen megabit cased commodity DRAMs: Apparent U.S. consumption and market shares for "domestic" and "imported" products, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-14
Sixty-four megabit cased commodity DRAMs: Domestic commercial shipments of "domestic" and "imported" products, and apparent U.S. consumption 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-15
Sixty-four megabit cased commodity DRAMs: Apparent U.S. consumption and market shares for "domestic" and "imported" products, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-16
DRAM modules: Domestic commercial shipments of "domestic" and "imported" products, and apparent U.S. consumption, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-17
DRAM modules: Apparent U.S. consumption and market shares for "domestic" and "imported" products, 1996-98, Jan.-June 1998, and Jan.-June 1999

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Table E-18
DRAMs from Taiwan: U.S. commercial sales of cased commodity DRAMs and modules in millions of dollars, and share of total sales by source; by density, 1996-98 and interim 1999

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Table E-19
DRAMs from Taiwan: DRAMs fabricated by domestic producers and imported Taiwan-fabricated DRAMs, by density and year, 1996-98 and interim 1999 (thousands of DRAMs, including specialty and commodity DRAMs)

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APPENDIX F

COMPAS PRESENTATION

Table F-1

DRAMs from Taiwan

COMPAS ver. 1.4 (DUMPING) -- THE EFFECTS OF LTFV PRICING OF IMPORTS (6/1/93)

by Joseph Francois and Keith Hall, Office of Economics, USITC

Sales to Original Equipment Manufacturers

INPUTS (in percentages)	11/08	Taiwan		From:	To:
Margin:	21.35		Substitution Elast.		
Domestic Share:	27.85		Domsetic/Unfair:	1	3
Unfair Import Share:	2.37		Domestic/Fair:	5	10
Ave. U.S. Tariff Rate:	0		Unfair/Fair:	1	3
Transportation Ratio:	0.39		Aggregate Demand Elast:	0.3	0.7
Domestic Content:	0		Domestic Supply Elast:	0.3	0.5
Dom. Capacity Util:	93.62		Fair Supply Elast:	3	5

	Estimated Impact of Dumping on U.S. Market (as percent of "fair" values)								But-for
SCENARIOS	#1	#2	#3	#4	#5	#6	#7	#8	Imports:
Domestic Price:	-0.2%	-0.1%	-0.1%	-0.1%	-0.6%	-0.4%	-0.4%	-0.3%	-1.8%
Domestic Output:	-0.1%	-0.1%	-0.0%	-0.0%	-0.2%	-0.2%	-0.1%	-0.2%	-0.6%
Domestic Revenue:	-0.2%	-0.2%	-0.1%	-0.1%	-0.8%	-0.6%	-0.6%	-0.5%	-2.4%
"BUT-FOR" ESTIMATIONS									
Domestic Share:	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%	27.9%	27.9%	28.5%
Unfair Import Share:	2.4%	2.4%	2.4%	2.4%	1.6%	1.6%	1.6%	1.6%	--
Fair Share:	69.8%	69.8%	69.8%	69.8%	70.5%	70.5%	70.5%	70.5%	71.5%
Capacity Utilization:	93.7%	93.7%	93.6%	93.6%	93.8%	93.8%	93.7%	93.8%	94.1%

ERRORS

complementary goods?

but-for imports?

Estimated Impact of Dumping on Imports (as a percentage of "fair" values)

Unfair Import Price:	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	--
Unfair Import Output:	20.8%	20.8%	21.1%	21.1%	73.8%	74.6%	75.0%	75.5%	--
Unfair Import Revenue:	-0.4%	-0.4%	-0.2%	-0.1%	43.3%	44.0%	44.3%	44.7%	--
Fair Import Price:	-0.1%	-0.1%	-0.0%	-0.0%	-0.5%	-0.3%	-0.3%	-0.2%	-0.6%
Fair Import Output:	-0.4%	-0.4%	-0.1%	-0.1%	-1.4%	-1.5%	-1.0%	-1.1%	-1.8%
Fair Import Revenue:	-0.5%	-0.5%	-0.2%	-0.2%	-1.8%	-1.8%	-1.4%	-1.4%	-2.4%

INPUTS									But-for
SCENARIOS	#1	#2	#3	#4	#5	#6	#7	#8	Imports:
ELASTICITIES OF SUBSTITUTION									
Dom/Unfair Imports:	1	1	1	1	3	3	3	3	--
Dom/Fair Imports:	5	5	5	5	10	10	10	10	--
Unfair/Fair Imports:	1	1	1	1	3	3	3	3	--
Domestic Supply Elast:	0.3	0.5	0.3	0.5	0.3	0.5	0.3	0.5	0.3
Fair Import Supply Elast:	3	5	3	5	3	5	3	5	3
Aggregate Demand Elast:	-0.30	-0.30	-0.70	-0.70	-0.30	-0.30	-0.70	-0.70	--

CALCULATED FROM INPUTS									
Domestic Demand Elast:	-3.6	-3.6	-3.7	-3.7	-7.1	-7.1	-7.2	-7.2	
Unfair Demand Elast:	-1.0	-1.0	-1.0	-1.0	-2.9	-2.9	-2.9	-2.9	
Fair Demand Elast:	-1.6	-1.6	-1.9	-1.9	-3.1	-3.1	-3.3	-3.3	
Cross Price Elasticities									
Dom/Unfair Import:	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	
Dom/Fair Import:	3.3	3.3	3.0	3.0	6.8	6.8	6.5	6.5	
Fair /Unfair Import:	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	
Fair Import/Dom:	1.3	1.3	1.2	1.2	2.7	2.7	2.6	2.6	
Unfair Import/Dom:	0.2	0.2	0.1	0.1	0.8	0.8	0.6	0.6	
Unfair/Fair Import:	0.5	0.5	0.2	0.2	1.9	1.9	1.6	1.6	
Adu:	0.004257 9403272 3773	0.00405 0045773 57339	0.001774 1070203 2363	0.001689 7793305 0515	0.008609 3116183 3263	0.00838 3719939 99463	0.007225 5618666 3662	0.00703 8952486 10224	
Adf:	0.841747 8344562 08	0.80064 9374427 83	0.748703 1053110 93	0.713115 3969555 45	0.910665 7786926 6	0.88680 3403798 157	0.860219 6432950 47	0.83800 3370329 479	
Afd:	0.282983 1760183 68	0.19756 1255384 467	0.244165 7525700 05	0.173440 8356095 74	0.445384 0117122 58	0.33494 1429109 881	0.408231 6188987 1	0.31038 7845494 55	
Afu:	0.003586 6082662 781	0.00250 3946848 10597	0.001449 6417692 5618	0.001029 7393354 633	0.010549 9353715 477	0.00793 3851098 01821	0.008591 6123419 1181	0.00653 2399551 32446	
ln(Pd):	0.2%	0.1%	0.1%	0.1%	0.6%	0.4%	0.4%	0.3%	1.8%
ln(Pu):	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	--
ln(Pf):	0.1%	0.1%	0.0%	0.0%	0.5%	0.3%	0.3%	0.2%	0.6%
ln(Qd):	0.1%	0.1%	0.0%	0.0%	0.2%	0.2%	0.1%	0.2%	0.6%
ln(Qu):	-18.9%	-18.9%	-19.1%	-19.1%	-55.3%	-55.7%	-56.0%	-56.2%	--
ln(Qf):	0.4%	0.4%	0.1%	0.1%	1.4%	1.5%	1.0%	1.1%	1.8%

CALCULATED VALUES FROM ABOVE			
		CIF U.S. Margin:	21.3%
Margin:	21.4%	Ave. U.S. Tariff Rate:	0.0%
Domestic Share:	27.9%	Transportation Ratio:	0.4%
Unfair Import Share:	2.4%	Domestic Content:	0.0%
Fair Import Share:	69.8%	Capacity Utilization:	93.6%

Table F-2
DRAMs from Taiwan

COMPAS ver. 1.4 (DUMPING) -- THE EFFECTS OF LTFV PRICING OF IMPORTS (6/1/93)
by Joseph Francois and Keith Hall, Office of Economics, USITC

Sales other than to Original Equipment Manufacturers
INPUTS (in percentages) 11/08 Taiwan From: To:

Margin:	21.35	Substitution Elast.		
Domestic Share:	27.85	Domsetic/Unfair:	3	5
Unfair Import Share:	14.2	Domestic/Fair:	5	10
Ave. U.S. Tariff Rate:	0	Unfair/Fair:	3	5
Transportation Ratio:	0.39	Aggregate Demand Elast:	0.3	0.7
Domestic Content:	0	Domestic Supply Elast:	0.3	0.5
Dom. Capacity Util:	93.62	Fair Supply Elast:	1	3

Estimated Impact of Dumping on U.S. Market (as percent of "fair" values)

SCENARIOS	#1	#2	#3	#4	#5	#6	#7	#8	But-for Imports:
Domestic Price:	-5.5%	-3.5%	-3.8%	-2.7%	-7.5%	-4.8%	-5.8%	-4.0%	-11.1%
Domestic Output:	-1.7%	-1.8%	-1.2%	-1.3%	-2.3%	-2.4%	-1.8%	-2.0%	-3.5%
Domestic Revenue:	-7.0%	-5.2%	-4.9%	-4.0%	-9.6%	-7.1%	-7.4%	-5.9%	-14.2%
"BUT-FOR" ESTIMATIONS									
Domestic Share:	28.4%	28.2%	28.6%	28.4%	28.6%	28.1%	28.9%	28.5%	32.5%
Unfair Import Share:	11.1%	10.6%	10.8%	10.5%	9.3%	8.3%	8.8%	8.1%	--
Fair Share:	60.5%	61.2%	60.6%	61.1%	62.1%	63.6%	62.3%	63.4%	67.5%
Capacity Utilization:	95.2%	95.3%	94.7%	94.9%	95.8%	96.0%	95.3%	95.5%	97.0%

ERRORS
complementary goods?
but-for imports?

Estimated Impact of Dumping on Imports (as a percentage of "fair" values)

Unfair Import Price:	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	-17.5%	--
Unfair Import Output:	47.0%	55.2%	56.1%	60.6%	70.8%	94.2%	89.0%	104.9%	--
Unfair Import Revenue:	21.2%	28.0%	28.8%	32.5%	40.8%	60.2%	55.9%	69.0%	--
Fair Import Price:	-4.8%	-2.4%	-3.3%	-1.8%	-7.0%	-3.9%	-5.4%	-3.2%	-7.4%
Fair Import Output:	-4.8%	-7.0%	-3.3%	-5.3%	-7.0%	-11.1%	-5.4%	-9.2%	-7.4%
Fair Import Revenue:	-9.4%	-9.2%	-6.5%	-7.0%	-13.5%	-14.5%	-10.5%	-12.1%	-14.2%

INPUTS

SCENARIOS	#1	#2	#3	#4	#5	#6	#7	#8	But-for Imports:
ELASTICITIES OF SUBSTITUTION									
Dom/Unfair Imports:	3	3	3	3	5	5	5	5	--
Dom/Fair Imports:	5	5	5	5	10	10	10	10	--
Unfair/Fair Imports:	3	3	3	3	5	5	5	5	--
Domestic Supply Elast:	0.3	0.5	0.3	0.5	0.3	0.5	0.3	0.5	0.3
Fair Import Supply Elast:	1	3	1	3	1	3	1	3	1
Aggregate Demand Elast:	-0.30	-0.30	-0.70	-0.70	-0.30	-0.30	-0.70	-0.70	--

CALCULATED FROM INPUTS									
Domestic Demand Elast:	-3.4	-3.4	-3.5	-3.5	-6.6	-6.6	-6.7	-6.7	
Unfair Demand Elast:	-2.6	-2.6	-2.7	-2.7	-4.3	-4.3	-4.4	-4.4	
Fair Demand Elast:	-2.0	-2.0	-2.2	-2.2	-3.7	-3.7	-3.9	-3.9	
Cross Price Elasticities									
Dom/Unfair Import:	0.4	0.4	0.3	0.3	0.7	0.7	0.6	0.6	
Dom/Fair Import:	2.7	2.7	2.5	2.5	5.6	5.6	5.4	5.4	
Fair /Unfair Import:	0.4	0.4	0.3	0.3	0.7	0.7	0.6	0.6	
Fair Import/Dom:	1.3	1.3	1.2	1.2	2.7	2.7	2.6	2.6	
Unfair Import/Dom:	0.8	0.8	0.6	0.6	1.3	1.3	1.2	1.2	
Unfair/Fair Import:	1.6	1.6	1.3	1.3	2.7	2.7	2.5	2.5	
Adu:	0.103424 5559137 32	0.09813 0302913 9633	0.085532 0876271 786	0.081275 1185158 457	0.096885 4112984 591	0.09415 1836412 2423	0.087229 1944942 464	0.08480 6144487 1145	
Adf:	0.734721 6789630 57	0.69711 1631537 861	0.652581 5448676 82	0.620102 2782416 11	0.816013 5296978 32	0.79299 0103758 879	0.769912 6422331 59	0.74852 6031430 774	
Afd:	0.437432 1185690 18	0.26219 1152463 269	0.371431 2299365 73	0.229233 4638170 8	0.578611 4353641 69	0.40508 4834716 63	0.528511 5239815 13	0.37533 4207647 106	
Afu:	0.128126 7231440 17	0.07679 7500175 2682	0.101298 0165314 89	0.062517 3473196 597	0.142947 4067489 85	0.10007 7224708 908	0.124595 7168946 98	0.08848 4418134 5236	
ln(Pd):	5.6%	3.6%	3.9%	2.7%	7.8%	4.9%	6.0%	4.1%	11.8%
ln(Pu):	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%	--
ln(Pf):	4.9%	2.4%	3.4%	1.8%	7.3%	3.9%	5.5%	3.2%	7.7%
ln(Qd):	1.7%	1.8%	1.2%	1.3%	2.3%	2.5%	1.8%	2.0%	3.5%
ln(Qu):	-38.5%	-44.0%	-44.6%	-47.4%	-53.5%	-66.4%	-63.7%	-71.7%	--
ln(Qf):	4.9%	7.3%	3.4%	5.5%	7.3%	11.8%	5.5%	9.7%	7.7%

CALCULATED VALUES FROM ABOVE		CIF U.S. Margin:	21.3%
Margin:	21.4%	Ave. U.S. Tariff Rate:	0.0%
Domestic Share:	27.9%	Transportation Ratio:	0.4%
Unfair Import Share:	14.2%	Domestic Content:	0.0%
Fair Import Share:	58.0%	Capacity Utilization:	93.6%

APPENDIX G

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

Table G-1
DRAMs: U.S. imports[1] for consumption of cased DRAMs, regardless of density, by principal sources, 1996-98, Jan.-June 1998, and Jan.-June 1999

Item	Calendar year			January-June	
	1996	1997	1998	1998	1999
Volume (*1,000 units*)					
Korea	255,045	287,161	327,770	167,997	146,181
Japan	240,428	269,274	215,427	105,156	100,882
Singapore	108,530	158,416	157,234	94,156	39,618
Canada	73,879	63,411	46,012	29,654	13,304
Malaysia	63,033	60,010	25,099	14,826	8,414
Taiwan	**73,876**	**123,825**	**164,198**	**86,721**	**91,292**
Germany	25,175	50,988	53,395	31,561	20,834
Italy	11,738	21,571	12,792	9,966	5,312
Total, all sources	910,808	1,088,771	1,076,954	577,340	442,640
Value (*1,000 dollars*)					
Korea	2,755,681	2,099,430	1,448,384	695,447	877,676
Japan	2,352,238	1,718,183	1,060,307	470,882	747,287
Singapore	1,104,742	820,069	498,362	267,433	218,340
Canada	854,257	611,582	679,720	430,481	192,690
Malaysia	528,065	228,424	80,993	37,948	56,559
Taiwan	**356,621**	**443,715**	**485,994**	**249,200**	**322,173**
Germany	174,002	206,106	143,878	76,632	87,148
Italy	107,873	89,533	43,790	32,660	30,000
Total, all sources	8,536,211	6,425,263	4,628,239	2,347,817	2,593,268

[1] HTS items 8542.13.8021 through 8542.13.8034.

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

APPENDIX H

PRICE GRAPHS

Figure H-1
DRAMs: Price trends of U.S. producers and importers of product 1 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-2
DRAMs: Price trends of U.S. producers and importers of product 1 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

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Figure H-3
DRAMs: Price trends of U.S. producers and importers of product 2 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-4
DRAMs: Price trends of U.S. producers and importers of product 2 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

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Figure H-5
DRAMs: Price trends of U.S. producers and importers of product 3 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-6
DRAMs: Price trends of U.S. producers and importers of product 3 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

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Figure H-7
DRAMs: Price trends of U.S. producers and importers of product 4 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-8
DRAMs: Price trends of U.S. producers and importers of product 4 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

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Figure H-9
DRAMs: Price trends of U.S. producers and importers of product 5 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-10
DRAMs: Price trends of U.S. producers and importers of product 5 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

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Figure H-11
DRAMs: Price trends of U.S. producers and importers of product 6 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-12
DRAMs: Price trends of U.S. producers and importers of product 6 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

* * * * * * *

Figure H-13
DRAMs: Price trends of U.S. producers and importers of product 7 fabricated in Taiwan and margins of under/overselling, sales to OEMs

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Figure H-14
DRAMs: Price trends of U.S. producers and importers of product 7 fabricated in Taiwan and margins of under/overselling, sales to non-OEMs

* * * * * * *

Figure H-15
DRAMs: Average price of product 8, sales by domestic producers to OEMs

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Figure H-16
DRAMs: Average price of product 8, sales by domestic producers to non-OEMs

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APPENDIX I

RESULTS OF OPERATIONS, CAPITAL EXPENDITURES, RESEARCH AND DEVELOPMENT EXPENSES, AND INVESTMENT IN PRODUCTIVE FACILITIES OF FABLESS PRODUCER

DRAM FABLESS PRODUCER OPERATIONS

The DRAM fabless producer operations of *** are presented in table I-1.[1]

Table I-1
Results of DRAM fabless producer operations of ***, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

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

The U.S. fabless producer's capital expenditures and research and development expenditures are presented in table I-2.

Table I-2
Capital expenditures, research and development expenditures, and assets utilized by the U.S. DRAM fabless producer, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

[1] The fiscal yearend of ***.

APPENDIX J

RESULTS OF OPERATIONS, CAPITAL EXPENDITURES, RESEARCH AND DEVELOPMENT EXPENSES, AND INVESTMENT IN PRODUCTIVE FACILITIES OF MODULE ASSEMBLERS

DRAM MODULE ASSEMBLER OPERATIONS

The U.S. DRAM module assembly operations are presented in table J-1.[1]

Table J-1
Results of U.S. DRAM module assembly operations, calendar years 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

Selected financial data, by firm, are presented in table J-2. The only operating loss period of the two producers is for ***.

Table J-2
Selected financial data of U.S. DRAM module assemblers, by firm, calendar years 1996-98, Jan.-June 1998, and Jan.-June 1999

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

The U.S. module assemblers' capital expenditures, research and development expenditures, and the value of their fixed assets are presented in table J-3.

Table J-3
Capital expenditures, research and development expenditures, and assets utilized by the U.S. DRAM module assemblers, calendar years 1996-98, Jan.-June 1998, and Jan.-June 1999

* * * * * * *

[1] *** have the calendar year as the end of their fiscal year.

APPENDIX K

DOMESTIC VALUE ADDED FOR DRAM PRODUCERS, THE FABLESS PRODUCER, AND A MODULE ASSEMBLER

DOMESTIC VALUE ADDED DETAIL COMPUTATIONS

The producers that fabricate dice in the United States, the fabless producer, and a module assembler provided their domestic value added to 16 Mb and 64 Mb DRAMs on a per-unit basis for their last full year of production and their source[1] of production costs. The detail computations[2] are shown on the following pages.

DOMESTIC VALUE ADDED PER DRAM

* * * * * * *

[1] The abbreviations used for the source countries are Canada - CN, France - FR, Germany - GRM, Italy - IT, Japan - JN, Singapore - SNG, Taiwan - TWN, United States - US, and worldwide - WW.

[2] Some of the producers combined production processes, e.g., testing/marking may include assembly.

APPENDIX L

CAPITAL EXPENDITURES BY PRODUCTION STAGE

CAPITAL EXPENDITURES BY STAGE OF PRODUCTION BY PRODUCER

Four producers provided capital expenditures by stage of production. The values and percent by stage and by firm are presented in table L-1.

Table L-1
Capital expenditures of U.S. producers, by production stage and by firm, fiscal years 1996-98, Jan.-June 1998, and Jan.-June 1999

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APPENDIX M

EFFECTS OF IMPORTS ON PRODUCERS' EXISTING DEVELOPMENT AND PRODUCTION EFFORTS, GROWTH, INVESTMENT, AND ABILITY TO RAISE CAPITAL

Responses of U.S. producers to the following questions:

1. Since January 1, 1996, 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 investments as a result of imports of DRAMs of 1 Meg or above or any DRAM modules from Taiwan?

* * * * * * *

2. Does your firm anticipate any negative impact of imports of DRAMs of 1 Meg or above or any DRAM modules from Taiwan?

* * * * * * *

APPENDIX N

INFORMATION ON TAIWAN PRODUCERS' FUTURE CAPACITY FOR THE PRODUCTION OF DRAMS

Petitioner's company-specific capacity/production allegations			
Producer	**Capacity utilization**	**Die shrinks**	**New/upgraded facilities**
Nan Ya	Fab 1: Will increase production from 22,000 to rated capacity of 30,000 wafers/month in 1999.	Fab 1: During 1999, converted from 0.280 to 0.200 technology, and plans to introduce 0.175 technology by the end of the year (through a technology licensing agreement).	Fab 2: $1.2 billion 8-inch DRAM fab with 30,000 wafers/month capacity. Will offer 500 million new shares in Nov. 1999 for purchase of any remaining equipment. Mass production to begin in June 2000 using 0.175 micron technology.
Pacific Semiconductor			Broke ground on 30,000 wafers/year facility utilizing 0.15 micron technology licensed from IBM. Production to begin in 2nd half 2000.
Powerchip	Will increase production from 20,000 wafers/month in October 1998 to 30,000 in 1999-2000.	Fab 1: Began production in 1996. Began production of 128 Mb DRAMs in March 1999 based on 0.200 technology that will upgrade to 0.180 by end of 1999. In 2nd half 1999, will start production of 64 Mb DRAMs using 0.180 technology (doubling the company's capacity).	
ProMos	Produced 36 million units of 64 Mb DRAMs in 1998. Increased 1999 forecast from 105 to 113 million units. Between 2nd and 4th quarters 1999, to increase 64 Mb DRAM units/quarter from 22.73 to 34.21 million. By end of 1999, projected to produce more 64s than any Japanese producer.		

Petitioner's company-specific capacity/production allegations			
Producer	**Capacity utilization**	**Die shrinks**	**New/upgraded facilities**
TSMC	In 1999 DRAMs will make up 25% of total production, up from 6% in 1998.	Largest foundry in the world. Plans in 1999 to increase production of 0.250 micron and lower DRAMs.	6th semiconductor fab to open in 2nd half 1999 with 60,000 wafers/month capacity.
Utek			Will spend NT$7 billion to increase wafers/month capacity from 14,000 to 22,000 between May and year-end 1999.
Vanguard (64 and 128 Mb)	Fab 1B: Current production of 32,000 wafers/month will be increased to rated capacity of 40,000.	Fab 1B: Began production in 1996. Will shift from 0.210 to 0.190 technology through end of 1999 (20 percent increase). At beginning of 2000, will use Mitsubishi-licensed technology to upgrade to 0.180 (and increase capacity an additional 20 percent).	Fab 1C: Production will begin in 2000 at a facility with a capacity of 25,000 wafer starts per month.
Winbond (64 and 128 Mb)		Fab 4: Began production late 1998. In 1999 spent $313 million upgrading from 0.250 to 0.200 micron, and increased 64 Mb chips from 4 to 5.6 million/month. Shifting to 0.175 micron at the end 1999. Fab 5: Producing 7,000 wafers/month (64 and 128 Mb DRAMs) until end of 1999, and 15,000 in 2000 using 0.200 technology.	
Source: Petitioner's prehearing brief, pp. 67-72 and 75-76, and public hearing transcript, pp. 38-40.			

Respondent's company-specific capacity/production rebuttal	
Producer	**Decreases in DRAMs capacity**
Mosel-Vitelic	Transferring its memory fab primarily to non-memory. No longer produces DRAMs; just buys/sells with ProMos.
Nan Ya	Has slowed down its plant expansion and transferred capacity from DRAMs to logic and other non-memory devices. Petitioner mischaracterizes the article provided in its prehearing brief: the 30,000 wafers/month in the new 8-inch fab is for non-DRAM products. Nan Ya ***.
Pacific Semiconductor	The one-paragraph news clipping that petitioner cites about a new Taiwan facility does not even mention DRAMs but rather appears to reference all of PSMC's semiconductor products. Petitioner offers no other evidence that PSMC, which is an upstart foundry, has any intentions to produce significant volumes of DRAMs. PSMC is a foundry still in the process of its fab buildup. It will have the capability to produce a variety of semiconductor products, and the healthy market for non-memory semiconductors suggests that PSMC will focus to a large degree on these products.
Powerchip	Has deferred investment in new DRAM production facilities and has also shipped some existing capacity to logic and non-memory products. Although it ***. ***.
ProMos	Cites Electronic Buyer's News: Due to the severe depression of the DRAM market in 1998 and early 1999, was forced in May to postpone the Phase II ramp up plan alleged by petitioner. It is ***. ***. The current 64 Mb DRAM production level of ProMos is about ***. ***. Micron's quarterly capacity is 188.4 million units of 64 Mb SDRAMs per quarter.
TSMC	As a result of TSMC's merger with Acer, Acer will be converted to a foundry dedicated to non-DRAM products. TSMC reports that ***. The article cited by petitioner was subsequently corrected to fix inaccuracies. A TSMC spokesman announced that TSMC has no plans to increase its DRAMs capacity as reported. ***.
Utek	Petitioner misstates article. It says that Utek is shifting from producing DRAM chips to producing DRAM wafers for UMC, not that Utek is shifting from other semiconductor products to DRAM chips or DRAM wafers. Moreover, petitioner fails to notify the Commission that Utek is a foundry with the capability to produce wafers from a variety of semiconductor products. The healthy market for non-memory semiconductors suggests that Utek will focus to a large degree on these other products rather than shift significant amounts of its production capacity to the production of DRAMs. Petitioner's article actually talks about the troubled operating condition of Utek.
Vanguard	Has converted 10,000 of its 30,000 per month total capacity to logic products. Has a contract with TSMC under which it will provide about 1/3 of its capacity to TSMC for logic foundry products. Currently has the capacity to produce *** wafers/month. The capacity increase of the current fab to which Micron's economist refers ***. ***. Vanguard's comment in its questionnaire response that it ***. Vanguard is investing in a new fab; however, this investment of about USD 1.2 billion will occur over the next 4 years. Construction will not commence until 2000, completion not likely until 2003, with trial productions thereafter.
Winbond	Contrary to the assertions of petitioner, ***. ***. Winbond ***. ***.

Respondent's company-specific capacity/production rebuttal	
Producer	**Decreases in DRAMs capacity**
***	***.
Source: Respondents' prehearing brief, pp. 43-44, public hearing transcript, pp. 138-39, and exhibit 10 of respondents' posthearing brief.	

Responses from foreign producer questionnaires regarding future capacity/production plans	
Company	**Plans**
Etron	***.
Mosel-Vitelic	***.
Nan Ya	***.
Powerchip	***.
Taiwan Memory Technology	***.
TASMC (formerly Acer)	***.
TSMC	***.
Vanguard	***.
Winbond	***.
Source: Compiled from responses to U.S. International Trade Commission questionnaires.	

APPENDIX O

ADDITIONAL DATA ON FOREIGN PRODUCERS' CAPACITY, PRODUCTION, INVENTORIES, CAPACITY UTILIZATION, AND SHIPMENTS

Table O-1
Uncased DRAMs ≥ 1 Mb: Taiwan's capacity, wafer starts, production, inventories, capacity utilization, and shipments, 1996-98, Jan.-June 1998, Jan.-June 1999, and projected 1999-2000

Item	Calendar years			January-June		Projected	
	1996	1997	1998	1998	1999	1999	2000
Quantity (*billion bits, except where specified*)							
Capacity (1,000 wafers)	1,197	1,794	1,793	914	919	1,888	1,832
Wafer starts (1,000 wafers)	1,170	1,712	1,539	780	949	1,864	1,839
Production	1,516,304	4,122,229	6,879,469	2,259,951	7,633,942	16,367,974	24,205,664
End-of-period inventories	21,820	36,170	80,419	122,104	187,198	76,739	26,505
Home market shipments							
Transfers to make cased DRAMs	***	***	***	***	***	***	***
Other company transfers	***	***	***	***	***	***	***
Other shipments	***	***	***	***	***	***	***
Total home market	***	***	***	***	***	***	***

Continued.

Table O-1--Continued
Uncased DRAMs ≥ 1 Mb: Taiwan's capacity, wafer starts, production, inventories, capacity utilization, and shipments, 1996-98, Jan.-June 1998, Jan.-June 1999, and projected 1999-2000

Item	Calendar years			January-June		Projected	
	1996	1997	1998	1998	1999	1999	2000
Exports to							
The United States	***	***	***	***	***	***	***
All other markets	***	***	***	***	***	***	***
Total exports	***	***	***	***	***	***	***
Total shipments	1,496,522	4,107,877	6,838,842	2,173,836	7,543,911	16,355,649	24,251,623
Ratios *(percent)*							
Capacity utilization	97.75	95.42	85.86	85.30	103.23	98.73	100.40
Inventories to production	1.44	0.88	1.17	2.70	1.23	0.47	0.11
Inventories to all shipments	1.46	0.88	1.18	2.81	1.24	0.47	0.11
Share of total quantity of shipments *(percent)*							
Home market							
Transfers to make cased DRAMs	***	***	***	***	***	***	***
Other company transfers	***	***	***	***	***	***	***
Other shipments	***	***	***	***	***	***	***
Total home market	***	***	***	***	***	***	***
Exports to							
The United States	***	***	***	***	***	***	***
All other markets	***	***	***	***	***	***	***

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

Table O-2
Cased DRAMs ≥ 1 Mb: Taiwan's capacity, production, inventories, capacity utilization, and shipments, 1996-98, Jan.-June 1998, Jan.-June 1999, and projected 1998-99

Item	Calendar years			January-June		Projected	
	1996	1997	1998	1998	1999	1999	2000
Quantity *(billion bits except where specified)*							
Capacity *(1,000 units)*	220,782	330,157	405,064	201,957	212,645	402,327	366,543
Assembly *(1,000 units)*	191,380	307,301	421,012	197,058	242,599	507,780	622,850
Production	1,026,333	3,896,321	7,407,552	2,777,862	7,018,441	17,834,603	39,121,106
End-of-period inventories	48,405	424,633	443,596	594,195	954,071	1,202,522	1,206,568
Home market shipments							
Transfers to produce DRAM modules	***	***	***	***	***	***	***
Other company transfers	***	***	***	***	***	***	***
Other shipments	***	1,174,228	2,795,463	755,297	2,718,293	7,133,284	14,167,150
Total home market	***	1,690,812	3,591,064	1,069,756	3,527,910	9,884,990	19,798,012
Exports to							
The United States	***	433,754	1,863,294	632,010	1,553,310	2,788,275	5,299,543
All other markets	***	1,432,456	1,835,816	803,360	1,282,470	4,423,699	11,418,791
Total exports	563,816	1,866,210	3,699,110	1,435,370	2,835,780	7,211,936	16,718,335
Total shipments	***	3,557,021	7,290,174	2,505,126	6,370,057	17,060,641	36,516,346

Continued.

Table O-2--Continued
Cased DRAMs ≥ 1 Mb: Taiwan's capacity, production, inventories, capacity utilization, and shipments, 1996-98, Jan.-June 1998, Jan.-June 1999, and projected 1999-2000

Item	Calendar years			January-June		Projected	
	1996	1997	1998	1998	1999	1999	2000
Ratios *(percent)*							
Capacity utilization	86.68	93.08	103.94	97.57	114.09	126.21	169.93
Inventories to production	4.72	10.90	5.99	10.70	6.80	6.74	3.08
Inventories to all shipments	***	11.94	6.08	11.86	7.49	7.05	3.30
Share of total quantity of shipments *(percent)*							
Home market							
Transfers to produce DRAM modules	***	***	***	***	***	***	***
Other company transfers	***	***	***	***	***	***	***
Other shipments	***	33.01	38.35	30.15	42.67	41.81	38.80
Total home market	***	47.53	49.26	42.70	55.38	57.94	54.22
Exports to							
The United States	***	12.19	25.56	25.23	24.38	16.34	14.51
All other markets	***	40.27	25.18	32.07	20.13	25.93	31.27

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

Table O-3
DRAM modules: Taiwan's production, inventories, and shipments, 1996-98, Jan.-June 1998, Jan.-June 1999, and projected 1999-2000

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